European Union Aviation Safety Agency

Notice of Proposed Amendment 2024-01

in accordance with Article 6 of MB Decision 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

EXECUTIVE SUMMARY

This NPA puts forward the establishment of a set of acceptable means of compliance (AMC) and guidance material (GM) associated with the proposed — through Opinion No 03/2023 — regulatory framework that addresses new operational and mobility concepts that are based on innovative technologies, such as aircraft with vertical take-off and landing (VTOL) capability, and fosters and promotes their acceptance and adoption by European citizens.

This NPA proposes amendments to existing AMC and GM and the creation of new ones to illustrate the means to show compliance with the operational requirements applicable to manned VTOL-capable aircraft (VCA).

The specific objectives of the proposed amendments are to:

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

— ensure that the 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 application of the regulations on manned VCA;

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

ED DECISIONS TO BE AMENDED	**ED DECISIONS TO BE ISSUED**
— 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 (SERA)	— ED Decision 20XX/XXX/X – AMC & GM to Part-IAM

AFFECTED STAKEHOLDERS

VCA operators; competent authorities (CAs); flight crews; VCA manufacturers; 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

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

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1. About this NPA

1.1. How this regulatory material was developed

The European Union Aviation Safety Agency (EASA) developed this Notice of Proposed Amendment (NPA) to establish a set of AMC and GM associated with the regulations proposed in Opinion No 03/2023[1] with regard to new operational and mobility concepts based on innovative technologies like aircraft with VTOL capability.

This rulemaking activity is included in the 2024 edition of Volume II of the European Plan for Aviation Safety (EPAS) for 2023–2025[2] under Rulemaking Task (RMT).0230 Subtask C#3. Such 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[3] (the Basic Regulation) and the Rulemaking Procedure[4], as well as in accordance with the objectives and working methods described in the Terms of Reference (ToR) for this RMT[5].

When developing the regulatory material EASA received support from several dedicated working groups of experts from the Member State competent authorities and industry, established for each of the affected domains.

1.2. How to comment on this NPA

The draft regulatory material is hereby submitted for consultation of the affected stakeholders.

Please submit your comments using the **Comment-Response Tool (CRT)** available at **http://hub.easa.europa.eu/crt/**[6].

The deadline for the submission of comments is **6 May 2024**.

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1 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).

2 https://www.easa.europa.eu/en/document-library/general-publications/european-plan-aviation-safety-epas-2024

3 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).

4 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).

5 ToR RMT.0230 Issue 4

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

1.3. The next steps

Following the consultation of the draft regulatory material, EASA will review all the comments received with the support of the working groups of experts and will duly consider those comments in the subsequent phases of this rulemaking activity.

Considering the above, following the adoption of the regulations establishing the operational requirements for manned VCA proposed with Opinion No 03/2023, EASA may issue a Decision issuing AMC and GM associated with those amended regulations.

When issuing the Decision, EASA will also provide feedback to the commentators and information to the public on who engaged in the process and/or provided comments during the consultation of the draft regulatory material, which comments were received, how such engagement and/or consultation was used in rulemaking, and how the comments were considered.

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 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. 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 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.

The drivers triggering the need for regulatory activity included:

— 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;

— 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 to EU's industry competitiveness at global level.

2.1.1. Description of the issue

The issues addressed by this regulatory activity include:

— 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 VCA 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 due to the presence of obstacles during navigation (e.g. buildings, barriers, etc.).

  — The risk of damage to critical infrastructures[7].

[7] 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.

- The ground risk also involves the risk associated with ground operations (taxiing, servicing of the aircraft, refuelling/recharging the aircraft, and the risk related to parts departing 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 with manned and unmanned aircraft)
  - The increase in the number of VCA in the 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 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 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 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, 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 actual adoption of the IAM use cases by future users, and also the acceptance of IAM use cases by urban residents.

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

2.1.3. Conclusion on the need for rulemaking

EASA concluded, as explained in Section 2.5 of Opinion No 03/2023, that an intervention was necessary and that non-regulatory actions cannot effectively mitigate and address the issue.

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.

RMT.0230 Subtask C#3 shall particularly contribute to achieving the objectives of Articles 1(1) and (2) of the Basic Regulation, and in particular:

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

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

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

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

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

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

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

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

— ensure that the 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 competent authorities of the EU Member States for the application of the regulations applicable on manned VCA; and

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

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

The following sections address the proposed amendments to the AMC & 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)

EASA Opinion No 03/2023 proposed, among other subjects, to amend Commission Regulation (EU) No 965/2012[8] (Air OPS Regulation) in order to accommodate the implementing rules for VCA operations. The proposed amendments affected the following parts of the Air OPS Regulation:

— Cover regulation;

— Annex I (Definitions);

— Annex II (Part-ARO);

— Annex III (Part-ORO);

— Annex V (Part-SPA).

EASA Opinion No 03/2023 also proposed that a new Annex IX (Part-IAM), dedicated to the IAM operations with VCA, be incorporated into the Air OPS Regulation, similarly to the existing Annexes dedicated to CAT, NCC, NCO and SPO operations.

This NPA proposes the AMC & GM to the draft implementing rules on IAM operations that were published with EASA Opinion No 03/2023.

The AMC & GM were developed with the primary objective of ensuring safe IAM operations taking into account the VCA specificities and expected operational risks, especially in congested (urban) areas. The main concerns regarding IAM operations relate to the pre-flight preparation, selection of vertiports and diversion locations as well as fuel/energy management. Therefore, the main efforts focused on the development of the means to demonstrate compliance with important operational requirements such as:

— the preparation of an operational flight plan for each intended flight in VFR day conditions with the surface in sight;

— the use of adequate vertiports, diversion locations and VEMS[9] operating sites, including the policy and procedures for their selection and the associated documentation. The relevant AMC & GM will assist operators also in complying with weather minima and fuel/energy scheme requirements;

[8] 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).

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

— the use of diversion locations in cross-border operations;

— the 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;

— the establishment of a final fuel/energy reserve amount and 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. For that purpose, the IAM operator should consider the certified minimum performance (CMP) data set of the VCA obtained by considering the effect of single failures and combinations of failures that are not extremely improbable on the nominal performance parameters. If in flight the reserve fuel/energy reserve can no longer be protected, then a fuel emergency should be declared.

2.3.2. Flight crew licensing (FCL)

As regards flight crew licensing, AMC are proposed to illustrate how compliance can be achieved with Article 4f of Regulation (EU) No 1178/2011[10] (as proposed with EASA Opinion No 03/2023).

The draft AMC1 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)). In the context of the latter, additionally theoretical knowledge areas, as relevant for VCA, are highlighted.

The draft AMC1 Article 4f(8)(a) illustrates arrangements for VCA instructor refresher training, mainly by referring to existing AMC for refresher training for type rating instructors and synthetic flight instructors.

2.3.3. Standardised European rules of the air (SERA)

As regards SERA, the AMC & GM are proposed to be amended and complemented with new information in order to provide guidance and clarification on operational aspects as well as terminology.

Firstly, respective amendments are proposed in relation to the term ‘fuel/energy’ referred to in:

— GM1 SERA.11012 Minimum fuel and fuel emergency

— GM2 SERA.11015 Interception

— Appendix 1 to AMC1 SERA.14001 General

— 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)

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

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 is introduced to accommodate new types of energy, other than fuel, used for aircraft propulsion purposes. 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 combination 'fuel/energy', the term 'energy' only refers to the electrical energy used for aircraft propulsion purposes. 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, the new GM1 SERA.5001(***)(b) *VMC visibility and distance from cloud minima* is proposed to clarify that until sufficient safety data related to operations of manned VCA is available, manned VCA should not be operated with less than 1 500 m flight visibility.

As explained in Section 2.3.6.2 of NPA 2022-06[11], 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 operations of manned VCA is paramount.

Finally, 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 change was proposed to point SERA.13001; however, it was considered necessary to add the new GM2 SERA.13001(c) for clarification.

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

3. Expected benefits and drawbacks of the proposed regulatory material

EASA assessed that an intervention was required and that new or amended AMC and GM are necessary to effectively address the issues described in Section 2.1, because the objectives described in Section 2.2 cannot be achieved effectively by non-regulatory action.

The AMC and GM that are proposed in this NPA do not create any impact beyond those that were identified by the proposed amendments to the related Regulations. The assessment of these impacts is presented in NPA 2022-06 and Opinion No 03/2023. They remain valid for the AMC and GM provided here. Please refer to Chapter 4 of NPA 2022-06 and Section 2.5 of Opinion No 03/2023 for details.

4. Proposed regulatory material

Please refer to:

Annex I to NPA 2024-01 — Proposed AMC & GM to AIR OPS

Annex II to NPA 2024-01 — Proposed AMC & GM to FCL

Annex III to NPA 2024-01 — Proposed AMC & GM to SERA

5. Monitoring and evaluation

EASA plans to evaluate the application of the AMC and GM on the opportunity of the meetings with the Advisory Bodies and during the standardisation inspections.

6. Proposed actions to support implementation

In order to support the affected stakeholders in the implementation of the new regulatory material EASA plans to take the following actions:

— 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 workshop/session

— Combination of the above-mentioned actions

Appendix — Quality of the NPA

To continuously improve the quality of its documents, EASA welcomes your feedback on the quality of this document with regard to the following aspects:

Please provide your feedback on the quality of this document as part of the other comments you have on this NPA. We invite you to also provide a brief justification, especially when you disagree or strongly disagree, so that we consider this for improvement. Your comments will be considered for internal quality assurance and management purposes only and will not be published (e.g. as part of the CRD).

1. The regulatory proposal is of technically good/high quality

Please choose one of the options

Fully agree / Agree / Neutral / Disagree / Strongly disagree

2. The text is clear, readable and understandable

Please choose one of the options

Fully agree / Agree / Neutral / Disagree / Strongly disagree

3. The regulatory proposal is well substantiated

Please choose one of the options

Fully agree / Agree / Neutral / Disagree / Strongly disagree

4. The regulatory proposal is fit for purpose (achieving the objectives set)

Please choose one of the options

Fully agree / Agree / Neutral / Disagree / Strongly disagree

5. The regulatory proposal is proportionate to the size of the issue

Please choose one of the options

Fully agree / Agree / Neutral / Disagree / Strongly disagree

6. The regulatory proposal applies the 'better regulation' principles[1]

Please choose one of the options

Fully agree / Agree / Neutral / Disagree / Strongly disagree

7. Any other comments on the quality of this document (please specify)

[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

7. Annex I — Proposed amendments to the AMC & GM to AIR OPS and rationale

The amendments are arranged as follows to show deleted, new and unchanged text:

— deleted text is ~~struck through~~;

— new text is highlighted in blue;

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

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

7.1. Draft GM to Regulation (EU) No 965/2012

GM1 Article 2(14) Definitions

VEMS FLIGHT

(a) A VEMS flight (also referred to as 'VEMS mission') normally starts and ends at the VEMS operating base following tasking by the 'VEMS dispatch centre'. Tasking can also occur when either airborne or on the ground at locations other than the VEMS operating base.

(b) The following elements can be regarded as integral parts of the VEMS mission:

(1) flights to/from a VEMS operating site when initiated by the VEMS dispatch centre;

(2) flights to/from a vertiport/VEMS operating site for the delivery or pick-up of medical supplies and/or persons required for completion of the VEMS mission; and

(3) flights to/from a vertiport/VEMS operating site for refuelling or battery recharging as required for the completion of the VEMS mission.

7.2. Draft GM to Annex I (Definitions) to Regulation (EU) No 965/2012

GM36 Annex I Definitions

GROUND TAXIING OF VCA (Definition (31(b))

Ground taxiing of VCA using a carriage system or equivalent is not considered a critical phase of the flight, as the risk of inadvertent take-off is not present.

GM37 Annex I Definitions

FLIGHT TIME IN THE CASE OF VCA (Definition (50a)(c))

The conditions 'until the moment the aircraft finally comes to rest at the end of the flight and the lift and thrust units are powered off' are cumulative and 'comes to rest' means that the aircraft should be 'parked' and, for example, towing has ended.

GM38 Annex I Definitions

VEMS OPERATING SITE (Definition (139))

Operating sites used in VEMS training are considered VEMS operating sites.

GM39 Annex I Definitions

VERTIPORT (Definition (140))

A vertiport is considered a type of aerodrome.

7.3. Draft AMC & GM to Annex II (Part-ARO)

GM1 ARO.OPS.100(b) Issue of the air operator certificate

AREA OF OPERATION

[…]

(b) The following factors should be taken into account when deciding the area of operation for CAT operations:

[…]

(6) The adequacy of aerodromes, ~~or~~ operating sites, vertiports or diversion locations available within the proposed area, and the availability of current maps, charts, associated documents or equivalent data.

[…]

AMC1 ARO.OPS.224(a) Approval of fuel/energy schemes for IAM operations

APPROVAL OF INDIVIDUAL FUEL/ENERGY SCHEMES — QUALIFICATION OF PERSONNEL

(a) The competent authority should have qualified inspectors for the approval of individual fuel/energy schemes for IAM operations.

(b) The competent authority inspectors should have the necessary knowledge and expertise to understand, monitor and validate the applicable criteria of points UAM.OP.VCA.190, UAM.OP.VCA.191, UAM.OP.VCA.195 and UAM.OP.MVCA.192 of Annex IX.

(c) The competent authority should develop guidance to be used by its inspectors when approving and verifying individual fuel/energy schemes for IAM operations.

GM1 ARO.OPS.224 Approval of fuel/energy schemes for IAM operations

INDIVIDUAL FUEL/ENERGY SCHEME — MEANING

The individual fuel/energy scheme may be route-specific and/or VCA-fleet-specific.

AMC1 ARO.OPS.224(b) Approval of fuel/energy schemes for IAM operations

VERIFICATION AND ASSESSMENT PRIOR TO APPROVAL

(a) For the purpose of issuing an approval of the individual fuel/energy scheme of a VCA operator, the competent authority should assess and verify the following:

(1) documentation and procedures relevant to the operator's fuel/energy planning and in-flight replanning policy, and in-flight fuel/energy management policy;

(2) the method for selection of vertiports, diversion locations and/or VEMS operating sites, as applicable, and relevant documentation;

(3) VCA-fleet-specific and route-/area-specific items:

(i) consumption data;

(ii) performance characteristics and performance required under the proposed fuel/energy scheme;

(iii) the impact of weather on the usable fuel/energy and reserves;

(iv) the efficiency and capacity of energy storage devices for the planned operating conditions;

(v) the reliability of the fuel/energy system, including the accuracy of the fuel/energy measurement and displaying equipment;

(vi) the route(s) and/or area(s) of operation where the individual fuel/energy scheme will be used;

(4) the operator's management system, particularly with regard to safety risk management, and the operator's processes for performance monitoring and measurement;

(5) pilot training and experience as relevant to the use of SOPs and systems that support the individual fuel/energy scheme.

(b) When collecting statistically relevant data, the competent authority inspectors should consider the specificities of the operations of each VCA operator. As a minimum, the data should be collected for a period of 2 years.

GM1 ARO.OPS.224(b) Approval of fuel/energy schemes

AMENDMENT OR REVOCATION OF AN INDIVIDUAL FUEL/ENERGY SCHEME

When the competent authority detects non-compliance of an individual fuel/energy scheme with the applicable requirements, the scheme should be amended to restore compliance or the approval should be revoked in accordance with ARO.GEN.350, as the case may be.

7.4. Draft AMC & GM to Annex III (Part-ORO)

GM1 ORO.GEN.310 Use of ~~aircraft~~ aeroplanes or helicopters listed on an AOC for non-commercial operations and specialised operations

EXAMPLES OF POSSIBLE SCENARIOS FOR THE USE OF ~~AIRCRAFT~~ AEROPLANES OR HELICOPTERS LISTED ON AN AOC

Aeroplanes and helicopters are referred to in here below as aircraft.

[…]

GM2 ORO.GEN.310 Use of ~~aircraft~~ aeroplanes or helicopters listed on an AOC for non-commercial operations and specialised operations

SPECIFIC APPROVALS

Aeroplanes and helicopters are referred to in here below as aircraft.

[…]

GM1 ORO.GEN.310(a)(2) Use of ~~aircraft~~ aeroplanes or helicopters listed on an AOC for non-commercial operations and specialised operations

EXCEEDING 30 DAYS OF CONTINUOUS OPERATION

Aeroplanes and helicopters are referred to in here below as aircraft.

[…]

AMC1 ORO.GEN.310(b);(e) Use of ~~aircraft~~ aeroplanes or helicopters listed on an AOC for non-commercial operations and specialised operations

RESPONSIBILITIES OF THE AOC HOLDER

Aeroplanes and helicopters are referred to in here below as aircraft.

[…]

GM1 ORO.GEN.310(d) Use of ~~aircraft~~ aeroplanes or helicopters listed on an AOC for non-commercial operations and specialised operations

CONTINUING AIRWORTHINESS MANAGEMENT

Aeroplanes and helicopters are referred to in here below as aircraft.

[…]

AMC1 ORO.GEN.310(b);(d);(f) Use of ~~aircraft~~ aeroplanes or helicopters listed on an AOC for non-commercial operations and specialised operations

RESPONSIBILITIES OF THE OTHER OPERATOR

Aeroplanes and helicopters are referred to in here below as aircraft.

[…]

AMC1 ORO.AOC.100(a) Application for an air operator certificate

OPERATOR SECURITY PROGRAMME

In accordance with Regulation (EC) No 300/2008, as part of granting the AOC, the ~~CAT~~ operator should provide the competent authority with the operator's security programme, including security training. The security programme should be adapted to the type and area of operation, as well as to the aircraft operated.

AMC1 ORO.AOC.110(c) Leasing agreement

WET LEASE-IN AGREEMENT WITH A THIRD-COUNTRY OPERATOR

If the operator is not intending to apply EU safety requirements for air operations and continuing airworthiness when wet leasing-in an aircraft registered in a third country, it should demonstrate to the competent authority that the standards complied with are equivalent to the following requirements:

(a) Annex IV (Part-CAT) for aeroplanes and helicopters, or Annex IX (Part-IAM) for VCA, as applicable;

(b) Part-ORO for aeroplanes, helicopters or VCA, as applicable:

(1) ORO.GEN.110 and Section 2 of Subpart GEN;

(2) ORO.MLR, excluding ORO.MLR.105;

(3) ORO.FC;

(4) ORO.CC, excluding ORO.CC.200 and ORO.CC.210(a);

(5) ORO.TC;

(6) ORO.FTL, including related CS-FTL, for aeroplanes; and

(7) ORO.SEC;

(c) Annex V (Part-SPA), if applicable;

(d) for continuing airworthiness management of the third-country operator, Part-M1 Subpart-B, Subpart-C and Subpart-G, excluding M.A.707, and M.A.710;

(e) for the maintenance organisation used by the third-country operator during the lease period: Part-145[12];

(f) retroactive airworthiness requirements in accordance with Part-26; and

(g) the operator should provide the competent authority with a full description of the flight time limitation scheme(s), operating procedures and safety assessment demonstrating compliance with the safety objectives set out in points (b)(1)-(6).

[12] Commission Regulation (EC) No 2042/2003 of 20 November 2003 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 315, 28.11.2003, p. 1). Regulation as last amended by Commission Regulation (EU) No 1149/2011 of 21 October 2011 (OJ L 298, 16.11.2011, p. 1).

AMC1 ORO.AOC.125(a) Non-commercial operations of an AOC holder with ~~aircraft~~ aeroplanes or helicopters listed on its AOC

FLIGHT AND DUTY TIME LIMITATIONS AND REST REQUIREMENTS

When aircrew members are assigned to perform a series of flights that combine several types of operation (CAT, NCC/NCO), the operator should:

(a) for aeroplanes, comply at any time with the provisions of ORO.FTL.210 'Flight times and duty periods' or, as applicable, the provisions of Council Regulation (EEC) No 3922/91 (EU-OPS, Subpart Q), to ensure compliance with Subpart FTL for any CAT operation; and

(b) include any combination of types of operation in its safety risk management process to ensure that the fatigue risks arising from such operations do not affect the CAT operation.

AMC2 ORO.AOC.125(a) Non-commercial operations of an AOC holder with ~~aircraft~~ aeroplanes or helicopters listed on its AOC

APPLICABLE REQUIREMENTS

Aeroplanes and helicopters are referred to in here below as aircraft.

[…]

AMC1 ORO.AOC.125(a)(2) Non-commercial operations of an AOC holder with ~~aircraft~~ aeroplanes or helicopters listed on its AOC

DIFFERENT OPERATING PROCEDURES FOR NON-COMMERCIAL OPERATIONS

Aeroplanes and helicopters are referred to in here below as aircraft.

[…]

AMC2 ORO.AOC.125(a)(2) Non-commercial operations of an AOC holder with ~~aircraft~~ aeroplanes or helicopters listed on its AOC

[…]

GM1 ORO.AOC.125(a)(2) Non-commercial operations of an AOC holder with ~~aircraft~~ aeroplanes or helicopters listed on an AOC

[…]

AMC1 ORO.MLR.100 Operations manual – general

GENERAL

[…]

(g) Except for IAM operations, ~~In the case of~~ for commercial operations with other-than-complex motor-powered aircraft or non-commercial operations with aeroplanes or helicopters, a 'pilot operating handbook' (POH), or equivalent document, may be used as the type-related part of the OM, provided that the POH covers the normal and abnormal/emergency operating procedures.

[…]

AMC2 ORO.MLR.100 Operations manual – General

CONTENTS OF THE OPERATIONS MANUAL FOR CERTAIN TYPES OF OPERATION

Except for IAM operations, ~~For~~ for non-commercial operations with complex motor-powered aircraft, or CAT operations with either single-engined propeller-driven aeroplanes with an MOPSC of 5 or less, or single-engined non-complex helicopters with an MOPSC of 5 or less, taking off and landing at the same aerodrome or operating site, under VFR by day, the OM should contain at least the following information, where applicable:

[…]

AMC3 ORO.MLR.100 Operations manual – general

CONTENTS — CAT OPERATIONS WITH AEROPLANES AND HELICOPTES AND IAM OPERATIONS WITH VCA

[…]

4.3 Flight crew incapacitation. For multi-pilot operation, ~~Instructions~~ instructions on the succession of command in the event of flight crew incapacitation.

[…]

8.1.2 Criteria and responsibilities for determining the adequacy of aerodromes to be used. For IAM operations, criteria and responsibilities for determining the adequacy of vertiports and diversion locations. For VEMS operations, instructions for the assessment of VEMS operating sites (elevation, landing direction, and obstacles in the area) and for surveillance of those sites.

8.1.3 Methods and responsibilities for establishing aerodrome/vertiport operating minima. Reference should be made to procedures for the determination of the visibility and/or

runway visual range (RVR) and for the applicability of the actual visibility observed by the pilots, the reported visibility and the reported RVR.

8.1.4 En-route operating minima for VFR flights or VFR portions of a flight and, where single-engined aircraft are used, instructions for route selection with respect to the availability of surfaces that permit a safe forced landing. For IAM operations, instructions for route selection with respect to the availability of vertiports or diversion locations that permit a continued safe flight and landing (CSFL).

8.1.5 Presentation and application of aerodrome/vertiport and en-route operating minima.

8.1.6 Interpretation of meteorological information. Explanatory material on the decoding of meteorological (MET) forecasts and MET reports relevant to the area of operations, including the interpretation of conditional expressions. For IAM operations including VEMS, instructions for the assessment of the weather conditions at vertiports, diversion locations and VEMS operating sites.

8.1.7 Determination of the quantities of fuel or amount of energy, oil and water methanol carried. The methods by which the quantities of fuel or amount of energy, oil and water methanol to be carried are determined and monitored in-flight. This section should also include instructions on the measurement and distribution of the fluid carried on board. Such instructions should take account of all circumstances likely to be encountered on the flight, including the possibility of in-flight ~~re-planning~~ replanning and of failure of one or more of the aircraft's power plants or lift and thrust units. The system for maintaining fuel/energy and oil records should also be described.

[…]

8.2.1 Fuelling procedures. A description of fuelling procedures, including:

(a) safety precautions during refuelling and defuelling including when:

(1) an aircraft auxiliary power unit is in operation; or

(2) for helicopters, when rotors are turning; or

(3) for aeroplanes, when an engine is running; or

(4) for VCA, when the lift and thrust units are powered on;

[…]

8.2.2 Aircraft, passengers and cargo handling procedures related to safety. A description of the handling procedures to be used when allocating seats, embarking and disembarking passengers and when loading and unloading the aircraft. Further procedures, aimed at achieving safety whilst the aircraft is on the ramp, such as charging or swapping of VCA batteries while passengers embark, are on board, or disembark, should also be given. Handling procedures should include:

[…]

(f) safety on the aerodrome/operating site or vertiport/diversion location, including fire prevention and safety in blast and suction areas;

(g) start-up, ramp departure and arrival procedures, including, for aeroplanes, push-back and towing operations and, for VCA, ground movement;

[…]

8.3.4 Altitude alerting system procedures for aeroplanes or audio voice alerting devices for helicopters or height determination equipment for VCA;

8.3.5 Ground proximity warning system (GPWS)/terrain avoidance warning system (TAWS), for aeroplanes or VCA, where applicable. Procedures and instructions required for the avoidance of controlled flight into terrain, including limitations on high rate of descent near the surface (the related training requirements are covered in OM-D 2.1).

8.3.6 Policy and procedures for the use of traffic collision avoidance system (TCAS)/airborne collision avoidance system (ACAS) for aeroplanes and, when applicable, for helicopters or VCA.

8.3.7 Policy and procedures for in-flight fuel/energy management. For VCA, the fuel/energy scheme comprising policy and procedures for fuel/energy planning and in-flight replanning, selection of vertiports, diversion locations or VEMS operating sites, and in-flight fuel/energy management.

8.3.9 Wake turbulence. Wake turbulence separation criteria, taking into account aircraft types, wind conditions and runway/final approach and take-off area (FATO) location. For helicopters, consideration should also be given to rotor downwash. For VCA, consideration should be given to the radial component of the downwash (outwash) around the VCA.

[…]

8.3.14 Incapacitation of crew members. Procedures to be followed in the event of incapacitation of crew members in-flight, including in single-pilot operations. Examples of the types of incapacitation and the means for recognising them should be included.

8.3.15 Cabin safety requirements. Procedures:

(a) covering cabin preparation for flight, in-flight requirements and preparation for landing, including procedures for securing the cabin and galleys;

(b) to ensure that passengers are seated where, in the event that an emergency evacuation is required, they may best assist and not hinder evacuation from the aircraft;

(c) to be followed during passenger embarkation and disembarkation;

(d) when refuelling/defuelling with passengers embarking, on board or disembarking;

(d1) when charging or swapping VCA batteries while passengers embark, are on board, or disembark;

(e) covering the carriage of special categories of passengers;

(f) covering smoking on board;

(g) covering the handling of suspected infectious diseases.

8.3.16 Passenger briefing procedures. The contents, means and timing of passenger briefing in accordance with Annex IV (Part-CAT) or Annex IX (Part-IAM), as applicable.

[…]

11 HANDLING, NOTIFYING AND REPORTING ACCIDENTS, INCIDENTS AND OCCURRENCES AND USING THE CVR RECORDING

[…]

(h) Procedures required by CAT.GEN.MPA.195 or IAM.GEN.VCA.195 for using the ~~CVR recording~~ recordings or ~~its~~ transcripts without prejudice to Regulation (EU) No 996/210 and Regulation (EU) 2016/679, when applicable.

(i) for IAM operations, procedures for the preservation of recorder recordings following an accident or a serious incident or when so directed by the investigating authority. These procedures should include:

(1) a full quotation of point (a) of IAM.GEN.VCA.195; and

(2) instructions and means to prevent inadvertent manipulations that can impair the preservation of recorder recordings by operator personnel or by third parties, and to ensure that recorder recordings are preserved for the needs of the investigating authority.

B AIRCRAFT OPERATING MATTERS — TYPE RELATED

[…]

1 LIMITATIONS

1.1 A description of the certified limitations and the applicable operational limitations should include the following:

[…]

(k) for aeroplanes or, if applicable, for VCA, limitations on wet or contaminated runways;

2 NORMAL PROCEDURES

[…]

(n) for aeroplanes or, if applicable, for VCA, limitations on wet or contaminated runways.

3 ABNORMAL AND/OR EMERGENCY PROCEDURES

[…]

(i) guidance for diversion in case of serious technical failure or CFP,

(k) ACAS/TCAS warning for aeroplanes or for VCA if applicable/audio voice alerting device (AVAD) warning for helicopters,

[…]

(n) for aeroplanes or for VCA, departure contingency procedures.

4 PERFORMANCE

[…]

4.1 Performance data. Performance material that provides the necessary data for compliance with the performance requirements prescribed in Annex IV (Part-CAT) or in Annex IX (Part-IAM). For aeroplanes, this performance data should be included to allow the determination of the following:

[…]

4.1.3 If performance data, as required for the VCA operations, is not available in the AFM, then other data should be included.

[…]

5 FLIGHT PLANNING

[…]

5.2 The method for calculating fuel/energy needed for the various stages of flight.

[…]

C ROUTE/ROLE/AREA AND AERODROME/OPERATING SITE OR VERTIPORT/DIVERSION LOCATION INSTRUCTIONS AND INFORMATION

1 Instructions and information relating to communications, navigation and aerodromes/operating sites or vertiports/diversion locations, including minimum flight levels and altitudes for each route to be flown and operating minima for each aerodrome/operating site or vertiport/diversion location planned to be used, including the following:

[…]

(b) operating minima for departure, destination and alternate aerodromes or, for IAM operations, operating minima for departure, destination and en-route vertiports and diversion locations;

[…]

(d) runway/final approach and take-off area (FATO) data and aerodrome/operating site or vertiport/diversion location facilities;

[…]

D TRAINING

[...]

2 Content: Training syllabi and checking programmes should include the following:

2.1 for flight crew, all relevant items prescribed in Annex IV (Part-CAT), Annex IX (Part-IAM), Annex V (Part-SPA) and ORO.FC;

[…]

2.3 for technical crew, all relevant items prescribed in Annex IV (Part-CAT), Annex IX (Part-IAM), Annex V (Part-SPA) and ORO.TC;

2.4 for operations personnel concerned, including crew members:

(a) all relevant items prescribed in SPA.DG Subpart G of Annex IV (SPA.DG); and

(b) all relevant items prescribed in Annex IV (Part-CAT), Annex IX (Part-IAM) and ORO.SEC; and

2.5 for operations personnel other than crew members (e.g. dispatcher, handling personnel, etc.), all other relevant items prescribed in Annex IV (Part-CAT), Annex IX (Part-IAM) and in this Annex pertaining to their duties.

3 Procedures:

[…]

3.3 Procedures to ensure that abnormal or emergency situations requiring the application of part or all of the abnormal or emergency procedures, and simulation of instrument meteorological conditions (IMC) by artificial means are not simulated during CAT operations with aeroplanes or helicopters or IAM operations with VCA.

[…]

AMC1 ORO.FC.105(b)(2);(c) Designation as pilot-in-command/commander

GENERAL

The operator should comply with the national training and checking requirements published in the aeronautical information publication (AIP).

ROUTE, AREA AND AERODROME KNOWLEDGE FOR COMMERCIAL OPERATIONS WITH AEROPLANES AND HELICOPTERS

The experience of the route or area to be flown and of the aerodrome facilities and procedures to be used should include the following:

AMC2 ORO.FC.105(b)(2);(c) Designation as pilot-in-command/ commander

GENERAL

The operator should comply with the national training and checking requirements published in the AIP.

ROUTE, AREA AND AERODROME KNOWLEDGE FOR NON-COMMERCIAL OPERATIONS WITH AEROPLANES AND HELICOPTERS

The knowledge of the route and area to be flown and of the aerodrome facilities and procedures to be used should include the following:

[…]

GM2 ORO.FC.105(b)(2) Designation as pilot-in-command/ commander

AERODROME KNOWLEDGE FOR NON-COMMERCIAL OPERATIONS WITH AEROPLANES AND HELICOPTERS

The operator may, based on complexity, categorise all aerodromes in one of the following three categories:

[…]

AMC3 ORO.FC.105(b)(2);(c) Designation as pilot-in-command/ commander

GENERAL

The operator should comply with the national training and checking requirements published in the AIP.

ROUTE, AREA AND VERTIPORT KNOWLEDGE FOR IAM OPERATIONS

The knowledge of the area and route to be flown and of the vertiport facilities and procedures to be used should include the following:

(a) Area and route knowledge

(1) Area and route familiarisation training should ensure that the pilot has knowledge of:

(i) terrain and minimum applicable altitudes/heights;

(ii) seasonal meteorological conditions;

(iii) meteorological, communication and air traffic facilities, services and procedures;

(iv) search and rescue procedures where available; and

(v) navigational facilities associated with the route along which the flight is to take place, as applicable.

(2) Area and route familiarisation training should also ensure that the pilots are aware of the most significant underlying risks and threats of a route that could affect their operations following the 'threat and error management model' or an alternative risk model agreed with the authority.

(3) The area and route familiarisation training should be conducted:

(i) as initial training before operating to a route and area;

(ii) as refresher training after not operating to a route and area for 12 months.

(4) The OM should describe appropriate methods and tools of area and route familiarisation depending on the complexity of the route , the type of risk or threat that needs to be trained and the experience of the pilot-in-command.

(b) Vertiport knowledge

(1) Vertiport familiarisation training should include knowledge of obstacle limitation surfaces, physical layout, lighting, take-off and landing profiles, hover, applicable visibility and distance from cloud minima, unusual local weather conditions, as well as taxiing and ground movement.

(2) The OM should describe appropriate methods of familiarisation depending on the complexity of the vertiport.

(3) If the competent authority of the vertiport requires specific training or familiarisation, the operator should maintain all records of this training or familiarisation in accordance with ORO.GEN.220.

(4) Where floating installations/surfaces are used, the limitations determined in accordance with the approval for operations on floating surfaces should be taken into account.

(c) Diversion locations knowledge

(1) The OM should describe appropriate methods of familiarisation with diversion locations depending on their complexity and/or risks associated with landing at diversion locations. Methods of familiarisation may include briefing or self-briefing by means of programmed instruction, instruction in a suitable FSTD or other means.

(2) Diversion locations familiarisation should include knowledge of overall dimensions, the location and height of relevant obstacles, the approach and take-off flight paths, surface condition, and means indicating wind speed and direction.

AMC1 ORO.FC.105(c) Designation as pilot-in-command/commander

ROUTE/AREA AND AERODROME/VERTIPORT/DIVERSION LOCATION RECENCY

(a) The 12-month period of validity of the aerodrome/vertiport knowledge should be counted from the last day of the month:

(1) when the initial familiarisation training was undertaken; or

(2) of the latest operation on the route or area to be flown and of the aerodromes/vertiports, facilities and procedures to be used.

(b) The 36-month period of validity of the route or area knowledge or diversion location knowledge should be counted from the last day of the month:

(1) when the initial familiarisation training was undertaken; ~~or~~

(2) when the latest operation on the route or area was flown; or

(3) when the latest operation at a diversion location was flown.

GM1 ORO.FC.105(c) Designation as pilot-in-command/commander

AREA AND ROUTE FAMILIARISATION TRAINING DELIVERY

When developing the area and route familiarisation training, the operator may apply the following methodology:

(a) Internal evidence

(1) Operator assessment by conducting an operational risk evaluation according to the following criteria:

(i) terrain and minimum applicable flight altitudes/heights;

(ii) seasonal meteorological conditions;

(iii) meteorological, communication and air traffic facilities, services and procedures;

(iv) search and rescue procedures where available; ~~and~~

(v) diversion locations associated with the route along which the flight is to take place, as applicable; and

(vi) navigational facilities associated with the route along which the flight is to take place, as applicable.

(2) Operator-specific evidence gathered through the safety management process in accordance with ORO.GEN.200.

[…]

AMC2 ORO.FC.115 Crew resource management (CRM) training

CRM TRAINING — SINGLE-PILOT OPERATIONS

(a) For single-pilot helicopter operations with technical crew or single-pilot VEMS operations with technical crew, AMC1 ORO.FC.115 should be applied.

[…]

AMC1 ORO.FC.120 Operator conversion training

OPERATOR CONVERSION TRAINING FOR NON-COMMERCIAL OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT (NCC) — AEROPLANES AND HELICOPTERS

[…]

AMC1 ORO.FC.125 Differences training, familiarisation, equipment and procedure training

GENERAL

(a) Differences training requires additional knowledge and training on the aircraft or an appropriate training device. It should be carried out:

(1) in the case of aeroplanes, when operating another variant of an aeroplane of the same type or another type of the same class currently operated; ~~or~~

(2) in the case of helicopters, when operating a variant of a helicopter currently operated~~.~~;

(3) in the case of VCA, when operating a variant of a VCA different from the VCA currently operated.

(b) Familiarisation requires only the acquisition of additional knowledge. It should be carried out when operating another ~~helicopter or aeroplane~~ aircraft of the same type.

AMC1 ORO.FC.130 Recurrent training and checking

RECURRENT TRAINING AND CHECKING TO DEMONSTRATE COMPETENCE FOR NON-COMMERCIAL OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT (NCC) — AEROPLANES AND HELICOPTERS

[…]

GM1 ORO.FC.130 Recurrent training and checking

PERIODIC CHECKS

(a) For CAT operations with aeroplanes and helicopters and IAM operations with VCA, the operator proficiency checks and the line checks are both part of the periodic checks. For EBT operators, the EBT module and the line evaluations of competence are both part of the periodic checks.

(b) For SPO operations with aeroplanes and helicopters, the operator proficiency checks are part of the periodic checks.

(c) For non-CAT operations with aeroplanes and helicopters, the periodic checks may include a line check.

AMC1 ORO.FC.135 Pilot qualification to operate in either pilot's seat

GENERAL

The training and checking for pilot qualification to operate in either pilot's seat should include any safety-critical items as specified in the operations manual where the action to be taken by the pilot is different depending on which seat they occupy.

NON-COMMERCIAL OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT (NCC) — AEROPLANES AND HELICOPTERS

Training should be arranged so that all such items will have been covered in the preceding 3-year period.

AMC1 ORO.FC.140(d) Operation on more than one type or variant

LINE CHECKS — HELICOPTERS AND VCA

(a) Prior to using a line check on one helicopter type or variant or one VCA type or variant to revalidate the line check on other helicopter types or variants or VCA types or variants, the operator should consider whether the types of operations are sufficiently similar in terms of:

(1) use of aerodromes or operating sites or, in the case of IAM operations with VCA, vertiports or diversion locations;

(2) day VFR or night VFR;

(3) use of operational approvals and specific approvals;

(4) normal procedures, including flight preparation, take-off and landing procedures; and

(5) use of automation.

(b) For IFR operations of helicopters, an operation should only be considered sufficiently similar to allow a line check on one type or variant to revalidate the line check for the other type or variant if such credits are defined in the operational suitability data established in accordance with Commission Regulation (EU) No 748/20121, as determined in point (a) of ORO.FC.140.

(c) Line check cross-crediting should be defined in the operations manual.

AMC1 ORO.FC.145 Provision of training, checking and assessment

ACCEPTANCE OF PREVIOUS TRAINING FOR NON-COMMERCIAL OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT (AEROPLANES AND HELICOPTERS), INCLUDING NON-COMMERCIAL SPECIALISED OPERATIONS

[…]

GM1 ORO.FC.145 Provision of training, checking and assessment

POLICY FOR ACCEPTANCE OF PREVIOUS TRAINING AND CHECKING FOR OTHER THAN COMMERCIAL AIR TRANSPORT OPERATIONS (NCC) — AEROPLANES AND HELICOPTERS

[…]

AMC1 ORO.FC.145(a) Provision of training, checking and assessment

TRAINING AND CHECKING PROGRAMMES AND SYLLABI

[…]

(b) Further details on the training and checking programmes and syllabi should be included in the operations manual depending on the complexity of the operations (e.g. further contextualization of the training programme, details of the airport/vertiport in which some items will be covered, time allocation to brief and debrief, whether the item to be trained is a legal requirement or an SMS item, etc.).

GM1 ORO.FC.145(d) Provision of training, checking and assessment

CONFIDENTIALITY AND PROTECTION OF TRAINING DATA IN ~~COMMERCIAL AIR TRANSPORT~~ CAT OPERATIONS WITH AEROPLANES AND HELICOPTERS AND IAM OPERATIONS WITH VCA

(a) Without prejudice to applicable ~~national legislation~~ Union law on the protection of individuals with regard to the processing of personal data, for the training conducted in accordance with ORO.FC.145 the operator may have a training data access and security policy (including the procedure to prevent disclosure of crew identity).

(b) If the operator decides to have such a policy, it should:

(1) be agreed by all parties involved (~~airline~~ operator management and flight crew member representatives nominated either by the union or the flight crew themselves);

(2) be in line with the organisation's safety policy in order to not make available or to not make use of the training data to attribute blame or liability.

(c) The training data access and security policy may include a policy for access to information only to specifically authorised persons identified by their position in order to perform their duties.

AMC1 ORO.FC.146(b) Personnel providing training, checking and assessment

PERSONNEL PROVIDING AIRCRAFT/FSTD TRAINING AND CONDUCTING OPERATOR PROFICIENCY CHECKING AND QUALIFIED UNDER ANNEX I (PART-FCL) TO REGULATION (EU) No 1178/2011

Training and checking should be provided by the following personnel:

(a) Flight training by a type rating instructor (TRI) or class rating instructor (CRI), flight instructor (FI) or, in the case of the FSTD content, a synthetic flight instructor (SFI). For ~~commercial air transport~~ CAT operations with aeroplanes and helicopters and, if applicable, for IAM operations with VCA, the FI, TRI, CRI or SFI should satisfy the operator's experience and knowledge requirements sufficiently to instruct on aircraft systems and operational procedures and requirements.

[…]

AMC1 ORO.FC.146(e);(f)&(g) Personnel providing training, checking and assessment

SUITABLY QUALIFIED PIC OR COMMANDER NOMINATED BY THE OPERATOR — GENERAL

(a) The nominated PIC/commander conducting training should either be qualified as an instructor under Regulation (EU) No 1178/2011 or receive training which should cover at least:

(1) techniques of briefing and debriefing;

(2) CRM concepts and CRM assessment;

(3) for SPO with aeroplanes or helicopters, which manoeuvres the nominated PIC/commander should not train or check unless qualified as an instructor.

[…]

CAT OPERATIONS WITH AEROPLANES AND HELICOPTERS AND IAM OPERATIONS WITH VCA — SUITABLY QUALIFIED PIC OR COMMANDER OR INSTRUCTOR NOMINATED BY THE OPERATOR

(f) For CAT operations with aeroplanes or helicopters under VFR by day, the minimum experience of the nominated commander should be more than 750 hours total flight time with at least 50 hours on the type, class or the aircraft variant.

(f1) For IAM operations with VCA under VFR by day, the minimum experience of the nominated PIC should be more than 350 hours total flight time with at least 25 sectors on the type, class or the aircraft variant.

(g) For CAT operations in performance class B aeroplanes under night VFR or under IFR, the minimum experience of the nominated commander should be more than 1 000 hours total flight time with at least 100 hours on the type, class or the aircraft variant.

(h) In the case of CAT operations in helicopters, the 350 hours flying experience in multi-pilot operations defined in (c) may be reduced on an individual basis, as part of the approval of the training and checking programmes. The operator may apply for such a reduced flying experience based on the unavailability of experienced pilots in both multi-pilot operations and in their types of operations. An FI/TRI/SFI rating and MCC training in helicopters should be a prerequisite for any reduced flying experience in multi-pilot operations. In addition, the operator should define mitigation measures after having performed a risk assessment. The following should be taken into account:

(1) flying experience criteria in single-pilot operations in the types of operations;

(2) any other training, checking, recency and experience criteria; and

(3) robustness and maturity of multi-pilot SOPs.

(i) ORO.FC.220(f) and ORO.FC.420 (e) allow~~s~~ the operator to develop a specific conversion course to address an operational circumstance, when the operator intends to have pilots temporally joining the operator to conduct line checks. The content of the specific operator's conversion course is included in AMC1 ORO.FC.220(f) or AMC1 ORO.FC.420(e) as applicable .

SPO — SUITABLY QUALIFIED PIC OR INSTRUCTOR NOMINATED BY THE OPERATOR

[…]

AMC1 ORO.FC.220 Operator conversion training and checking

OPERATOR CONVERSION TRAINING SYLLABUS

(a) General

(1) The operator conversion training should include, in the following order:

(i) ground training and checking, including all of the following:

[…]

(C) abnormal and emergency procedures, which include pilot incapacitation ~~as applicable~~;

[…]

AMC1 ORO.FC.220(f) Operator conversion training and checking

SPECIFIC CONVERSION COURSE — SUITABLY QUALIFIED COMMANDER NOMINATED BY THE OPERATOR — PILOTS WHO TEMPORARILY JOIN THE OPERATOR AND WILL BE NOMINATED TO CONDUCT LINE CHECKS

(a) In some cases, operational circumstances may require the operator to develop a specific conversion course to nominate pilots as suitably qualified commanders to conduct line checks in accordance with the requirements of ORO.FC.146. In this case, the operator conversion training should include training as follows:

(1) normal procedures, which include flight planning and ground-handling and flight operations, including performance, mass and balance, fuel schemes, selection of alternates, and ground de-icing/anti-icing;

(2) abnormal and emergency procedures, which include pilot incapacitation ~~as applicable~~.

[…]

AMC1 ORO.FC.230 Recurrent training and checking

RECURRENT TRAINING AND CHECKING SYLLABUS

(a) Recurrent training

Recurrent training should comprise the following:

(1) Ground training

(i) The ground training programme should include:

[…]

(C) abnormal and emergency procedures, which include pilot incapacitation ~~as applicable~~;

[…]

(c) Flight crew incapacitation training~~, except single-pilot operations~~

[…]

AMC1 ORO.FC.330 Recurrent training and checking — operator proficiency check

SPO — RECURRENT TRAINING

(a) The training should include:

(1) ground training, including all the following:

[…]

(iii) abnormal and emergency procedures, which include pilot incapacitation ~~as applicable;~~

AMC1 ORO.FC.415 Initial operator's crew resource management (CRM) training

TRAINING ELEMENTS AND TRAINER QUALIFICATION

The initial operator's CRM training should:

(a) cover the applicable provisions of AMC1 ORO.FC.115, including the training elements as specified in Table 1 thereof; and

(b) be conducted by a flight crew CRM trainer who is qualified as specified in AMC2 ORO.FC.146.

AMC1 ORO.FC.420 Operator conversion training and checking

OPERATOR CONVERSION TRAINING SYLLABUS FOR IAM OPERATIONS

(a) General

(1) The operator conversion training should include, in the following order:

(i) ground training, including the following:

(A) VCA systems;

(B) normal procedures, including but not limited to flight planning, ground-handling, flight operations, fuel/energy schemes, selection of vertiports and diversion locations, VCA performance, mass and balance;

(C) abnormal and emergency procedures, which include pilot incapacitation;

(D) a review of the occurrences that may be relevant for the intended operation;

(ii) emergency and safety equipment training and checking, including survival equipment training (completed before any flight training in a VCA commences);

(iii) flight training and checking (aircraft and FSTD); and

(iv) line flying under supervision and line check.

(2) When the pilot has not previously completed an operator's conversion course, he or she should undergo general first-aid training and, if applicable, ditching procedures training using the equipment in water.

(3) The operator conversion course may be combined with a new type rating course, as required by Commission Regulation (EU) No 1178/2011.

(4) The operator should ensure that:

(i) applicable elements of CRM training, as specified in Table 1 of AMC1 ORO.FC.115, are integrated into all appropriate phases of the conversion training;

(ii) the personnel integrating elements of CRM into conversion training are suitably qualified, as specified in AMC2 ORO.FC.146.

(b) Ground training

(1) Ground training should comprise a properly organised programme of ground instruction supervised by training staff with adequate facilities, including any necessary audio, mechanical and visual aids. Self-study using appropriate electronic learning aids, computer-based training (CBT), etc., may be used with adequate supervision of the standards achieved. However, if the aircraft concerned is relatively simple, unsupervised private study may be adequate if the operator provides suitable manuals and/or study notes.

(2) The course of ground instruction should incorporate formal tests.

(c) Emergency and safety equipment training

(1) Emergency and safety equipment training should take place in conjunction with technical crew undergoing similar training, as far as applicable and practicable; emphasis should be placed on the importance of effective coordination and two-way communication between crew members in various emergency situations.

(2) On the initial conversion course and on subsequent conversion courses as applicable, the following should be addressed:

(i) Instruction on first aid in general (initial conversion course only; instruction on first aid as relevant to the type of operation (initial and subsequent).

(ii) Aero-medical topics, as relevant to the type of operation.

(iii) The effect of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment.

(iv) Actual firefighting, using equipment representative of that carried in the VCA on an actual or simulated fire except that, with Halon extinguishers, an alternative extinguisher may be used.

(v) The operational procedures of security, rescue and emergency services.

(vi) Survival information appropriate to the areas of operation and training in the use of any survival equipment required to be carried.

(vii) A comprehensive drill to cover all ditching procedures where flotation equipment is carried. This should include practice of the actual donning and inflation of a life jacket, together with a demonstration or audiovisual presentation of the inflation of life rafts and/or slide rafts and associated equipment. This practice should, on an initial conversion course, be conducted using the equipment in water, although previous certified training with another operator or the use of similar equipment will be accepted in lieu of further wet-drill training.

(viii) Instruction on the location of emergency and safety equipment, correct use of all appropriate drills, and procedures that could be required of flight crew in different emergency situations. Evacuation of the aircraft (or a representative training device) by use of a slide where fitted should be included when the operations manual procedure requires the early evacuation of flight crew to assist on the ground.

(3) Passenger handling

(i) Other than general training on dealing with people, emphasis should be placed on the following:

(A) advice on the recognition and management of passengers who appear to be or are intoxicated with alcohol, under the influence of drugs or aggressive;

(B) methods used to motivate passengers and the crowd control necessary to expedite an aircraft evacuation; and

(C) the importance of correct seat allocation with reference to aircraft mass and balance. Particular emphasis should also be given on the seating of special categories of passengers.

(ii) Discipline and responsibilities

Emphasis should be placed on discipline and an individual's responsibilities in relation to:

(A) his or her ongoing competence and fitness to operate as a crew member with special regard to flight and duty time limitation (FTL) requirements; and

(B) security procedures.

(iii) Passenger briefing/safety demonstrations

Training should be given in the preparation of passengers for normal and emergency situations.

(d) Flight training

(1) Flight training should be conducted to familiarise the flight crew member thoroughly with all aspects of limitations and normal, abnormal and emergency procedures associated

with the VCA and should be carried out by suitably qualified type rating instructors and/or examiners or a suitably qualified PIC holding a FI/TRI/SFI certificate and nominated by the operator, as applicable.

(2) In planning flight training on VCA with a flight crew of two or more, particular emphasis should be placed on the practice of LOFT with emphasis on CRM, and the use of crew coordination procedures, including coping with incapacitation.

(3) Normally, the same training and practice in the flying of the VCA should be given to all flight crew members. The 'flight handling' sections of the syllabus should include all the requirements of the operator proficiency check required by ORO.FC.430.

(4) The training should include at least three take-offs and landings in the VCA.

(e) Operator proficiency check

(1) For VCA, the operator proficiency check that is part of the operator's conversion checking should include at least the following emergency/abnormal procedures as relevant to the VCA and the operations, as applicable:

(i) lift and thrust system fire;

(ii) interior VCA fire or smoke;

(iii) emergency operation of undercarriage;

(iv) hydraulic failure;

(v) electrical failure;

(vi) malfunctions of the flight and lift and thrust units control system;

(vii) recovery from unusual attitudes;

(viii) landing with one or more lift and thrust unit(s) inoperative;

(xi) pilot incapacitation;

(xii) directional control failures and malfunctions;

(xiii) other system failures;

(xiv) CFP during take-off before decision point;

(xv) CFP during take-off after decision point;

(xvi) CFP during landing before decision point; and

(xvii) CFP during landing after decision point.

(2) The flight crew should be assessed on their CRM skills in accordance with the methodology described in AMC1 ORO.FC.115 and as specified in the operations manual.

(3) The use of FSTDs, composition of the flight crew, and the possible combinations with training or with the licence proficiency check should be defined as per AMC1 ORO.FC.430.

(f) Line flying under supervision (LIFUS)

(1) Following completion of flight training and checking as part of the operator's conversion course, each flight crew member should operate a minimum number of sectors and/or flight hours under the supervision of a flight crew member nominated by the operator.

(2) The minimum flight sectors/hours should be specified in the operations manual and should be determined by all the following:

(i) previous experience of the flight crew member;

(ii) complexity of the operation, taking into consideration the type of aircraft as well as the type and area of operation.

AMC2 ORO.FC.420 Operator conversion training and checking

TRAINING PROGRAMMES

The operator should ensure that training programmes include the relevant de-identified feedback from the management system, including occurrence reporting.

GM1 ORO.FC.420(b) Operator conversion training and checking

COMPLETION OF AN OPERATOR'S CONVERSION COURSE

(a) The operator conversion course is deemed to have started when the flight training has begun. The theoretical element of the course may be undertaken ahead of the practical element.

(b) Under certain circumstances the course may have started and reached a stage where, for unforeseen reasons, it is not possible to complete it without a delay. In these circumstances, the operator may allow the pilot to revert to the original type.

(c) Before the resumption of the operator conversion course, the operator should evaluate how much of the course needs to be repeated before continuing with the remainder of the course.

GM1 ORO.FC.420(d) Operator conversion training and checking

LINE FLYING UNDER SUPERVISION

(a) Line flying under supervision provides the opportunity for a flight crew member to put into practice the procedures and techniques he or she has been made familiar with during the ground and flight training of an operator conversion course. This is accomplished under the supervision of a flight crew member specifically nominated and trained for the task. At the end of line flying under supervision the respective crew member should be able to perform a safe and efficient flight.

(b) A variety of reasonable combinations may exist with respect to:

(1) a flight crew member's previous experience; and

(2) the complexity of the operation, taking into consideration the type of aircraft as well as the type and area of operation.

(c) The operator defines the details to be flown under supervision in the operations manual.

AMC1 ORO.FC.420(e) Operator conversion training and checking

SPECIFIC CONVERSION COURSE

(a) In some cases, operational circumstances may require the operator to develop a specific conversion course to nominate pilots as suitably qualified PIC to conduct line checks in accordance with the requirements of ORO.FC.146. In such cases, the operator conversion training should include training as follows:

(1) normal procedures, including but not limited to flight planning, ground handling, flight operations, including performance, mass and balance, fuel/energy schemes, selection of vertiports and/or diversion locations, VCA performance, mass and balance;

(2) abnormal and emergency procedures, which include pilot incapacitation.

(b) The operator should ensure that the line checker is familiar with:

(1) the operating procedures and the use of checklists used by the operator;

(2) the emergency and safety equipment installed or carried on the operated aircraft.

(c) After the completion of the specific conversion course, the following apply:

(1) The line checker should not exercise duties at the controls of the aircraft.

(2) The line checker should only conduct recurrent line checks of pilots whose previous line check has not expired, in accordance with ORO.FC.430.

(d) The validity of the specific conversion course should be limited to 6 months.

GM1 ORO.FC.420 Operator conversion training and checking

SINGLE PILOT INCAPACITATION IN IAM OPERATIONS WITH VCA

Pilot incapacitation is the term used to describe a sudden degradation of medical fitness of an operating flight crew member, rendering the flight crew member unable to carry out their normal duties because of the onset, during flight, of the effects of physiological factors.

Incapacitation may have different severity states. Death is the most extreme example of incapacitation (typically due to cardiovascular disease). By far the most common cause of flight crew incapacitation is gastroenteritis. Other causes may include:

— hypoxia at altitudes above 10 000 ft;

— smoke or fumes associated with contamination of the air conditioning system;

— food poisoning or food allergy;

— falling asleep;

— heart attack, stroke due to cardiovascular disease;

— physical injury;

— a hostile act by an unruly passenger, terrorist action.

The single pilot and/or the technical crew member (e.g. in VEMS operations with a technical crew member) should undergo initial and recurrent training to be able to (self-)detect the early stages of pilot incapacitation and handle it, including by activating the relevant operator's procedure. The recurrent training should be conducted every year and can form part of other recurrent training. It should take the form of classroom instruction, discussion, audiovisual presentation or other similar means.

If an FSTD is available for the type of aircraft operated, practical training on flight crew incapacitation should be carried out at intervals not exceeding 3 years.

The pilot incapacitation training objectives for single-pilot operations and for operations with a technical crew member should include:

— (self-)detection of pilot incapacitation;

— taking appropriate actions including correct stop/go decision;

— applying the appropriate operator's procedure correctly;

— maintaining aircraft control, as applicable (e.g. in single-pilot operations with a technical crew member);

— managing consequences for non-incapacitated crew member, as applicable (e.g. in single-pilot operations with a technical crew member).

Operator's procedures in the event of pilot incapacitation are required today for both single-pilot and multi-crew operations, however, relevant training (OCC, OPC, recurrent) is only prescribed for multi-pilot/multi-crew CAT, SPO and NCC operations with aeroplanes and helicopters.

For single-pilot IAM operations with VCA, unlike CAT, SPO and NCC operations with aeroplanes and helicopters, it was found appropriate to include guidance on pilot incapacitation training. EASA is hereby inviting interested parties to provide their opinion as to whether similar guidance needs to be included for CAT, SPO and NCC operations.

AMC1 ORO.FC.430 Recurrent training and checking

RECURRENT TRAINING AND CHECKING SYLLABUS

(a) Recurrent training

Recurrent training should comprise the following:

(1) Ground training

(i) The ground training programme should include:

(A) aircraft systems;

(B) normal procedures, including but not limited to flight planning, ground handling, flight operations, including VCA performance, mass and balance, fuel/energy schemes, selection of vertiports and diversion locations;

(C) abnormal and emergency procedures, which include pilot incapacitation;

(D) a review of relevant occurrences to increase awareness regarding the occurrences that may be relevant for the intended operation.

(ii) Knowledge of the ground training should be verified by a questionnaire or other suitable methods.

(2) Emergency and safety equipment training

(i) Emergency and safety equipment training may be combined with emergency and safety equipment checking and should be conducted in an aircraft or a suitable alternative training device.

(ii) Every year the emergency and safety equipment training programme should include the following:

(A) actual donning of a life jacket if the VCA is operated over water;

(B) actual handling of fire extinguishers of the type used;

(C) instruction on the location and use of all emergency and safety equipment carried on the aircraft;

(D) instruction on the location and use of all types of exits;

(E) security procedures.

(iii) Every 3 years the training programme should include the following:

(A) actual operation of all exits;

(B) demonstration of the method used to operate a slide where fitted;

(C) actual firefighting using equipment representative of that carried in the aircraft on an actual or simulated fire except that, with Halon extinguishers, an alternative extinguisher may be used;

(D) the effects of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment;

(E) actual handling of pyrotechnics, real or simulated, where applicable;

(F) demonstration and use of the life rafts if the VCA is involved in over-water operations in a hostile or non-hostile sea at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed.

VCA water survival training

Where the VCA is equipped with life rafts in accordance with UAM.IDE.MVCA.310, a comprehensive wet drill to cover all ditching procedures should be practised by crew members. This wet drill should include, as appropriate, practice of the actual donning and inflation of a life jacket, together with a demonstration or audiovisual presentation of the inflation of life rafts. The crew member should board the same (or similar) life rafts from the water whilst wearing a life jacket. Training should include the use of all survival equipment carried on board life rafts and any additional survival equipment carried separately on board the VCA.

Consideration should be given to the provision of further specialist training such as underwater escape training. Where operations are predominately conducted over water in a hostile or non-hostile sea at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed, operators should conduct 3-yearly VCA underwater escape training at an appropriate facility.

Wet practice drill should always be given in initial training unless the crew member concerned has received similar training provided by another operator;

(G) first aid, appropriate to the kind of operation and crew complement.

(iv) The successful resolution of VCA emergencies requires interaction between flight crew and technical crew, if applicable, and emphasis should be placed on the importance of effective coordination and two-way communication between all crew members in various emergency situations.

(v) Emergency and safety equipment training should include joint practice in evacuations from a VCA so that all who are involved are aware of the duties other crew members should perform. When such practice is not possible, combined flight crew and technical crew training should include joint discussion of emergency scenarios.

(vi) Emergency and safety equipment training should, as far as practicable, take place in conjunction with technical crew undergoing similar training with emphasis on coordinated procedures and two-way communication between the flight crew compartment and the cabin.

(3) CRM

Elements of CRM training, as specified in Table 1 of AMC1 ORO.FC.115, should be integrated into all appropriate phases of recurrent training.

(4) VCA/FSTD training

(i) General

(A) The VCA/FSTD training programme should be established in a way that all major failures, including CFP, of VCA systems and associated procedures will have been trained in the preceding 3-year period.

(B) The CFP should preferably be simulated and trained in a FSTD and not trained in a VCA.

(C) The recurrent VCA/FSTD training of a single task or manoeuvre should be separate from, and should not take place at the same time as, an operator proficiency check of the item.

(ii) VCA/FSTD

(A) If the operator is able to demonstrate, on the basis of a compliance and risk assessment, that alternating the use of an FSTD with the use of a VCA for this training provides equivalent standards of training with safety levels similar to those achieved using an FSTD, the VCA may be used (alternating with the use of an FSTD) for this training to the extent necessary.

(b) Recurrent checking

Recurrent checking should comprise the following:

(1) Operator proficiency checks

(i) VCA/FSTD

(A) The VCA/FSTD checking programme should be established in a way that all major failures of VCA systems, including CFP, and associated procedures will have been checked in the preceding 3-year period.

The operator should define which failures are major for the purpose of the operator proficiency check based on a risk assessment, taking the following into account:

(a) cautions or warnings associated with the failure;

(b) the criticality of the situation or failure;

(c) the outcome of the procedure (land immediately or as soon as possible as opposed to land as soon as practical);

(d) when available, manufacturer documentation including relevant information in OSD; and

(e) the list of abnormal/emergency procedures described in point (e) of AMC1 ORO.FC.420.

(B) Operator proficiency checks should be conducted with one qualified pilot in single-pilot operations.

(C) The flight crew should be assessed on their CRM skills in accordance with the methodology described in AMC1 and AMC2 ORO.FC.115 and as specified in the operations manual.

(D) If the operator is able to demonstrate, on the basis of a compliance and risk assessment, that alternating the use of an FSTD with the use of a VCA for this training provides equivalent standards of checking with safety levels similar to those achieved using an FSTD, the aircraft may be used (alternating with the use of an FSTD) for this checking to the extent necessary.

(ii) The checks prescribed in (b)(1)(i) may be combined with the skill test or proficiency check required for the issue, the revalidation or renewal of the aircraft type rating.

(2) Emergency and safety equipment checks

The items to be checked should be those for which training has been carried out in accordance with (a)(2).

(3) Line checks

(i) A line check should establish the ability to perform satisfactorily a complete line operation, including pre-flight and post-flight procedures and use of the equipment provided, as specified in the operations manual. The route chosen should be such as to give adequate representation of the scope of a pilot's normal operations. The PIC should also demonstrate their ability to 'manage' the operation and take appropriate command decisions.

(ii) The flight crew should be assessed on their CRM skills in accordance with the methodology described in AMC1 ORO.FC.115 and as specified in the operations manual.

(iii) CRM assessment should not be used as a reason for the failure of the line check unless the observed behaviour could lead to an unacceptable reduction in the safety margin.

(iv) When pilots are assigned duties as pilot flying and pilot monitoring, they should be checked in both functions.

(v) A line check should be conducted by a PIC nominated by the operator. The operator should maintain a list of nominated PICs and inform the competent authority about the persons nominated.

(vi) CRM assessment during the line check

The CRM assessment taking place during the line check should be solely based on observations made during the initial briefing, flight crew compartment briefing and those phases where the line checker occupies the observer's seat.

(vii) Complementary CRM assessment

If a suitable FSTD is available and accessible for operator proficiency checks or FSTD training, then a CRM assessment should take place in a line-oriented flight scenario (LOFT or line-oriented section of the OPC) of an FSTD session. This assessment complements the CRM assessment taking place during the line check, but is not part of the line check.

(4) The recurrent checks referred to in (b)(1) and (3) should be performed in the single-pilot role in an environment representative of the operation.

(c) Flight crew incapacitation training

(1) Procedures should be established to train flight crew to recognise and handle flight crew incapacitation. This training should be conducted every year and can form part of other recurrent training. It should take the form of classroom instruction, discussion, audiovisual presentation or other similar means.

(2) If an FSTD is available for the type of aircraft operated, practical training on flight crew incapacitation should be carried out at intervals not exceeding 3 years.

(d) Use of FSTD

(1) Training and checking provide an opportunity to practise abnormal/emergency procedures that rarely arise in normal operations and should be part of a structured programme of recurrent training. This should be carried out in an FSTD when available and accessible.

(2) The line check should be performed in the aircraft. All other training and checking should be performed in an FSTD, or, if it is not reasonably practicable to gain access to such devices, in an aircraft of the same type or in the case of emergency and safety equipment training, in a representative training device. The type of equipment used for training and checking should be representative of the instrumentation, equipment and layout of the aircraft type operated by the flight crew member.

(3) Because of the unacceptable risk when simulating CFP, the CFP should preferably be covered in an FSTD. If no FSTD is available, CFP may be covered in the aircraft using a safe airborne simulation, bearing in mind the effect of any subsequent failure, and the exercise should be preceded by a comprehensive briefing.

AMC2 ORO.FC.430 Recurrent training and checking

TRAINING PROGRAMMES

The operator should ensure that training programmes include the relevant de-identified feedback from the management system, including occurrence reporting.

GM1 ORO.FC.430 Recurrent training and checking

LINE CHECK AND PROFICIENCY TRAINING AND CHECKING

(a) Line checks, route and vertiport knowledge and recent experience requirements are intended to ensure the crew member's ability to operate efficiently under normal conditions, whereas other checks and emergency and safety equipment training are primarily intended to prepare the crew member for abnormal/emergency procedures.

(b) The line check is considered a particularly important factor in the development, maintenance and refinement of high operating standards, and can provide the operator with a valuable indication of the usefulness of its training policy and methods. Line checks are a test of a flight crew member's ability to perform a complete line operation, including pre-flight and post-flight procedures and use of the equipment provided, and an opportunity for an overall assessment of their ability to perform the duties required as specified in the operations manual. The line check is not intended to determine knowledge on any particular route.

(c) Proficiency training and checking

When an FSTD is used, the opportunity should be taken, where possible, to use LOFT.

MAJOR FAILURES — VCA

(d) The list of major failures as defined by the operator under AMC1 ORO.FC.430 for the purpose of training may be more extensive than the list covered in the 3-yearly operator proficiency checking programme for the following reasons:

(1) It may happen that several training elements are covered by a single check; and

(2) Certain complex system malfunctions are best explored under recurrent training, where the trainee will derive more benefit and training to proficiency is also employed.

AMC1 ORO.FC.440 Operations on more than one type or variant

MORE THAN ONE TYPE OR VARIANT OF VCA

(a) For operations on more than one type or variant of VCA, the following should be met:

(1) the recency requirements and the requirements for recurrent training and checking should be met and confirmed prior to IAM operations on any of the types/variants, and the minimum number of flights on each type/variant should be specified in the operations manual;

(2) the ORO.FC.430 requirements with regard to recurrent training; and

(3) the ORO.FC.430 requirements with regard to proficiency checks. When credits related to the training, checking and recent experience requirements are defined in the operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for the relevant types or variants, the requirements of ORO.FC.430 with regard to

proficiency checks may be met by a 6-monthly check on any one type or variant operated. However, a proficiency check on each type or variant operated should be completed every 12 months.

(b) For any combination of aircraft types or groups of types, including at least one VCA, the following should be met:

(1) when more than one type or variant of VCA is operated in IAM operations as part of the combination, the applicable requirements are those specified in point (a) above with respect to the VCA types/variants;

(2) when the combination consists of aeroplanes and/or helicopters, operated in CAT, NCC and/or SPO, and at least one VCA operated in IAM, the applicable requirements with regard to those aeroplanes and/or helicopters are contained in ORO.FC.240.

GM 1 ORO.FC.440 Operations on more than one type or variant

GROUP OF TYPES OF HELICOPTERS

Information about the 'group of types of helicopters' is provided in AMC1 ORO.FC.240.

AMC1 ORO.TC.105 Conditions for assignment to duties

GENERAL

(a) The technical crew member in HEMS, VEMS, HHO or NVIS operations should undergo an initial medical examination or assessment and, if applicable, a re-assessment before undertaking duties.

[…]

AMC1 ORO.TC.115 Initial training

ELEMENTS

(a) The elements of initial training mentioned in ORO.TC.115 should include in particular:

[…]

(2) Fire and smoke training:

(i) reactions to emergencies involving fire and smoke and identification of the fire sources, including battery fires;

(ii) the classification of fires and the appropriate type and techniques of application of extinguishing agents, the consequences of misapplication, and of use in a confined space; ~~and~~

(iii) the general procedures of ground-based emergency services at aerodromes/vertiports;~~.~~

(iv) the risks of overcharging, overheating, short circuit and fire when charging or swapping VCA batteries; heat generation and 'thermal runaway', if applicable.

(3) When conducting extended overwater operations with helicopters, including operations with VCA over water in a hostile or non-hostile sea at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed, water survival training, including the use of personal flotation equipment.

[…]

AMC1 ORO.TC.120&.125 Operator conversion training and differences training

ELEMENTS

(a) Operator conversion training mentioned in ORO.TC.120(b) and differences training mentioned in ORO.TC.125(a) should include the following:

(1) Fire and smoke training, including practical training in the use of all ~~fire-fighting~~ firefighting equipment as well as protective clothing representative of that carried in the aircraft. Each technical crew member should:

(i) extinguish a fire characteristic of an aircraft interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; ~~and~~

(ii) practise the donning and use of protective breathing equipment (when fitted) in an enclosed, simulated smoke-filled environment; and

(iii) manage a fire of a battery mounted on a VCA, where applicable.

(2) Practical training on operating and opening all normal and emergency exits for passenger evacuation in an aircraft or representative training device and demonstration of the operation of all other exits.

(3) Evacuation procedures and other emergency situations, including:

(i) recognition of planned or unplanned evacuations on land or water — this training should include recognition of unusable exits or unserviceable evacuation equipment;

(ii) in-flight fire and identification of fire source; and

(iii) other in-flight emergencies.

(4) ~~When the flight crew is more than one, training~~ Training on assisting if a pilot becomes incapacitated, including a demonstration of:

(i) the pilot's seat mechanism;

(ii) fastening and unfastening the pilot's seat restraint system;

(iii) use of the pilot's oxygen equipment, when applicable; and

(iv) use of pilots' checklists.

[…]

AMC1 ORO.TC.135 Recurrent training

ELEMENTS

[…]

(c) Recurrent training should include every 3 years:

(1) practical training on operating and opening all normal and emergency exits for passenger evacuation in an aircraft or representative training device and demonstration of the operation of all other exits;

(2) practical training in the use of all firefighting equipment as well as protective clothing representative of that carried in the aircraft. Each technical crew member should:

(i) extinguish a fire characteristic of an aircraft interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; ~~and~~

(ii) practise the donning and use of protective breathing equipment (when fitted) in an enclosed, simulated smoke-filled environment~~.~~; and

(iii) manage a fire of a battery mounted on a VCA, where applicable;

(3) use of pyrotechnics (actual or representative devices); and

(4) demonstration of the use of the life raft, where fitted.

7.5. Draft AMC & GM to Annex V (Part-SPA)

GM1 SPA.GEN.100(a) Competent authority

DETERMINING THE PLACE WHERE AN OPERATOR ~~IS RESIDING~~ RESIDES

For the purpose of Regulation (EU) No 965/2012, the concept of 'place where the operator ~~is residing'~~ resides is mainly addressed to a natural person.

[…]

AMC1 SPA.EFB.100(b) Use of electronic flight bags (EFBs) — operational approval

SUITABILITY OF THE HARDWARE

[…]

(c) Power source

The design of a portable EFB system should consider the source of electrical power, the independence of the power sources for multiple EFBs, and the potential need for an independent battery source. A non-exhaustive list of factors to be considered includes:

(1) the possibility to adopt operational procedures to ensure an adequate level of safety (for example, a minimum preflight level of charge);

(2) the possible redundancy of portable EFBs to reduce the risk of exhausted batteries;

(3) the availability of backup battery packs to ensure that there is an alternative source of power.

Battery-powered EFBs that have aircraft power available for recharging the internal EFB batteries are considered to have a suitable backup power source.

For EFBs that have an internal battery power source, and that are used as an alternative for paper documentation that is required by CAT.GEN.MPA.180 or IAM.GEN.MVCA.180, the operator should either have at least one EFB connected to an aircraft power bus, or have established and documented mitigation means and procedures to ensure that sufficient power with acceptable margins will be available during the whole flight.

[…]

AMC3 SPA.EFB.100(b)(3) Use of electronic flight bags (EFBs) — operational approval

PROCEDURES

[…]

(c) Procedures to mitigate and/or control workload

Procedures should be designed to mitigate and/or control additional workload created by using an EFB system. The operator should implement procedures to ensure that, while the aircraft is in flight or moving on the ground, flight crew members do not become preoccupied with the EFB system at the same time. Workload should be shared between flight crew members, between the pilot and the technical crew member, to ensure ease of use and continued monitoring of other flight crew functions and aircraft equipment. These procedures should be

strictly applied in flight and the operator should specify any times when the flight crew may not use a specific EFB application.

[…]

(g) Electronic signatures

Part-CAT, Part-IAM and Part-M may require a signature when issuing or accepting a document (e.g. load sheet, technical logbook, notification to captain (NOTOC)). In order to be accepted as being equivalent to a handwritten signature, electronic signatures used in EFB applications need, as a minimum, to fulfil the same objectives and to assure the same degree of security as the handwritten or any other form of signature that they are intended to replace. AMC1 CAT.POL.MAB.105(c) and AMC1 UAM.POL.VCA.145(c) provide the means to comply with the required handwritten signature or its equivalent for mass and balance documentation.

[…]

AMC5 SPA.EFB.100(b)(3) Use of electronic flight bags (EFBs) — operational approval

PERFORMANCE AND MASS AND BALANCE APPLICATIONS

(a) General

Performance and mass and balance applications should be based on existing published data found in the AFM or performance manual, and should account for the applicable ~~CAT.POL~~ performance requirements of this Regulation. The applications may use algorithms or data spreadsheets to determine results. They may have the capability to interpolate within the information contained in the published data for the particular aircraft but they should not extrapolate beyond it.

[…]

AMC6 SPA.EFB.100(b)(3) Use of electronic flight bags (EFBs) — operational approval

~~AIRPORT~~ AERODROME MOVING MAP DISPLAY (AMMD) APPLICATION WITH OWN-SHIP POSITION

[…]

(e) Operational procedures

Changes to operational procedures of the aircraft (e.g. flight crew procedures) should be documented in the operations manual or user's guide as appropriate. In particular, the documentation should highlight that the AMMD is only designed to assist flight crew members in orienting themselves on the ~~airport~~ aerodrome surface so as to improve the flight crew members' positional awareness during taxiing, and that it is not to be used as the basis for ground manoeuvring.

[…]

AMC7 SPA.EFB.100(b)(3) Use of electronic flight bags (EFBs) — operational approval

USE OF COMMERCIAL OFF-THE-SHELF (COTS) POSITION SOURCE

[…]

(b) Installation aspects:

If the COTS position sources are stand-alone PEDs, they should be treated as C-PEDs and their installation and use should follow the requirements of CAT.GEN.MPA.140 or IAM.GEN.VCA.140 and associated AMC & GM.

If an external COTS position source transmits wirelessly, cyber security aspects have to be considered.

Non-certified securing systems should be assessed according to ~~paragraph~~ point (h) of AMC1 CAT.GEN.MPA.141(a) as applicable to operations with aeroplanes, helicopters and VCA.

[…]

AMC10 SPA.EFB.100(b)(3) Use of electronic flight bags (EFBs) — operational approval

APPLICATIONS DISPLAYING OWN-SHIP POSITION IN FLIGHT

(a) Limitations

The display of own-ship position in flight as an overlay to other EFB applications should not be used as a primary source of information to fly or navigate the aircraft.

Except on VFR flights over routes navigated by reference to visual landmark, the display of the own-ship symbol is allowed only in aircraft having a certified navigation display (moving map).

In the specific case of IFW applications, the display of own-ship on such applications is restricted to ~~aircraft~~ aeroplanes and helicopters equipped with a weather radar.

[…]

GM5 SPA.EFB.100(b)(3) Use of electronic flight bags (EFBs) — operational approval

USE OF COMMERCIAL OFF-THE-SHELF (COTS) POSITION SOURCE — PRACTICAL EVALUATION

The tests should consist of a statistically relevant sample of taxiing. It is recommended to include taxiing at ~~airports~~ aerodromes that are representative of the more complex ~~airports~~ aerodromes typically accessed by the operator. Taxiing segment samples should include data that is derived from runways/FATO and taxiways, and should include numerous turns, in particular of 90 degrees or more, and segments in straight lines at the maximum speed at which the own-ship symbol is displayed. Taxiing segment samples should include parts in areas of high buildings such as terminals.

The analysis should include at least 25 inbound and/or outbound taxiing segments between the parking location and the runway/FATO.

During the tests, any unusual events (such as observing the own-ship symbol in a location on the map that is notably offset compared to the actual position, the own-ship symbol changing to non-directional when the aircraft is moving, and times when the own-ship symbol disappears from the map display) should be noted. For the test, the pilot should be instructed to diligently taxi on the centre line.

AMC1 SPA.VEMS.100 Emergency medical service operations with manned VTOL-capable aircraft (VEMS)

PUBLIC INTEREST SITE (PIS)

The VEMS operator should include in their operations manual a diagram or annotated photograph of each PIS used that shows its main aspects, dimensions, main hazards and the contingency plan in case of an incident. The VEMS operator should keep the information up to date.

AMC2 SPA.VEMS.100 Emergency medical service operations with manned VTOL-capable aircraft (VEMS)

PRE-SURVEYED VEMS OPERATING SITES

(a) The operator should have in place a procedure for the survey of VEMS operating sites by a competent person. Alternatively, the operator may use reliable survey information provided by site owners.

(b) The operator should address the following when using adequate pre-surveyed VEMS operating sites for VEMS missions or VEMS training, in a particular region of operation:

(1) at the strategic planning level:

(i) the location of adequate pre-surveyed operating sites taking into account the CMP following a CFP;

(ii) the adequacy of pre-surveyed VEMS operating sites which should be regularly assessed, at least on an annual basis, using publicly available information or by conducting on-site surveys;

(iii) possible changes to the site characteristics which may have taken place since last surveyed;

(iv) the operating region's prevailing weather conditions information, available from local or other sources; this includes:

(A) local observations;

(B) regional weather information (e.g. significant weather charts); and

(C) METAR/TAF of the nearest aerodromes/vertiports;

(2) at the pre-flight planning phase:

(i) the expected weather conditions along the route and at the VEMS operating site should not affect the capability of the VCA to reach a VEMS operating site under CMP following a CFP;

(ii) vertiports or locations suitable for diversion should be programmed into the navigation system, if such system is available on board, so that track and distance to those sites/vertiports are continuously available and immediately displayed when required.

(c) The operator should specify in the operations manual the VEMS sites that are pre-surveyed. The operations manual should contain diagrams and/or ground and aerial photographs, and depiction (pictorial) and description of:

(1) the overall dimensions of the operating site;

(2) the location and height of relevant obstacles in the approach and take-off flight paths and in the manoeuvring area;

(3) the approach and take-off flight paths;

(4) the surface condition (blowing dust/snow/sand);

(5) how third parties ensure control at the site, if applicable;

(6) lighting, if applicable;

(7) site adequacy with reference to aircraft performance;

(8) procedure for activating the operating site in accordance with national regulations, if applicable; and

(9) other useful information; for example, details of the appropriate ATS agency and frequency.

AMC3 SPA.VEMS.100 Emergency medical service operations with manned VTOL-capable aircraft (VEMS)

NON-PRE-SURVEYED VEMS OPERATING SITES

(a) For the use of non-pre-surveyed VEMS operating sites the operator should have in place a procedure that enables the pilot to make a judgement on the suitability of a site for a safe landing and take-off with a reasonable expectation of no injuries to persons in the VCA.

(b) All information reasonably practical to acquire should be used by the operator to establish the characteristics of non-pre-surveyed VEMS operating sites.

GM1 SPA.VEMS.100 Emergency medical service operations with manned VTOL-capable aircraft (VEMS)

NON-PRE-SURVEYED VEMS OPERATING SITES — PROCEDURE

(a) When planning to land at a non-pre-surveyed and unfamiliar site, the PIC should gather as much information as possible about the area allowing the best estimate of obstacles, area slope and terrain.

(b) A reconnaissance turn should be flown prior to landing at a sufficient altitude to determine:

(1) the direction and speed of the wind;

(2) the touchdown point;

(3) suitable approach and departure paths; and

(4) the obstacles in the approach and departure paths.

(c) Whenever necessary, additional reconnaissance turns should be flown until the PIC is satisfied that a safe landing can be conducted. Decision to land or go around should be made before or at the LDP.

(d) The PIC should perform a ground reconnaissance prior to take-off to determine the best take-off path, considering the load, height of obstacles, shape of the area, direction of the wind and surface conditions (dust, sand, snow, mud, rocks). The PIC should consider positioning the VCA at the most downwind position of the site to be able to take off into the wind.

Rationale

Additional reconnaissance turns should remain at the discretion of the PIC. Not always multiple reconnaissance turns are necessary. It depends on the site and situation.

Crews already know their area well. If the site is uncritical, to save time, there is usually one slightly banked fly-by followed by one descending reconnaissance turn and landing.

Most reconnaissance turns are being flown at the same height AGL; often the ceiling does not allow for a 'high' reconnaissance turn. In addition, the obstacles cannot be seen when the reconnaissance turn is performed too high.

There are cases, however, where several reconnaissance turns might be necessary. Flying reconnaissance turns takes time and in EMS time is crucial. Sometimes reconnaissance takes longer than the en-route phase of the flight.

GM1 SPA.VEMS.110 Equipment requirements for VEMS operations

GENERAL

Approval requirements in accordance with Regulation (EU) No 748/2012 apply to permanently installed equipment.

Non-permanently installed equipment is not subject to the airworthiness approval requirements of Regulation (EU) No 748/2012. In addition, no licensed personnel is required to install or remove non-permanently installed equipment. However, the operator should ensure that no equipment (medical or not, installed or not) affects the airworthiness or the safe operation of the aircraft even in the case of failures or malfunctions.

GM2 SPA.VEMS.110 Equipment requirements for VEMS operations

AUTOPILOT

If the VEMS operator chooses to install an autopilot on the VCA, the autopilot should have at least the following functions:

(a) attitude hold;

(b) altitude hold mode; and

(c) heading hold mode.

AMC1 SPA.VEMS.110 Equipment requirements for VEMS operations

MOVING MAP DISPLAYS

The moving map display should show the relative altitude of the surrounding terrain and obstacles to that of the VCA, and may be any of the following:

(a) a TAWS that is airworthiness approved;

(b) a display that is integrated in the cockpit environment and is airworthiness approved;

(c) a type B EFB software application.

The database should cover the area where the VCA usually performs VEMS operations.

GM3 SPA.VEMS.110 Equipment requirements for VEMS operations

MOVING MAPS — TRAINING

ORO.FC.125 requires differences training or familiarisation when introducing new equipment and procedures. For EFB applications, AMC4 SPA.EFB.100(b)(3) defines the related training.

In either case, the training focuses not only on the usage of the equipment or EFB application, but also on its limitations, including the following limitations of moving maps:

(a) Not all terrain and obstacles will be included in the database.

(b) In VFR, the proper selection of altitude and efficient visual scanning of the environment remain the primary means of obstacle and terrain avoidance.

(c) A type B EFB software application can only be used for increased situational awareness.

GM1 SPA.VEMS.120 Visibility and distance from cloud minima

REDUCED VISIBILITY MINIMA

(a) When permitted by the competent authority, in accordance with SERA.5001, to operate VEMS flights with reduced flight visibilities in Class F and Class G airspace, the pilot should only conduct the VEMS flight:

— during day with the surface in sight;

— in flight visibility of not less than 1 500 m, and at a speed of 140 kt IAS or less to have adequate opportunity to observe other traffic and any obstacles in time to avoid a collision.

(b) The reduced visibility minima should also cover VEMS training flights.

AMC1 SPA.VEMS.125 Performance requirements for VEMS operations

VEMS OPERATING SITE DIMENSIONS AND FEATURES

(a) A VEMS operating site in a congested area, when selected from the air, should have a minimum dimension of at least 2 × D.

The operator should establish alternative criteria for VEMS operating sites in non-congested areas, when selected from the air, together with operating procedures and training, which mitigate the risks identified in the operator's risk assessment. In this case the operator may choose not to define minimum site dimensions.

(b) A pre-surveyed VEMS operating site should have a minimum dimension of at least 2 × D.

(c) The VEMS operating site features should enable the VCA to adequately clear all obstructions.

(d) Before operating at a VEMS operating site, the PIC should estimate whether it is suitable for safe operations based on the above and on the environmental conditions.

AMC1 SPA.VEMS.130 Crew requirements

VEMS PILOT-IN-COMMAND MINIMUM EXPERIENCE

(a) The minimum experience level for the PIC who conducts VEMS flights should not be less than:

(1) either:

(i) 1 000 hours as pilot-in-command/commander of any aircraft, of which 500 hours are as pilot-in-command/commander on helicopters and/or VCA; or

(ii) 1 000 hours as co-pilot in VEMS or HEMS operations, of which at least 500 hours are as pilot-in-command under supervision, and 100 hours as pilot-in-command/commander on helicopters and/or VCA; and

(2) 500 hours of operating experience in helicopters and/or VCA, gained in an operational environment similar to that of the intended operation; and

(3) reserved

(4) reserved

(b) The minimum experience level for a commander conducting VEMS flights should take into account the geographical characteristics of the operation (sea, mountain, big cities with heavy traffic, etc.).

AMC2 SPA.VEMS.130 Crew requirements

VEMS TECHNICAL CREW MEMBER

(a) When the crew is composed of one pilot and one VEMS technical crew member, the latter should be seated in a forward-facing front seat during the flight, so as to be able to carry out his or her primary tasks of assisting the commander in:

(1) collision avoidance;

(2) selection of the VEMS operating site;

(3) detection of obstacles during the approach and take-off phases; and

(4) reading of checklists.

(b) By day, the VEMS technical crew member may be seated in the cabin at the discretion of the PIC if all of the following conditions are met:

(1) the VEMS technical crew member provides medical assistance to the medical patient in flight; or

(2) the flight is conducted to or from a VEMS operating site.

(c) The PIC may delegate other aviation tasks to the VEMS technical crew member, as necessary:

(1) assistance in navigation;

(2) assistance in the selection of radio communication/radio navigation means;

(3) if properly qualified and licensed, radio communication; and

(4) monitoring of parameters.

(d) The PIC may also delegate to the VEMS technical crew member tasks on the ground such as:

(1) assistance in preparing the VCA and dedicated medical specialist equipment for a subsequent VEMS departure; or

(2) assistance in the application of safety measures during ground operations with lift and thrust units powered on (including, as applicable, crowd control, embarking and disembarking of passengers, refuelling, battery recharging or swapping, etc.).

(e) There may be exceptional circumstances when it is not possible for the VEMS technical crew member to carry out his or her primary tasks as defined under (a). This is to be regarded as exceptional and the tasks are only to be undertaken at the discretion of the PIC, taking into account the dimensions and environment of the VEMS operating site.

(f) Reserved

(g) When selecting flight crew for single-pilot operations in accordance with SPA.VEMS.130(a), the operator should consider the experience of both the PIC and the technical crew member.

The operator should consider a VEMS technical crew member as inexperienced until he or she has completed 50 route sectors. The operator may include VEMS missions flown during line flying under supervision.

When an inexperienced VEMS technical crew member is part of the crew, the following should apply:

(1) the pilot has achieved 30 route sectors on the type within a period of 60 days since the completion of the operator's conversion course on the type; or

(2) the pilot has achieved 50 route sectors on the type after the completion of the operator's conversion course on the type.

(h) A smaller number of sectors than those defined in (g) may be acceptable to the competent authority and subject to any conditions which the competent authority may impose, when one of the following applies:

(1) a new operator commences operations;

(2) an operator introduces a new VCA type;

(3) the pilot has previously completed a type conversion course with the same operator (reconversion);

(4) credits are defined in the operational suitability data established in accordance with Commission Regulation (EU) No 748/2012.

AMC3 SPA.VEMS.130 Crew requirements

SINGLE-PILOT OPERATIONS WITH NO TECHNICAL CREW MEMBER

(a) The PIC should decide whether the technical crew member can be relieved from aviation tasks to provide medical assistance to the medical patient on the ground or in flight or during the transport of the medical patient in another vehicle.

(b) When relieved from aviation tasks, the technical crew member should take part in the departure briefing that summarises the relevant obstacles and threats.

GM1 SPA.VEMS.130 Crew requirements

CONTINUITY OF THE CREW CONCEPT

The crew concept includes the operator's normal crew composition and variations to it that the operator accepts that will occur during the VEMS mission. The operator ensures the continuity of the crew concept by managing these variations.

AMC4 SPA.VEMS.130 Crew requirements

FLIGHT CREW TRAINING AND CHECKING SYLLABUS

(a) The flight crew initial and recurrent training syllabus should include the following items:

(1) meteorological training focusing on the understanding and interpretation of available weather information;

(2) preparing the VCA and specialist medical equipment for subsequent VEMS departure;

(3) practice of VEMS departures;

(4) assessment from the air of the suitability of VEMS operating sites;

(5) medical effects that air transport may have on the patient;

(6) in-flight replanning, including fuel/energy replanning and CMP constraints.

(b) Single-pilot operations

(1) The flight crew training syllabus should include initial and annual recurrent VCA/FSTD training focusing on crew cooperation with the technical crew member.

(2) The initial training should include at least 4 hours flight instruction dedicated to crew cooperation unless the pilot:

(i) holds a certificate of satisfactory completion of a multi-crew cooperation course in accordance with Commission Regulation (EU) No 1178/2011; or

(ii) has at least 500 hours in either multi-pilot operations or single-pilot operations with a VEMS or HEMS technical crew member, or a combination of these.

(3) The training described in (1) and (2) above should be organised with a crew composition of one pilot and one technical crew member.

(4) The training described in (1) and (2) should be conducted by a suitably qualified commander/PIC with a minimum experience of 350 route sectors in either multi-pilot operations or single-pilot operations with a VEMS or HEMS technical crew member, or a combination of these.

(c) The flight crew checking syllabus should include:

(1) proficiency checks, which should include landing and take-off profiles likely to be used at VEMS operating sites; and

(2) line checks, with special emphasis on all of the following:

(i) local area meteorology;

(ii) VEMS flight planning and in-flight replanning;

(iii) VEMS departures;

(iv) the selection from the air of VEMS operating sites;

(v) familiarity with established VEMS operating sites and diversion locations in the operator's local area register;

(vi) crew cooperation.

AMC5 SPA.VEMS.130 Crew requirements

VEMS TECHNICAL CREW MEMBER TRAINING AND CHECKING SYLLABUS

INITIAL AND RECURRENT TRAINING COVERING PRIMARY TASKS

(a) The VEMS technical crew member initial and recurrent training and checking syllabus covering primary tasks should include the following items:

(1) Applicable laws and regulations;

(2) VCA general knowledge:

(i) stowage, cabin safety and use of on-board medical equipment;

(ii) general knowledge of VCA operations;

(3) Meteorology;

(4) Operational procedures:

(i) company procedures;

(ii) duties in the VEMS role;

(iii) response to VEMS dispatch;

(iv) VEMS operating site selection and use;

(v) patients;

(v) portable electronic devices and electronic flight bags, as applicable.

(5) Crew coordination, including checklists;

(6) Human performance and limitations, CRM in accordance with AMC1 ORO.FC.115;

(7) Flight safety:

(i) general flight safety in VCA operations;

(ii) obstacle and traffic clearance;

(iii) handling of abnormal and emergency situations, including checklists;

(iv) dangerous goods (DG), as relevant for VEMS operation;

(8) Security.

NAVIGATION TRAINING

(b) If the VEMS technical crew member is tasked to provide assistance in navigation, the initial and recurrent training and checking syllabus should also include the following items:

(1) applicable parts of SERA, as relevant to the navigation tasks of the VEMS crew member;

(2) basic navigation training;

(3) navigation aid principles and use;

(4) airspace, restricted areas, and noise-abatement procedures.

(5) crew coordination.

COMMUNICATION TRAINING

(c) If the VEMS technical crew member is tasked to provide assistance in radio communications, the initial and recurrent training and checking syllabus should also include the following items:

(1) operation of relevant radio equipment;

(2) crew coordination.

MONITORING TRAINING

(d) If the VEMS technical crew member is tasked to provide assistance in monitoring the flight path and instruments, the initial and recurrent training and checking syllabus should also include the following items:

(1) general knowledge of VCA operations;

(2) monitoring function;

(3) crew coordination;

(4) handling of abnormal and emergency situations, as applicable.

GROUND CREW TRAINING

(e) If the VEMS technical crew member is tasked to provide assistance to the VCA on the ground, the initial and recurrent training and checking syllabus should also include the following items as applicable to their tasks:

(1) safety and security at the VEMS operating site;

(2) the dangers to self and others by rotors or propellers or other rotating parts;

(3) preparing the VCA and specialist medical equipment for subsequent departure;

(4) conducting refuelling, and conducting refuelling with lift and thrust units powered on;

(5) marshalling signals;

(6) safety on the vertiport/operating site, including fire prevention and ramp safety areas;

(7) towing of VCA/trolley; and

(8) risks arising from damaged VCA batteries.

ADDITIONAL TRAINING, AS APPROPRIATE

(f) Reserved

CONVERSION COURSE GROUND TRAINING AND CHECKING

(g) The conversion course ground training and checking when changing VCA types should include the elements of (a) to (f) above that are relevant to the new VCA type.

(h) The conversion course ground training and checking when changing operators should include the elements of (a) to (f) above that are relevant in the context of changing operators.

INITIAL VCA/FSTD TRAINING

(i) The technical crew member training syllabus should include VCA/FSTD training focusing on crew cooperation with the pilot.

(1) The initial VCA/FSTD training should include at least 4 hours of instruction dedicated to crew cooperation unless:

(i) the VEMS crew member has undergone this training under another operator; or

(ii) the VEMS crew member has performed at least 50 missions in VEMS or equivalent role as a technical crew member.

(2) The initial VCA/FSTD training should be organised with a crew composition of one pilot and one technical crew member.

(3) The initial VCA/FSTD training may be combined with the line flying under supervision.

LINE FLYING UNDER SUPERVISION

(j) Line flying under supervision

(1) Line flying under supervision should take place during the operator's conversion course.

(2) Line flying under supervision provides the opportunity for a VEMS technical crew member to practise the procedures and techniques he or she should be familiar with, regarding ground and flight operations, including any elements that are specific to a particular VCA type. Upon completion of the line flying under supervision, the VEMS technical crew member should be able to safely conduct the flight operational duties assigned to him or her according to the procedures laid down in the operator's operations manual.

(3) Line flying under supervision should include a minimum of five sectors. These sectors should include a minimum of three VEMS operating sites that the technical crew member is not familiar with.

RECURRENT VCA/FSTD TRAINING

(k) Recurrent VCA/FSTD training

(1) The recurrent VCA/FSTD training should focus on crew cooperation and contain a minimum of 2 hours of flight.

(2) The recurrent VCA/FSTD training should take place in the same conditions as the initial training in (i) above.

(3) The validity period of the recurrent VCA/FSTD training should be 12 calendar months.

LINE CHECKS

(l) Line checks

(1) The line check should be performed during a VEMS mission or alternatively, during a flight that is representative of a VEMS mission.

(2) The operator's conversion course should include a line check. The line check should take place after the completion of the line flying under supervision.

(3) Any task-specific items may be checked by a suitably qualified VEMS technical crew member nominated by the operator and trained in CRM concepts and the assessment of non-technical skills.

OPERATOR PROFICIENCY CHECKS

(m) Operator proficiency checks

(1) The VEMS technical crew member should complete an operator proficiency check to demonstrate his or her competence in carrying out normal, abnormal and emergency procedures, covering the relevant aspects associated with the flight operational tasks described in the operations manual and not already covered in the line check.

(2) The conversion course should include an operator proficiency check.

(3) The operator proficiency check should be valid for a given VCA type. In order to consider an operator proficiency check to be valid for several VCA types, the operator should demonstrate that the types are sufficiently similar from the technical crew member's perspective.

PROVISION OF TRAINING AND CHECKING

(n) Use of FSTDs

(1) The line check and line flying under supervision should be performed in the VCA used for the training of the VEMS technical crew member or in another VCA of the same type or variant.

(2) Notwithstanding (1), the operator may perform the line check in two parts, in a suitable FSTD and on ground, if all of the following conditions are met:

(i) the FSTD part of the line check takes place in a line-oriented evaluation;

(ii) the ground part of the line check takes place at the VEMS operating base and includes all normal operating procedures not checked in the FSTD;

(iii) both parts of the line check are conducted within 3 months of each other;

(iv) for the purpose of AMC1 SPA.VEMS.130, the line check is considered to be performed on the day when the last part of the line check is completed;

(v) for the purpose of (ii), the operator should arrange to replicate realistic conditions as much as practicable, so that normal operating procedures that take place on ground at the VEMS operating site are also checked.

(3) Operator proficiency checks and FSTD training should be performed in a suitable FSTD or, if it is not reasonably practicable to gain access to such devices, in the VCA used for the training of the VEMS technical crew member or in another VCA of the same type or variant.

(o) Emergency and safety equipment training should be performed in the VCA involved in VEMS operations or in a representative training device or in a VCA of the same type or variant.

(p) The type of equipment used for training and checking should be representative of the instrumentation, equipment and layout of the VCA type to be operated by the crew member.

(q) Training and checking in the VCA/FSTD should take place as part of the normal crew complement.

(r) The person conducting the training and checking should be a suitably qualified PIC nominated by the operator. In the case of the training described in (i) and (k) above, the person conducting the training should have a minimum experience of 350 hours in either multi-pilot operations or single-pilot operations with a VEMS/HEMS technical crew member or a combination of these two types of operations. The person conducting a CRM assessment should be trained in CRM concepts and the assessment of CRM skills.

(s) Notwithstanding (r), the person conducting the training and checking of tasks conducted in the cabin where crew cooperation is not essential may be a suitably qualified technical crew member nominated by the operator.

CRM ASSESSMENT OF THE VEMS TECHNICAL CREW MEMBER

(t) A CRM assessment should take place during the line check or should take place annually in a line-oriented flight scenario (LOFT or line-oriented section of the operator proficiency check) of an FSTD session in a suitable FSTD. The CRM assessment in the VCA type to be operated by the crew member should take place as described for the pilots in AMC1 ORO.FC.430 point (b)(3)(vi) or (b)(3)(vii).

AMC6 SPA.VEMS.130 Crew requirements

LINE CHECKS

Where due to the size, the configuration or the performance of the VCA, the line check cannot be conducted on an operational flight, it may be conducted on a specially arranged representative flight. This flight may be immediately adjacent to, but not simultaneous with, one of the biannual proficiency checks.

GM2 SPA.VEMS.130 Crew requirements

VEMS TECHNICAL CREW MEMBER THEORETICAL TRAINING

(a) The VEMS technical crew member training and checking may be adapted to the knowledge of the technical crew member and structured as shown in Table 1. The operator should decide to what extent a qualified HEMS technical crew member needs the theoretical training as shown in Table 1.

Table 1: VEMS technical crew member training

VEMS TECHNICAL CREW MEMBER TRAINING TRAINING TOPIC	Trainee with PPL(H)*	Trainee with PPL(A)**	Other Trainee
(1) Applicable laws and regulations			
(i) Introduction to the regulatory environment applicable to VEMS operations, including SERA			X
(ii) VEMS requirements	X	X	X
(iii) Public interest sites (PISs) if applicable	X	X	X
(2) VCA general knowledge			
(i) Stowage, cabin safety and use of on-board medical equipment			
(A) safe storage of loose personal objects and medical equipment			X
(B) securing patients on the EMS stretcher (if applicable)	X	X	X
(C) influence of medical equipment usage on VCA systems (e.g. defibrillator)	X	X	X
(ii) General knowledge of VCA operations			
(A) general principles of flight		X	X
(B) VCA mass and balance			X
(C) VCA performance (including CSFL capability and operations)	X	X	X

(D) location and design of normal and emergency systems and equipment including all VCA lights and operation of doors			X
(E) intercommunication system			X
(3) Meteorology			
(i) meteorology as relevant to the operating area			X
(ii) meteorology as a limiting factor for mission planning/execution			X
(4) Operational procedures			
(i) operator's procedures			
(A) the relevant extracts of the organisation's management manual and operations manual	X	X	X
(B) operational control and supervision	X	X	X
(ii) duties in the VEMS role			
(A) duties of the technical crew member before flight, during all flight phases and post-flight duties	X	X	X
(B) legal aspects of delegated tasks by the commander	X	X	X
(iii) response to VEMS dispatch			
(A) flight planning, preparation, and in-flight operations	X	X	X
(iv) VEMS operating site selection and use			
(A) minimum dimensions or equivalent criteria	X	X	X

(B) effects of downwash (outwash)	X	X	X
(C) accessibility	X	X	X
(v) patients (if applicable)			
(A) aspects of VEMS operating site selection for patient transport	X	X	X
(B) patient on-/off-loading	X	X	X
(C) medical consequences of air transport on patients including influence of noise, vibration, air pressure and temperature	X	X	X
(D) consequences of hospital selection on flight (endurance, weather)	X	X	X
(E) knowledge of hospital casualty reception	X	X	X
(vi) Portable electronic devices and electronic flight bags, as applicable	X	X	X
(5) Crew coordination including checklists			
(i) crew concept	X	X	X
(ii) checklist reading philosophy, initiation, interruptions, and termination	X	X	X
(iii) communication and call-outs	X	X	X
(iv) effective use of intercommunication system	X	X	X
(v) early identification of pilot incapacitation	X	X	X
(vi) debriefing	X	X	X

(6) Human performance and limitations, CRM: as per AMC1 ORO.FC.115	X	X	X
(7) Flight safety			
(i) general flight safety in VCA operations			
(A) if necessary, noise protection for crew members embarking/disembarking with lift and thrust units powered on		X	X
(B) the dangers to self and others of turning rotors or turning propellers or other rotating parts; familiarisation with hazard areas of the VCA		X	X
(C) effects of downwash (outwash) on persons and objects		X	X
(D) dangers of turning rotors or tuning propellers or other rotating parts hitting objects on ground and in flight		X	X
(E) safety at the VEMS operating site		X	X
(F) safety at other landing sites, including the VEMS operating base and diversion locations		X	X
(ii) obstacle and traffic clearance			
(A) importance of lookout for collision avoidance and associated call-outs			X
(B) application of the sterile flight crew compartment procedures during critical phases of flight			X
(C) identification of obstacles and conflicting terrain			X

(iii) handling of abnormal and emergency situations including checklists			
(A) necessary coordination procedures between flight and technical/other crew members including checklists as applicable	X	X	X
(B) early identification of pilot incapacitation	X	X	X
(C) emergency evacuation	X	X	X
(iv) dangerous goods (DG), as relevant for VEMS operation			
(A) DG that might be in medical passengers' luggage including oxygen, if not part of the cabin design			X
(B) awareness of DG that might be in patients' or other passengers' luggage, backpacks or clothes			X
(8) security			
(i) The operator's security programme	X	X	X
(ii) VEMS operating sites and operating base	X	X	X

* *Applicable to trainees that have passed the theoretical knowledge examination for at least PPL(H) or that hold at least a PPL(H).*

** *Applicable to trainees that have passed the theoretical knowledge examination for at least PPL(A) or that hold at least a PPL(A).*

(b) The operator may consider that trainees that have passed the theoretical knowledge examination for at least PPL(A) or PPL(H), or that hold at least a PPL(A) or PPL(H), or that are qualified HEMS technical crew members do not need additional navigation training. In all other cases, if the VEMS technical crew member is tasked to provide assistance in navigation, the navigation training may be structured as follows:

(1) Applicable parts of SERA, as relevant to the navigation tasks of the VEMS crew member

(2) Basic navigation training

(i) charts (convergence, scale, projections, symbology, plotting)

(ii) measuring distances and courses

(iii) ability to keep track with helicopter position on map

(iv) moving map if applicable

(v) identification of obstacles and conflicting terrain

(vi) time (local/UTC, sunrise/sunset) and speed

(vii) units and unit conversion

(3) Principles and use of navigation aids

(i) navigation equipment and AFCS operations as applicable

(ii) transponder

(iii) ACAS, HTAWS, weather radar, moving map, as applicable

(iv) inadvertent IMC

(4) Airspace, restricted areas, and noise-abatement procedures

(i) air traffic services

(ii) aerodrome procedures

(iii) AIP

(iv) NOTAMs

(5) Crew coordination: assignment of navigation tasks

(c) The operator may consider that trainees that have passed the theoretical knowledge examination for at least PPL(A) or PPL(H) or that hold at least a PPL(A) or PPL(H), or are qualified HEMS technical crew member, do not require communication training. In all other cases, if the VEMS technical crew member is tasked to provide assistance in radio communications, the radio communications training may be structured as follows:

(1) operation of relevant radio equipment: radio licence as applicable to the frequencies used by the technical crew member;

(2) crew coordination: effective use of radio communication system.

(d) If the VEMS technical crew member is tasked to provide assistance in monitoring, the training towards monitoring may be adapted to the knowledge of the technical crew member and structured as shown in Table 2.

Table 2: VEMS technical crew member monitoring training

VEMS TECHNICAL CREW MEMBER MONITORING TRAINING **TRAINING TOPIC**	**Trainee with PPL(H)***	**Trainee with PPL(A)****	**Other trainee**
(1) General knowledge of VCA operations			
(i) general knowledge of VCA structure, power plant, systems, instruments, and airworthiness		X	X
(ii) limitations, normal, and abnormal procedures including CSFL-capability	X	X	X
(2) Monitoring function			
(i) assignment of flight crew compartment tasks	X	X	X
(ii) parameters the VEMS crew member is tasked to monitor	X	X	X
(iii) flight path monitoring in the context of collision avoidance and, if applicable, navigation	X	X	X
(3) Crew coordination			
(i) assignment of monitoring tasks	X	X	X
(ii) emphasis on call-outs and actions resulting from the monitoring process	X	X	X
(4) Handling of abnormal and emergency situations, as applicable			
(i) definition of warnings, cautions and advisories			X
(ii) identification of malfunctions (visual and aural)			X
(iii) selection of appropriate abnormal or emergency procedure in checklist			X
(iv) abnormal or emergency procedures checklist reading			X
(v) monitoring of critical actions			X
(vi) distress call and other means of emergency signalling			X

* *Applicable to trainees that have passed the theoretical knowledge examination for at least PPL(H) or that hold at least a PPL(H).*

*** Applicable to trainees that have passed the theoretical knowledge examination for at least PPL(A) or that hold at least a PPL(A).*

(e) Reserved

(f) If the VEMS technical crew member is tasked to provide assistance on the ground, the training towards these tasks may be structured as in AMC5 SPA.VEMS.130.

GM3 SPA.VEMS.130 Crew requirements

VEMS TECHNICAL CREW MEMBER OBSERVATION FLIGHTS

If the candidate VEMS technical crew member has no prior flight experience as technical crew member, flight crew member or student pilot, the operator may provide observation flights on VEMS missions, prior to the VCA/FSTD training, once the ground training and checking of the conversion course has been completed.

GM4 SPA.VEMS.130 Crew requirements

USE OF VEMS OPERATING SITES FOR TRAINING AND CHECKING

In order to ensure that the training and checking is relevant to the duties of the crew members and ground personnel as required by ORO.GEN.110(e), the operator may define VEMS operating sites for the purpose of the VEMS training and checking required in SPA.VEMS.130, except for the initial part of the training.

The training and checking may involve all personnel necessary to the VEMS mission.

AMC1 SPA.VEMS.135 Briefing of VEMS medical passengers and of other personnel

VEMS MEDICAL PASSENGER BRIEFING

The briefing should ensure that the medical passenger understands his or her role in the operation, which includes:

(a) the familiarisation with the VCA type(s) operated;

(b) the entry and exit under normal and emergency conditions both for self and patients;

(c) the use of the relevant on-board specialist medical equipment;

(d) the need for the PIC's approval prior to the use of specialised equipment;

(e) the method of supervision of other medical staff;

(f) the use of VCA inter-communication systems;

(g) the location and use of on-board fire extinguishers; and

(h) the operator's crew coordination concept including relevant elements of crew resource management.

AMC2 SPA.VEMS.135 Briefing of VEMS medical passengers and of other personnel

GROUND EMERGENCY SERVICE PERSONNEL

(a) The VCA operator should provide assistance for the training of emergency service personnel in VEMS support. This can be achieved by various means, such as, but not limited to, the production of flyers, publication of relevant information on the operator's website, development of applications and provision of extracts from the operations manual.

(b) The elements that should be covered include:

(1) two-way radio communication procedures with VCA;

(2) the selection of suitable VEMS operating sites for VEMS flights;

(3) the physical danger areas of VCA;

(4) crowd control in respect of VCA operations; and

(5) the evacuation of VCA occupants following an on-site VCA accident.

GM1 SPA.VEMS.135 Briefing of VEMS medical passengers and of other personnel

GROUND EMERGENCY SERVICE PERSONNEL

(a) When applying AMC2 SPA.VEMS.135, the VEMS operator may describe the following items:

(1) Definitions: List applicable definitions and abbreviations

(2) VCA(s)

(i) Type(s) of VCA(s) in use and layout(s) such as doors for loading and offloading with text(s), figure(s) or photo(s); and

(ii) Hazardous areas with figure(s) or photo(s), with emphasis on dangers from turning rotors or turning propellers or other rotating parts, as well as from sloping terrain.

(3) Types, and selection, of VEMS operating sites as applicable to the operation

(i) Various types of VEMS operating sites; for example, roads, mountains, gardens, fields, mountain ledges, steep terrain, football fields, school yards, pre-surveyed sites, aerodromes;

(ii) Advantages and disadvantages, hazards (for example, weather and light conditions, the use of flashlights/searchlights, surface, dust, snow, fixed and loose obstacles, wires, downwash (outwash), open fires/fireplaces, traffic and bystanders), limitations and procedures associated with the various types of VEMS operating sites;

(iii) Challenges related to weather (temperature, wind, fog, low clouds, rain, snow) and light conditions;

(iv) VEMS operating site dimension(s) for the different type(s) of VCA(s) with text(s), figure(s) or photo(s);

(v) How to illuminate the VEMS operating site from the ground;

(vi) Light on skid/wheel;

(vii) Ground to VCA signals;

(viii) Special hazards related to fire or chemical, biological, or radiological accidents and the importance of selecting a safe VEMS operating site(s) for the protection of both ground emergency services personnel and crew; and

(ix) Communication between the ground emergency services personnel and VCA during landing (radio communication or hand signals).

(b) The operator could make available a short checklist, covering, for example, the following actions:

(1) establish communication;

(2) select operating site;

(3) secure the operating site (public/bystanders/crowd control/obstacles/loose objects); and

(4) communicate with the VCA the position of/how to identify the operating site, weather, and hazards.

(c) Operators in the same operating area should collaborate when developing checklists and when describing items covered in AMC2 SPA.VEMS.135.

AMC1 SPA.VEMS.140 Information, procedures and documentation

OPERATIONS MANUAL

The operations manual should include all of the following:

(a) the use of portable equipment on board;

(b) guidance on take-off and landing procedures at non-pre-surveyed VEMS operating sites;

(c) the final reserve fuel/energy, in accordance with UAM.OP.VCA.191;

(d) operating minima;

(e) recommended routes for regular flights to pre-surveyed VEMS operating sites, including the minimum flight altitude;

(f) guidance for the selection of the VEMS operating site in the case of a flight to a non-pre-surveyed VEMS operating site;

(g) the safety altitude for the area overflown;

(h) abnormal procedures including procedures to be followed in case of inadvertent entry into cloud;

(i) operational dispatch criteria;

(j) a description of the crew composition for all phases of flight and conditions, standard operating procedures for the described crew composition including any procedures to ensure the continuity of the crew concept;

(k) flight crew and technical crew training and checking syllabi, as required by SPA.VEMS.130.

AMC2 SPA.VEMS.140 Information, procedures and documentation

VEMS OPERATOR'S RISK ASSESSMENT

The operator's VEMS risk assessment should take into account, but not be limited to, all of the following:

(a) adequate ground reference;

(b) reliability of weather reporting facilities;

(c) crew composition, minimum crew qualification, initial and recurrent training;

(d) flight time limitations and crew fatigue;

(e) operating procedures, including crew coordination;

(f) weather minima;

(g) equipment of the VCA;

(h) additional considerations due to specific local conditions;

(i) location and availability of diversion locations;

(j) CSFL-compliance, both for pre-flight planning and in-flight replanning

GM1 SPA.VEMS.140(b) Information, procedures and documentation

VEMS TACTICAL RISK ASSESSMENT

The tactical risk assessment of the PIC of a VEMS flight may be included in the daily briefing and amended as necessary. The following may be considered:

(a) operating environment, including airspace, local geography and availability of diversion locations;

(b) weather;

(c) NOTAMs;

(d) performance;

(e) VCA, equipment and defects, MEL, and medical equipment;

(f) fuel/energy planning;

(g) crew fatigue, recency and qualifications;

(h) dispatch criteria;

(i) tasking, roles and responsibilities;

(j) in-flight replanning;

(k) relevant threats.

AMC1 SPA.VEMS.150 Fuelling/defuelling/battery charging/battery swapping while passengers are embarking, on board, or disembarking

The VEMS operator should comply with UAM.OP.MVCA.200 or UAM.OP.MVCA.205 as applicable, considering that medical personnel, ill or injured persons and other persons directly involved and technical crew may be embarking, on board, or disembarking.

AMC1 SPA.VEMS.155 Aircraft tracking system

GENERAL

(a) The operator should track and monitor VEMS flights from take-off to landing.

(b) The operator should establish a detailed procedure describing how the aircraft tracking system is to be monitored, what actions are to be taken if a deviation or anomaly has been detected, and when those actions are to be taken.

OPERATIONAL PROCEDURE

(c) The procedure should take into account the following aspects:

(1) the outcome of the risk assessment made when the frequency of position reports was defined;

(2) the local environment of the intended operations; and

(3) the interface with the operator's emergency response plan.

(d) Aircraft tracking data should be recorded on the ground and retained for at least 48 hours. Following an accident or a serious incident subject to investigation, the data should be retained for at least 30 days, and the operator should be capable of providing a copy of this data without delay.

7.6. Draft AMC & GM to Annex IX (Part-IAM)

GM1 IAM.GEN.050 Scope

IAM OPERATIONS WITH VCA INCLUDED IN THE SCOPE

The scope of applicability of IAM operations includes:

(a) commercial air transport operations with manned VCA;

(b) non-commercial operations with manned VCA, including training flights, maintenance check flights, demonstration flights and ferry flights;

(c) emergency medical services (EMS) with manned VCA (VEMS).

Rationale

The current scope of Annex IX (Part-IAM) to Regulation (EU) 965/2012 is limited to manned operations with VCA. The structure of this Annex is so conceived so that it can accommodate in the future other aspects of VCA operations; for instance, VFR night, IFR, operations in non-congested areas only, VCA certified in the basic category of VTOL, unmanned VCA for passengers' transport and unmanned VCA for small cargo deliveries in urban areas.

Although IAM operations include among other things commercial air transport operations, it was decided to distinguish between existing CAT with aeroplanes and helicopters and IAM operations with VCA. It should be noted that IAM also includes non-commercial operations (passengers, cargo, training flights, maintenance check flights, demonstration flights and ferry flights). Unlike non-commercial operations with aeroplanes and helicopters, which are subject to different sets of rules (NCC, NCO, SPO), non-commercial flights with VCA will be subject to the requirements of Part-IAM.

AMC1 IAM.GEN.VCA.100 Pilot responsibilities

COPIES OF REPORTS

Where a written report is required, a copy of the report should be communicated to the PIC concerned unless the terms of the operator's reporting scheme dictate otherwise.

GM1 IAM.GEN.VCA.100 Pilot responsibilities

OCCURRENCE REPORTING SCHEME

Regulation (EU) No 376/2014 of the European Parliament and of the Council contains the relevant requirements of the operator's occurrence reporting scheme.

GM2 IAM.GEN.VCA.100 Pilot responsibilities

FLIGHT TIME, DUTY TIME AND REST REQUIREMENTS

IAM.GEN.VCA.100(b)(4) does not require that the pilots of VCA and other crew members of VCA comply with the flight time, duty time and rest requirements (FTL) contained in Regulation (EU) 965/2012, Part-ORO, Subpart FTL, which apply to aircrew in CAT operations with aeroplanes. With regard to VCA operations, flight time, duty time and rest requirements may be established at the operator and/or national level.

AMC2 IAM.GEN.VCA.100 Pilot responsibilities

ALCOHOL CONSUMPTION

The operator should issue instructions concerning the consumption of alcohol by crew members. The instructions should be not less restrictive than the following:

(a) no alcohol should be consumed less than 8 hours prior to the specified reporting time for a flight duty period or the commencement of standby;

(b) the blood alcohol level should not exceed the lower of the national requirements or 0.2 per thousand at the start of a flight duty period;

(c) no alcohol should be consumed during the flight duty period or whilst on standby.

GM3 IAM.GEN.VCA.100 Pilot responsibilities

ELAPSED TIME BEFORE RETURNING TO FLYING DUTY

24 hours is a suitable minimum length of time to allow after normal blood donation or normal recreational (sport) diving with compressed air before returning to flying duties. This should be

considered by operators when determining a reasonable time period for the guidance of crew members.

Information on the effects of medication, drugs, other treatments and alcohol can be found in Annex IV (Part-MED) to Commission Regulation (EU) No 1178/2011.

AMC1 IAM.GEN.VCA.105 Responsibilities of the pilot-in-command (PIC)

INITIATION (COMMENCEMENT) OF FLIGHT

The PIC should only commence a flight if he or she is satisfied that:

(a) instruments and equipment required for the execution of that flight are installed in the VCA and are operative, unless operation with inoperative equipment is permitted by the minimum equipment list (MEL) or equivalent document;

(b) the mass of the VCA and centre of gravity (CG) location are such that the flight can be conducted within the limits prescribed in the airworthiness documentation;

(c) all baggage and cargo are properly loaded and secured;

(d) the VCA operating limitations as specified in the VCA flight manual (AFM) will not be exceeded at any time during the flight;

(e) the pilot and other crew members under his or her authority are properly rated and meet competency and recency requirements;

(f) the other crew members under his or her authority are not incapacitated from performing duties by any cause such as injury, sickness, fatigue or the effects of any psychoactive substance;

(g) any navigational database required for the flight is suitable and current.

GM1 IAM.GEN.VCA.105 Responsibilities of the pilot-in-command (PIC)

MEANING OF THE TERM 'ENSURE'

The term 'ensure' in the context of PIC responsibilities means that the PIC should make all reasonable endeavours to obtain the required result, either directly or through another person, placed under their authority.

AMC2 IAM.GEN.VCA.105 Responsibilities of the pilot-in-command (PIC)

AUTHORITY OF THE PIC

The operator should ensure that the PIC has the authority to:

(a) disembark any person, or any part of the cargo, that may represent a potential hazard to the safety of the VCA or its occupants;

(b) not allow a person to be carried in the VCA who appears to be under the influence of alcohol or drugs to the extent that the safety of the VCA or its occupants is likely to be endangered;

(c) refuse transportation of inadmissible passengers, deportees or persons in custody if their carriage increases the risk to the safety of the VCA or its occupants.

AMC3 IAM.GEN.VCA.105 Responsibilities of the pilot-in-command (PIC)

PRESERVATION OF FLIGHT RECORDER RECORDINGS

The PIC should ensure that in the event of an occurrence that is subject to reporting in accordance with ORO.GEN.160(a) or if preservation of recordings of the flight recorder is directed by the investigating authority:

(a) the recordings of the flight recorder are not intentionally erased; and

(b) precautionary measures to preserve the recordings of the flight recorder are taken before leaving the VCA.

GM2 IAM.GEN.VCA.105 Responsibilities of the pilot-in-command (PIC)

ACCEPTANCE OF THE VCA WITH UNSERVICEABILITY

The acceptance of the VCA with unserviceability in accordance with the configuration deviation list (CDL) or the minimum equipment list (MEL) and VCA technical log book may be supported by maintenance or other personnel, if properly licensed.

AMC4 IAM.GEN.VCA.105 Responsibilities of the pilot-in-command (PIC)

BIRD HAZARDS AND STRIKES

(a) Whenever a potential bird hazard is observed, the PIC should inform the appropriate ATS unit as soon as his or her workload allows.

(b) In case of a bird strike that results in significant damage to the VCA or the loss or malfunction of any essential service, the PIC should submit a written bird strike report to the competent authority after landing in accordance with ORO.GEN.160.

GM1 IAM.GEN.VCA.130 Powering-on of lift and thrust units

INTENT OF THE RULE

(a) The following two situations where the lift and trust units are powered on should be distinguished:

(1) for the purpose of flight; this is the intent of IAM.GEN.VCA.130;

(2) for maintenance purposes or for parking.

(b) Lift and trust unit engagement for the purpose of flight: the pilot should not leave the controls when the lift and trust units are powered on.

(c) Engagement of lift and trust units for the purpose of maintenance or parking: IAM.GEN.VCA.130 does not prevent ground runs or ground taxi from being conducted by qualified and authorised personnel other than pilots.

AMC1 IAM.GEN.VCA.140 Portable electronic devices (PEDs)

USE OF PEDs

(a) The IAM operator should comply with AMC1 CAT.GEN.MPA.140 as regards the technical prerequisites for the use of PEDs.

(b) The IAM operator should comply with AMC2 CAT.GEN.MPA.140 as regards the procedures for the use of PEDs.

GM1 IAM.GEN.VCA.140 Portable electronic devices (PEDs)

USE OF PEDs

Useful guidance material about the use of PEDs can be found in:

— GM1 CAT.GEN.MPA.140;

— GM2 CAT.GEN.MPA.140; and

— GM3 CAT.GEN.MPA.140.

AMC1 IAM.GEN.VCA.141 Use of electronic flight bags (EFBs)

EFB HARDWARE AND SOFTWARE APPLICATIONS

(a) The IAM operator should comply with AMC1 CAT.GEN.MPA.141(a) as regards the hardware of EFBs.

(b) The IAM operator should comply with AMC1 CAT.GEN.MPA.141(b) as regards the application classification of EFBs.

(c) The IAM operator should comply with AMC2 CAT.GEN.MPA.141(b) as regards type A EFB applications. The term 'airport' should be understood to also mean 'vertiport' in the case of IAM operations.

(d) The IAM operator should comply with AMC3 CAT.GEN.MPA.141(b) for type B EFB applications. The term 'airport' should be understood to also mean 'vertiport' in the case of IAM operations.

GM1 IAM.GEN.VCA.141 Use of electronic flight bags (EFBs)

USE OF EFBs

Useful guidance material about the use of EFBs can be found in:

— GM1 CAT.GEN.MPA.141;

— GM2 CAT.GEN.MPA.141;

— GM1 CAT.GEN.MPA.141(a);

— GM1 CAT.GEN.MPA.141(b); and

— GM2 CAT.GEN.MPA.141(b).

AMC1 IAM.GEN.VCA.145 Information on emergency and survival equipment carried on board VCA

ITEMS FOR COMMUNICATION TO THE RCC

The IAM operator should include, as applicable, the number, colour and type of life rafts and pyrotechnics, details of emergency medical supplies, e.g. first-aid kits, emergency medical kits, water supplies and the type and frequencies of the emergency portable radio equipment.

GM1 IAM.GEN.VCA.155 Carriage of weapons of war and munitions of war

WEAPONS OF WAR AND MUNITIONS OF WAR

(a) Considering the increased security risks during VCA operations in congested areas or in other sensitive areas, carriage of weapons of war on board should not be permitted. Weapons of war carried by sky marshals or bodyguards may be allowed under strict conditions, but this is rather an exception and not a regular operation.

(b) There is no internationally agreed definition of weapons of war and munitions of war. Some States may have defined them for their particular purposes or for national need.

(c) It is the responsibility of the operator to check, with the State(s) concerned, whether or not a particular weapon or munition is regarded as a weapon of war or munitions of war. For the purpose of granting approvals for the carriage of weapons of war or munitions of war, the States concerned are those of origin, transit, overflight and destination of the consignment and the State of the operator.

AMC1 IAM.GEN.VCA 160 Carriage of sporting weapons and ammunition

STOWAGE IN THE VCA

(a) If sporting weapons cannot be stowed in a place that is inaccessible with all ammunition unloaded, they should not be accepted for carriage. Exemptions may be provided by the competent authority on a case-by-case basis.

(b) Where the VCA does not have a separate compartment in which the sporting weapons can be stowed, they should be stowed so they are not immediately accessible to the passengers, e.g. in locked boxes, in checked baggage that is stowed under other baggage or under fixed netting.

(b) Unloaded ammunition for sporting weapons may be carried separately in passengers' checked baggage, in accordance with the technical instructions.

GM1 IAM.GEN.VCA. 160 Carriage of sporting weapons and ammunition

SPORTING WEAPONS

(a) In accordance with Regulation (EC) No 300/2008, sporting weapons may be carried on board an aircraft, in a place that is not inaccessible, if the required security conditions in accordance with national laws have been fulfilled and an authorisation has been given by the State(s) involved.

(b) There is no internationally agreed definition of sporting weapons. In general, it may be any weapon that is not a weapon of war or munitions of war. Sporting weapons include hunting

knives, bows and other similar articles. An antique weapon, which at one time may have been a weapon of war or munitions of war, such as a musket, may now be regarded as a sporting weapon.

(c) A firearm is any gun, rifle or pistol that fires a projectile.

The following firearms are generally regarded as being sporting weapons:

(1) those designed for shooting game, birds and other animals;

(2) those used for target shooting, clay-pigeon shooting and competition shooting, providing that the weapons are not those on standard issue to military forces; and

(3) airguns, dart guns, starting pistols, etc.

A firearm, which is not a weapon of war or munitions of war, should be treated as a sporting weapon for the purposes of its carriage on a VCA.

AMC1 IAM.GEN.VCA.170 Psychoactive substances

POLICY ON PREVENTION OF MISUSE OF PSYCHOACTIVE SUBSTANCES

(a) The IAM operator should comply with AMC1 CAT.GEN.MPA.170(b) and AMC2 CAT.GEN.MPA.170(b) as regards the policy on prevention of misuse of psychoactive substances.

(b) The reference to CAT.GEN.MPA.215 in AMC1 CAT.GEN.MPA.170(b) should be considered as a reference to IAM.GEN.VCA.176.

GM1 IAM.GEN.VCA.170 Psychoactive substances

POLICY ON THE PREVENTION AND DETECTION OF MISUSE OF PSYCHOACTIVE SUBSTANCES

Other useful guidance material with regard to the policy on the prevention and detection of misuse of psychoactive substances by crew members can be found in:

— GM1 CAT.GEN.MPA.170(b);

— GM2 CAT.GEN.MPA.170(b);

— GM3 CAT.GEN.MPA.170(b); and

— GM4 CAT.GEN.MPA.170(b).

AMC2 IAM.GEN.VCA.170 Psychoactive substances

OBJECTIVE, TRANSPARENT AND NON-DISCRIMINATORY TESTING PROCEDURE

The IAM operator should refer to AMC1 CAT.GEN.MPA.170(c) when developing and implementing an objective, transparent and non-discriminatory testing procedure.

AMC1 IAM.GEN.VCA.175 Endangering safety

PSYCHOLOGICAL ASSESSMENT

The IAM operator should refer to AMC1 CAT.GEN.MPA.175(b) for the psychological assessment of their flight crew.

GM1 IAM.GEN.VCA.175 Endangering safety

PSYCHOLOGICAL ASSESSMENT

Useful guidance on conducting a psychological assessment can be found in GM1 CAT.GEN.MPA.175(b).

AMC2 IAM.GEN.VCA.175 Endangering safety

INTERNAL ASSESSMENT FOR NON-COMPLEX OPERATORS

(a) A non-complex IAM operator in accordance with AMC1 ORO.GEN.200(b) may replace the psychological assessment with an internal assessment of the psychological attributes and suitability of the flight crew.

(b) The internal assessment for non-complex operators of VCA should as far as possible apply the same principles as the psychological assessment before commencing line flying for complex operators.

AMC1 IAM.GEN.VCA.176 Pilot support programme

SUPPORT PROGRAMME

The IAM operator should comply with:

(a) AMC1 CAT.GEN.MPA.215 as regards the principles governing a support programme;

(b) AMC2 CAT.GEN.MPA.215 as regards the confidentiality and protection of data;

(c) AMC3 CAT.GEN.MPA.215 as regards the elements of a support programme; and

(d) AMC4 CAT.GEN.MPA.215 as regards the training and awareness.

GM1 IAM.GEN.VCA.176 Pilot support programme

SUPPORT PROGRAMME

Useful guidance material about the support programme can be found in:

— GM1 CAT.GEN.MPA.215;

— GM2 CAT.GEN.MPA.215;

— GM3 CAT.GEN.MPA.215;

— GM4 CAT.GEN.MPA.215;

— GM5 CAT.GEN.MPA.215;

— GM6 CAT.GEN.MPA.215;

— GM7 CAT.GEN.MPA.215; and

— GM8 CAT.GEN.MPA.215.

AMC1 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

PRESERVATION OF RECORDED DATA FOR INVESTIGATION

The IAM operator should comply with AMC1 CAT.GEN.MPA.195(a) as regards the preservation of recorded data for investigation.

GM1 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

REMOVAL OF RECORDERS IN CASE OF AN INVESTIGATION

Useful guidance material as regards the need for removal of the recorders from the VCA can be found in GM1 CAT.GEN.MPA.195(a).

AMC2 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

INSPECTIONS AND CHECKS OF RECORDINGS

(a) The IAM operator should comply with AMC1 CAT.GEN.MPA.195(b) as regards the inspections and check of recordings, to the extent applicable to IAM operations and the VCA.

(b) In point (c) of AMC1 CAT.GEN.MPA.195(b), the references to CAT.IDE.A.191 and CAT.IDE.H.191 should be considered as a reference to UAM.IDE.MVCA.191.

GM2 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

INSPECTION OF THE FLIGHT RECORDERS' RECORDINGS FOR ENSURING SERVICEABILITY

(a) Useful guidance material as regards the inspection of the flight recorders' recordings for ensuring serviceability, to the extent applicable to IAM operations and the VCA, can be found in GM1 CAT.GEN.MPA.195(b).

(b) In point (b) of GM1 CAT.GEN.MPA.195(b), the references to CAT.GEN.MPA.195(f)(1a) should be considered as a reference to IAM.GEN.VCA.195(f)(2).

(c) In point (d) of GM1 CAT.GEN.MPA.195(b), the references to CAT.GEN.MPA.195(f)(3a) should be considered as a reference to IAM.GEN.VCA.195(f)(5).

GM3 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

MONITORING AND CHECKING THE PROPER OPERATION OF FLIGHT RECORDERS — EXPLANATION OF TERMS

For the understanding of the terms used in IAM.GEN.VCA.195(b) and AMC1 IAM.GEN.VCA.195(b), the IAM operator should refer to GM2 CAT.GEN.MPA.195(b).

AMC3 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

USE OF AUDIO RECORDINGS FOR MAINTAINING OR IMPROVING SAFETY

(a) The IAM operator should comply with AMC1 CAT.GEN.MPA.195(f)(1) as regards the use of audio recordings for maintaining or improving safety.

(b) The reference in point (b) of AMC1 CAT.GEN.MPA.195(f)(1) to CAT.GEN.MPA.195(f)(1) should be considered as a reference to IAM.GEN.VCA.195(f)(1).

AMC4 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

INSPECTION OF AUDIO RECORDINGS FOR ENSURING SERVICEABILITY

The IAM operator should comply with AMC1 CAT.GEN.MPA.195(f)(1a) as regards the inspection of audio recordings for ensuring serviceability.

AMC5 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

USE OF IMAGES FROM THE FLIGHT CREW COMPARTMENT FOR MAINTAINING OR IMPROVING SAFETY

The IAM operator should comply with AMC1 CAT.GEN.MPA.195(f)(3) as regards the use of images from the flight crew compartment for maintaining or improving safety.

AMC6 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

INSPECTION OF IMAGES OF THE FLIGHT CREW COMPARTMENT FOR ENSURING SERVICEABILITY

The IAM operator should comply with AMC1 CAT.GEN.MPA.195(f)(3a) as regards the inspection of images of the flight crew compartment for ensuring serviceability.

GM4 IAM.GEN.VCA.195 Preservation, production, protection and use of recorder recordings

FLIGHT CREW COMPARTMENT

If there are no compartments to physically segregate the flight crew from the passengers during the flight, the 'flight crew compartment' in point (f)(5) of IAM.GEN.VCA.195 is understood to refer to the area comprising:

(a) the flight crew seats;

(b) VCA and engine controls;

(c) VCA instruments;

(d) windshield and windows used by the flight crew to get an external view while seated at their duty station; and

(e) circuit breakers accessible by the flight crew while seated at their duty station.

GM1 IAM.GEN.VCA.200 Transport of dangerous goods under a specific approval

APPLICABLE TECHNICAL INSTRUCTIONS

The applicable technical instructions are the Technical instructions for the Safe Transport of Dangerous Goods by Air (ICAO Doc 9284-AN/905).

AMC1 IAM.GEN.VCA.200 Transport of dangerous goods under a specific approval

DANGEROUS GOODS ACCIDENT AND INCIDENT REPORTING

(a) Dangerous goods accidents or incidents, the discovery of undeclared or misdeclared dangerous goods, as well as the finding of dangerous goods carried by passengers or crew members, or in their baggage, when not in accordance with Part 8 of the Technical Instructions, should be reported. The reporting of undeclared and misdeclared dangerous goods found in cargo also applies to items of operators' stores that are classified as dangerous goods.

(b) The first report should be dispatched within 72 hours of the event. It may be sent by any means, including email, telephone or fax. This report should include the details that are known at that time. If necessary, a subsequent report should be sent as soon as possible giving all the details that were not known at the time the first report was sent. If a report has been made verbally, written confirmation should be sent as soon as possible.

(c) The first and any subsequent report should be as precise as possible and should contain the following data, where relevant:

(1) date of the incident or accident or the finding of undeclared or misdeclared dangerous goods;

(2) location and flight date;

(3) description of the goods and the reference number of the air waybill, pouch, baggage tag, ticket, etc.;

(4) proper shipping name (including the technical name, if appropriate) and UN/ID number, when known;

(5) class or division and any subsidiary risk;

(6) type of packaging, and the packaging specification marking on it;

(7) quantity;

(8) name and address of the shipper, passenger, etc.;

(9) any other relevant details;

(10) suspected cause of the incident or accident;

(11) action taken;

(12) any other reporting action taken; and

(13) name, title, address and telephone number of the person making the report.

(d) Copies of relevant documents and any photographs taken should be attached to the report.

(e) A dangerous goods accident or incident may also constitute an VCA accident, serious incident or incident. The criteria for reporting both types of occurrences should be met.

(f) The following dangerous goods reporting form should be used, but other forms, including electronic transfer of data, may be used provided that at least the minimum information of this AMC is supplied:

DANGEROUS GOODS OCCURRENCE REPORT **DGOR No:**

1. Operator:	2. Date of occurrence:	3. Local time of occurrence:
4. Flight date:	5. Flight ID:	

DANGEROUS GOODS OCCURRENCE REPORT **DGOR No:**

<table>
<tr><td colspan="2">6. Departure vertiport:</td><td colspan="2">7. Destination vertiport:</td></tr>
<tr><td colspan="2">8. VCA type:</td><td colspan="2">9. VCA registration:</td></tr>
<tr><td colspan="2">10. Location of occurrence:</td><td colspan="2">11. Origin of the goods:</td></tr>
<tr><td colspan="4">12. Description of the occurrence, including details of injury, damage, etc.
(if necessary, continue on the reverse of this form):</td></tr>
<tr><td colspan="3">13. Proper shipping name (including the technical name):</td><td>14. UN/ID No (when known):</td></tr>
<tr><td>15.Class/division (when known):</td><td>16. Subsidiary risk(s):</td><td>17. Packing group:</td><td>18 Category (Class 7 only):</td></tr>
<tr><td>19. Type of packaging:</td><td>20.Packaging specification marking:</td><td>21. No of packages:</td><td>22. Quantity (or transport index, if applicable):</td></tr>
<tr><td colspan="4">23. Reference No of airway bill:</td></tr>
<tr><td colspan="4">24. Reference No of courier pouch, baggage tag, or transport document:</td></tr>
<tr><td colspan="4">25. Name and address of shipper, agent, passenger, etc.:</td></tr>
<tr><td colspan="4">26. Other relevant information (including suspected cause, any action taken):</td></tr>
<tr><td colspan="2">27. Name and title of person making the report:</td><td colspan="2">28. Telephone No:</td></tr>
<tr><td colspan="2">29. Company:</td><td colspan="2">30. Reporter(s) ref.:</td></tr>
<tr><td colspan="2" rowspan="2">31. Address:</td><td colspan="2">32. Signature:</td></tr>
<tr><td colspan="2">33. Date:</td></tr>
<tr><td colspan="4">Description of the occurrence (continuation)</td></tr>
</table>

Notes for the completion of the form:

1. A dangerous goods accident is as defined in Annex I. For this purpose, serious injury is as defined in Regulation (EU) No 996/2010 of the European Parliament and of the Council[13].

2. This form should also be used to report any occasion when undeclared or misdeclared dangerous goods are discovered in cargo, mail or unaccompanied baggage or when accompanied baggage contains dangerous goods which passengers or crew are not permitted to take on the VCA.

3. The initial report should be dispatched unless exceptional circumstances prevent this. This occurrence report form, duly completed, should be sent as soon as possible, even if all the information is not available.

4. Copies of all relevant documents and any photographs taken should be attached to this report.

5. Any further information, or any information not included in the initial report, should be sent as soon as possible to the authorities identified in IAM.GEN.VCA.200(f).

6. Providing it is safe to do so, all dangerous goods, packaging, documents, etc., relating to the occurrence should be retained until after the initial report has been sent to the authorities identified in IAM.GEN.VCA.200(f), and they have indicated whether or not these should continue to be retained.

GM2 IAM.GEN.VCA.200 Transport of dangerous goods under a specific approval

GENERAL

(a) The Technical Instructions provide that in certain circumstances dangerous goods, which are normally forbidden on a VCA, may be carried. In these circumstances, all the States concerned may grant exemptions from the provisions of the Technical Instructions provided that an overall level of safety which is at least equivalent to that provided by the Technical Instructions is achieved.

The Technical Instructions also make provision for some dangerous goods to be carried only when an approval has been granted by the State of origin and the State of the operator.

(b) When an exemption is required, the States concerned are those of origin, transit, overflight and destination of the consignment and that of the operator. For the State of overflight, if none of the criteria for granting an exemption are relevant, an exemption may be granted based solely on whether it is believed that an equivalent level of safety in air transport has been achieved.

[13] 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).

(c) The Technical Instructions provide that exemptions and approvals are granted by the 'appropriate national authority', which is intended to be the authority responsible for the particular aspect against which the exemption or approval is being sought. The Instructions do not specify who should seek exemptions and, depending on the legislation of the particular State, this may mean the operator, the shipper or an agent. If an exemption or approval has been granted to other than the operator, the operator should ensure that a copy has been obtained before the relevant flight. The operator should ensure that all relevant conditions on an exemption or approval are met.

(d) The exemption or approval referred to in points (a) to (c) is in addition to the approval required by Annex V (Part SPA), Subpart G.

GM1 IAM.GEN.VCA.205 Transport of dangerous goods without a specific approval

APPLICABLE TECHNICAL INSTRUCTIONS

The applicable technical instructions are the Technical instructions for the Safe Transport of Dangerous Goods by Air (ICAO Doc 9284-AN/905).

GM2 IAM.GEN.VCA.205 Transport of dangerous goods without a specific approval

GENERAL

No specific approval for the transport of dangerous goods by air is required when:

(a) they are not subject to the Technical Instructions in accordance with Part 1 thereof; or

(b) they are carried by passengers or crew, or are in baggage, in accordance with Part 8 of the Technical Instructions.

AMC1 IAM.GEN.VCA.205 Transport of dangerous goods without a specific approval

DANGEROUS GOODS TRAINING PROGRAMME

The training programme should meet the requirements of ICAO Annex 18 and the applicable requirements of the Technical instructions, Part 1, Chapter 4.

AMC2 IAM.GEN.VCA.205 Transport of dangerous goods without a specific approval

DANGEROUS GOODS ACCIDENT AND INCIDENT REPORTING

Dangerous goods accidents or incidents, the discovery of undeclared dangerous goods, as well as the finding of dangerous goods carried by passengers or crew members, or in their baggage, when not in accordance with Part 8 of the Technical Instructions, should be reported in accordance with AMC1 IAM.GEN.VCA.200 as applicable.

AMC1 IAM.GEN.MVCA.135 Admission to the flight crew compartment

ADMISSION OF PASSENGERS TO / CARRIAGE OF PASSENGERS IN THE FLIGHT CREW COMPARTMENT

Where a VCA is used in a single-pilot operation and has more than one pilot station, passengers may be carried in the unoccupied pilot seat(s), provided that the commander is satisfied that:

(a) this will not cause distraction or interference with the operation of the flight; and

(b) the passenger occupying a pilot seat is familiar with the relevant restrictions and safety procedures.

AMC1 IAM.GEN.MVCA.180 Documents, manuals and information to be carried on board each flight

DIGITAL MEDIA

The IAM operator should use digital media such as EFBs that host type A and/or type B EFB applications as an alternative to the carriage of documents, manuals and information in paper on each flight, in accordance with point IAM.GEN.VCA.141.

GM1 IAM.GEN.MVCA.180 Documents, manuals and information to be carried on board each flight

CERTIFIED TRUE COPIES

(a) Certified true copies may be provided:

(1) either directly by the competent authority;

(2) or by persons holding privileges for certification of official documents in accordance with the applicable Member State's legislation, e.g. public notaries, authorised officials in public services.

(b) Translations of the air operator certificate (AOC) including operations specifications do not need to be certified.

GM2 IAM.GEN.MVCA.180 Documents, manuals and information to be carried on board each flight

JOURNEY LOG OR EQUIVALENT

'Journey log, or equivalent' means that the required information may be recorded in documentation other than a log book, such as the operational flight plan or the VCA technical log.

AMC2 IAM.GEN.MVCA.180 Documents, manuals and information to be carried on board each flight

PROCEDURES AND VISUAL SIGNALS FOR USE BY INTERCEPTING AND INTERCEPTED AIRCRAFT

The procedures and the visual signals information for use by intercepting and intercepted aircraft should reflect those contained in Part-SERA. They may be part of the operations manual.

AMC3 IAM.GEN.MVCA.180 Documents, manuals and information to be carried on board each flight

APPROPRIATE METEOROLOGICAL INFORMATION

(a) The appropriate meteorological information should be relevant to the planned operation, as specified in point (a) of point MET.TR.215 of Annex V (Part-MET) to Regulation (EU) 2017/373, and comprise the following:

(1) the meteorological information that is specified in point (e) of point MET.TR.215 of Part-MET; and/or

(2) supplemental meteorological information:

(i) information other than that specified in point (a) above, which should be based on data from certified meteorological service providers; or

(ii) information from other reliable sources of meteorological information that should be evaluated by the operator.

(b) The providers of meteorological information specified in point (e) of point MET.TR.215 should be certified meteorological services providers that meet the necessary oversight and certification requirements as specified in Part-MET.

(c) All of the following should qualify as supplemental meteorological information:

(1) a reliable, timestamped image from a serviceable digital camera of known location, bearing, and altitude, which shows the weather conditions in the approach path at destination;

(2) a meteorological observation from a properly trained observer; and

(3) a report from non-certified automatic weather observation systems to which the operator should apply relevant margins based on the reliability and precision of the system.

GM3 IAM.GEN.MVCA.180 Documents, manuals and information to be carried on board each flight

DATA FROM CERTIFIED METEOROLOGICAL SERVICE PROVIDERS

The supplemental meteorological information, in the context of point (a)(2)(i) of AMC3 IAM.GEN.MVCA.180, should originate only from authoritative sources or certified providers and should not be transformed or tampered, except for the purpose of presenting the data in the correct format.

GM4 IAM.GEN.MVCA.180 Documents, manuals and information to be carried on board each flight

INFORMATION FROM OTHER RELIABLE SOURCES OF METEOROLOGICAL INFORMATION

Other reliable sources of meteorological information, in the context of point (a)(2)(ii) of AMC3 IAM.GEN.MVCA.180, are organisations that are able to provide an appropriate level of data assurance in terms of accuracy and integrity.

For the purpose of evaluating such organisations, the operator should consider whether the organisation has established a quality assurance system to cover source selection, acquisition/import, processing, validity period check, and distribution phase of data.

GM5 IAM.GEN.MVCA.180 Documents, manuals and information to be carried on board each flight

SUPPLEMENTAL INFORMATION

Supplemental information is information included in point (e) of MET.TR.215 Part-MET and refers to meteorological information to be reported in specific cases such as freezing precipitation, blowing snow, thunderstorm, etc.

GM1 IAM.GEN.MVCA.181 Documents and information that may not be carried on board

MEANING OF 'LOCAL AREA'

The 'local area' is defined by the competent authority of the operator, in a radius of nautical miles or otherwise.

GM1 UAM. OP.VCA.125 Taxiing and ground movement

GENERAL

(a) Taxiing is the movement of a VCA on the movement area of a vertiport, diversion location or VEMS operating site , under its own power, either on the ground or in the air.

(b) Ground taxiing with passengers for the purpose of flight or after landing is a critical phase of the flight (Definition (31)) as is air taxiing and hover taxiing. Due to the safety-critical nature of these types of taxiing, they are performed by an appropriately qualified pilot at the controls of the VCA.

(c) Ground taxiing without passengers for a purpose other than taking off e.g. for repositioning or maintenance, should not be considered a critical phase of flight. This type of taxiing may be performed by appropriately qualified pilots or by trained personnel other than pilots, designated by the IAM operator.

(d) Ground movement is the movement of a VCA on the movement area of a vertiport, diversion location or VEMS operating site with the support of external equipment or accessory that is not powered by the VCA. When the ground movement is carried out with the help of automated or autonomous equipment, the operation of such equipment should be carried out by suitably trained personnel for the task, even if that personnel only monitors the functioning of the systems.

AMC1 UAM.OP.VCA.125 Taxiing and ground movement

PROCEDURES FOR GROUND TAXIING OF VCA

(a) The IAM operator should take into account the particular operational environment at the vertiport, diversion location or VEMS operating site being used for the operation(s) when establishing procedures for ground taxiing.

(b) These procedures should include at least the following:

(1) instructions on the use of standard radio-telephony (RTF) phraseology;

(2) instructions on the use of lights, if applicable;

(3) measures to enhance the situational awareness, such as the use of the layout charts of a particular vertiport, diversion location or VEMS operating site as applicable;

(4) instructions on the avoidance of actions which may create distraction from the taxiing activity.

(c) Operator's procedures for ground taxiing without passengers for a purpose other than taking off should in particular ensure that the lift and thrust units of the VCA are not powered on inadvertently by the person designated in accordance with UAM.OP.VCA.125(b)(2).

AMC2 UAM.OP.VCA.125 Taxiing and ground movement

PROCEDURES FOR GROUND MOVEMENT OF VCA

(a) Operator's procedures for ground movement of VCA should take into consideration at least the following:

(1) VCA dimensions, proper movement speed and VCA turning arcs;

(2) measures to maintain overall situational awareness of the location and movement of the VCA and of other traffic at the vertiport, diversion location or VEMS operating site;

(3) measures to keep the VCA being moved within the appropriate designated areas.

(b) Operator's procedures for ground movement of VCA should include instructions for team members involved in ground movement of VCA to follow and adhere to all operational and safety procedures during the VCA movement and to communicate among them to prevent accidents.

AMC3 UAM.OP.VCA.125 Taxiing and ground movement

DESIGNATED PERSONS

The operator should only designate a person other than a pilot for the ground taxiing of the VCA on the movement area of a vertiport, diversion location or VEMS operating site, if that person:

(a) is trained in ground taxiing of the VCA;

(b) is trained to use the radio telephone;

(c) has received instruction in respect of the layout of the vertiport, diversion location or VEMS operating site, as applicable, and the routes, signs, marking and lights thereon;

(d) has received instruction in respect of air traffic control (ATC) signals and instructions, phraseology and procedures, if applicable;

(e) is able to conform to the operational standards required for a safe ground taxiing at the vertiport, diversion location or VEMS operating site.

AMC1 UAM.OP.VCA.135 Routes and areas of operation

USE OF DESIGNATED ROUTES

If the competent authority of the place of operation has designated routes for VFR day operations with VCA to account for potential ground risks and potential risks of collision with other aircraft or for airspace management purposes, the operator should ensure that operations are only conducted along those routes.

GM1 UAM.OP.VCA.135 Routes and areas of operation

USE OF ADEQUATE VERTIPORTS, DIVERSION LOCATIONS OR VEMS OPERATING SITES

The actions needed to make a diversion location comply with the requirements, such as those related to availability and adequacy, may be subcontracted (for example, to the owner of the land or any third party) in accordance with ORO.GEN.205. The IAM operator should ensure, in particular, that the services provided by the subcontractor are appropriately integrated to its flight preparation and operations management processes.

AMC1 UAM.OP.VCA.145 Establishment of minimum flight altitudes

CONSIDERATIONS WHEN ESTABLISHING MINIMUM FLIGHT ALTITUDES

(a) When establishing minimum flight altitudes for flights to be conducted in accordance with VFR day, the operator should take into consideration all of the following:

(1) the minimum flight altitudes specified in point SERA.5005(f) of Regulation (EU) No 623/2012 or the exemptions granted by the competent authorities of the place of operation or the minima established by the State where the operation takes place;

(2) the accuracy with which the position of the VCA can be determined;

(3) the probable inaccuracies in the indications of the altimeters used;

(4) the characteristics of the terrain, such as sudden changes in the elevation, along the routes or in the areas where operations are to be conducted;

(5) the probability of encountering unfavourable meteorological conditions, such as severe turbulence and descending air currents;

(6) the possible inaccuracies in aeronautical charts.

(b) The operator should also consider:

(1) corrections for temperature and pressure variations from standard values;

(2) ATC requirements, if applicable; and

(3) any foreseeable contingencies along the planned route.

GM1 UAM.OP.VCA.190 Fuel/energy scheme — general

GENERAL

For the purpose of establishing the fuel/energy scheme for safe operations with VCA, the IAM operator should consider the certified minimum performance (CMP) data set of the VCA obtained by considering the effect of single failures and combinations of failures that are not extremely improbable on the nominal performance parameters.

For some VCA designs, a failure or a combination of failures in the fuel/energy system may lead to the most detrimental effect on the aircraft range during cruise phase. Such failure(s) would then become, for the respective flight phase and performance parameter, the critical failure for performance (CFP).

The CFP affects the aircraft systems and CSFL ability. The CFP considers all types of failures that are not extremely improbable. The critical failures may be different per flight phase and performance parameter.

The CMP and CFP are defined in Annex I — definitions (133) and (135) respectively. Definitions of the CMP and CFP are also included in MOC VTOL.2000. For reference, the CMP corresponds to a critical engine failure (OEI) scenario of a Category A helicopter.

The goal of the fuel/energy scheme is to ensure that a flight can be conducted safely; in particular, that the VCA can reach the selected vertiports, diversion locations or VEMS operating sites. In VCA using conventional fuels for propulsion this depends primarily on the quantity of fuel on board, while for VCA with electric propulsion it may be other factors that are critical, e.g. component temperature limitations following a CFP. For some configurations it is likely that the VCA has plenty of remaining energy after a CFP but cannot reach a vertiport or a diversion location on a particular day because the energy is not accessible, e.g. in the case of a component overheat.

The CMP data allows the operator to plan the range of VCA if affected by the CFP, as well as other flight parameters such as rate of climb, thus assessing the suitability of the vertiports, diversion locations or VEMS operating sites along the route before each flight.

AMC1 UAM.OP.VCA.191 Fuel/energy scheme — fuel/energy planning and in-flight replanning

VCA SPECIFIC DATA

When no VCA-specific data (derived from a fuel/energy consumption monitoring system) exists for the precise conditions of the flight, the planned amount of usable fuel/energy for the flight may be based on estimated fuel/energy consumption data.

GM 1 UAM.OP.VCA.191 Fuel/energy scheme — fuel/energy planning and in-flight re-planning

NOTAMs

Pilots should review all available NOTAMs affecting their flight route before take-off. Best practice is to check NOTAMs early and often, both when planning the flight and on the day of operations.

NOTAMs can be accessed online and are also available at most airport weather stations.

AMC2 UAM.OP.VCA.191 Fuel/energy scheme — fuel/energy planning and in-flight replanning

TRIP FUEL/ENERGY

The trip fuel/energy should include fuel/energy:

(a) for take-off and climb from the departure vertiport elevation to initial cruising level/altitude, taking into account the expected departure routing;

(b) from the top of climb to the top of descent;

(c) from the top of descent to the point where the approach procedure is initiated;

(d) for the approach and landing at the destination vertiport.

GM 2 UAM.OP.VCA.191Fuel/energy scheme — fuel/energy planning and in-flight re-planning

FUEL/ENERGY FOR LANDING

The amount of fuel/energy necessary for landing at the destination vertiport, from the LDP, should only be calculated once for the planned route.

AMC3 UAM.OP.VCA.191 Fuel/energy scheme — fuel/energy planning and in-flight replanning

CONTINGENCY FUEL/ENERGY

The contingency fuel/energy should be equivalent to 10 % of the planned trip fuel/energy or, in the event of in-flight replanning, 10 % of the trip fuel/energy for the remainder of the flight.

GM3 UAM.OP.VCA.191 Fuel/energy scheme — fuel/energy planning and in-flight re-planning

CONTINGENCY FUEL/ENERGY — UNFORESEEN FACTORS

Unforeseen factors are those which could have an influence on the fuel consumption from take-off vertiport to the destination vertiport such as deviations of an individual VCA from the expected fuel consumption data, deviations from forecast meteorological conditions, extended delays and deviations from planned routings and/or cruising levels.

AMC4 UAM.OP.VCA.191 Fuel/energy scheme—fuel/energy planning and in-flight replanning

FINAL RESERVE FUEL/ENERGY

The representative time in accordance with UAM.OP.VCA.191(c)(4)(ii) should be provided by the VCA manufacturer in accordance with MOC VTOL.2130.

GM4 UAM.OP.VCA.191Fuel/energy scheme — fuel/energy planning and in-flight re-planning

FINAL RESERVE FUEL/ENERGY

The objective of the final reserve fuel/energy protection is to ensure that a safe landing is made when unforeseen circumstances may not allow to complete the flight, as originally planned.

The PIC should plan the flight so in way that allows from any point along the route a safe-landing to be performed with more than the final reserve fuel/energy. If in-flight the final reserve fuel/energy can no longer be protected, then a fuel emergency should be declared.

GM5 UAM.OP.VCA.191Fuel/energy scheme — fuel/energy planning and in-flight re-planning

FINAL RESERVE/FUEL ENERGY

Operators may determine one final reserve fuel/energy value for each VCA type in their fleet rounded up to an easily recalled figure.

There may be also different calculations of the final fuel/energy reserves for each VCA type , for example, a final fuel/energy reserve for vertical landing and a final reserve for a conventional landing.

ICAO Doc 9976 and the EASA Fuel Manual provide further detailed guidance on the development of a comprehensive in-flight fuel management policy and related procedures.

AMC5 UAM.OP.VCA.191 Fuel/energy scheme — fuel/energy planning and in-flight replanning

ADDITIONAL ENERGY

The pre-flight planning should take into account the CMP data and, in particular, a potentially lower total fuel/energy remaining after an assumed CFP and a potentially higher consumption after an assumed CFP.

Rationale

EASA does not propose a fixed time for the determination of the minimum final fuel/energy reserve, differently from aeroplanes and helicopters, the reason being that all safety layers foreseen for VCA flights are expected to better assure the achievement of a safe operation than the inclusion of a minimum fixed time for final reserve for all VCA.

Safety layers, whose purpose is to avoid/minimise situations in which the pilot would have a very low final fuel/energy reserve when reaching the destination vertiport, are ensured by the following requirements:

- *selection of vertiports and diversion locations within the CMP range of the aircraft while en-route;*
- *planning more than one safe landing option at the destination reachable within the CMP range;*
- *mounting fuel/energy measuring equipment that will provide a conservative estimate in flight of the amount of fuel/energy necessary to complete the remaining part of the flight considering the individual fuel/energy scheme, i.e. including the final fuel/energy reserve; and*
- *last but not least, the total time for the calculation of final reserve is based on four elements, and the representative time for a go-around manoeuvre is only one of them; this means that total time > representative time. The representative time for a go-around manoeuvre will be provided by the manufacturer, but the total time for final reserve will need to be calculated by the operators and approved by the national competent authority.*

At this point, the inclusion of an arbitrary value (which is not based on actual data) would have more drawbacks than benefits. For example, if it is too low, it may become a target for operators, who would most likely end up by not factoring in all other safety precautions, also leaving NCAs with no leverage in the future. On the other hand, including a higher number will also have its drawbacks, since whatever value is arbitrarily included in the AMC will create additional difficulties for operators that can go below it. At this point, considering the level of knowledge we have, the safest and fairest option is to include no fixed values at AMC level, but only the criteria for the calculation for the final fuel/energy reserve.

Nevertheless, EASA will continue the work on this issue. If necessary, additional AMC & GM may be developed to specify the conditions and the requirements for the representative time for go-around (speed, manoeuvres, etc.), as well as to link the final fuel/energy reserve to the time necessary for CSFL, following a CFP.

AMC1 UAM.OP.VCA.195 Fuel/energy scheme — in-flight fuel/energy management

IN-FLIGHT FUEL/ENERGY CHECKS

(a) The operator's policy and procedures should ensure that the PIC monitors and compares the remaining usable amount of fuel/energy and the fuel/energy necessary to proceed to a vertiport, diversion location or VEMS operating site where a safe landing can be performed, either through dynamic in-flight fuel/energy checks or checks at regular intervals.

(b) When routes have been established in the operations manual by the operator with specific check points according to the operator's policy and procedures, the following may be calculated during the fuel/energy planning for those check points and monitored and compared by the PIC:

(1) the amount of fuel/energy necessary to complete the remaining portion of the flight to the destination; and

(2) the amount of fuel/energy necessary to reach a vertiport or diversion location along the route.

The specific check points should be regularly distributed along the route to allow for a safe management of the fuel/energy in flight.

The PIC should monitor the fuel/energy on board as the VCA proceeds towards its destination and confirm that sufficient fuel/energy remains to complete the flight safely by comparing the calculated amounts at check points with the indications of the energy measuring equipment that is required by UAM.IDE.MVCA.140.

(c) The relevant fuel/energy data and estimations should be recorded.

Rationale

The procedure for regular checks may be used as an alternative to the equipment requirement of UAM.IDE.MVCA.140 in certain conditions such as routes established by the operator (refer to AMC1 CAT.OP.MPA.195 point (a)).

AMC2 UAM.OP.VCA.195 Fuel/energy scheme — in-flight fuel/energy management

ENSURING A SAFE LANDING

If an in-flight fuel/energy check in accordance with point (a) of AMC1 UAM.OP.VCA.195 shows that the usable fuel/energy that is expected to remain upon landing at the destination is less than the fuel/energy necessary to complete the remaining portion of the flight to the destination plus the final fuel/energy reserve, the PIC should:

(a) divert to a selected vertiport/diversion location along the route in accordance with the individual fuel/energy scheme; or

(b) replan the flight in accordance with point (d) of UAM.OP.VCA.191.

GM1 UAM.OP.VCA.195 Fuel/energy scheme — in-flight fuel/energy management

'MINIMUM FUEL' DECLARATION

(a) The 'MINIMUM FUEL' declaration informs the appropriate ATC unit that any change to the existing clearance, or air traffic delays, may result in landing with less than the planned final reserve fuel/energy. This is not an emergency situation but an indication that an emergency situation is possible, should any additional delay occur.

(b) Guidance on declaring MINIMUM FUEL is contained in the ICAO Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).

GM2 UAM.OP.VCA.195 Fuel/energy scheme — in-flight fuel/energy management

BROADCASTING 'MAYDAY MAYDAY MAYDAY FUEL'

The 'MAYDAY MAYDAY MAYDAY FUEL' declaration informs the ATC that a final fuel/energy reserve portion may be consumed prior to landing.

The standard phraseology 'MAYDAY FUEL' describes the nature of the distress conditions as required in ICAO Annex 10, Volume II.

AMC1 UAM.OP.VCA.250 Ice and other contaminants — ground procedures

DE-ICING AND ANTI-ICING ON THE GROUND

(a) The IAM operator should include in its OM a description of the de-icing and anti-icing policy and procedures for aircraft on the ground. These should include descriptions of the types and effects of icing and other contaminants on aircraft whilst stationary, during ground movements and during take-off.

(b) In addition, a description of the fluid types used should be given, including the following:

(1) proprietary or commercial names;

(2) characteristics;

(3) effects on aircraft performance;

(4) hold-over times;

(5) precautions during usage.

GM1 UAM.OP.VCA.250 Ice and other contaminants — ground procedures

DE-ICING/ANTI-ICING

Useful guidance material as regards de-icing and anti-icing can be found in:

— GM1 CAT.OP.MPA.250, with guidance on terms used in the context of de-icing/anti-icing;

— GM2 CAT.OP.MPA.250, with guidance on de-icing and/or anti-icing procedures; and

— GM3 CAT.OP.MPA.250, with further guidance on de-icing and/or anti-icing.

GM1 UAM.OP.VCA.290 Proximity detection

TRAINING OBJECTIVES FOR THE USE OF THE PROXIMITY WARNING SYSTEM

When a VCA operator has a proximity warning system installed, the performance-based training objectives of GM1 CAT.OP.MPA.290 may be used for the pilot training programmes.

AMC1 UAM.OP.VCA.300 Approach and landing conditions

LANDING DISTANCE ASSESSMENT — VCA INTENDING A CONVENTIONAL LANDING WITH ROLL-ON

(a) The in-flight landing distance assessment should be based on the latest available weather report and runway condition report (RCR) or equivalent information based on the RCR.

(b) The assessment should be initially carried out when the weather report and the RCR are obtained, usually around top of descent. If the planned duration of the flight does not allow the flight crew to carry out the assessment in non-critical phases of flight, the assessment should be carried out before departure.

(c) When meteorological conditions may lead to a degradation of the runway surface condition, the assessment should include consideration of how much deterioration in runway surface friction characteristics may be tolerated, so that a quick decision can be made prior to landing.

(d) The flight crew should monitor the evolution of the actual conditions during the approach, to ensure that they do not degrade below the condition that was previously determined to be the minimum acceptable.

AMC2 UAM.OP.VCA.300 Approach and landing conditions

WIND DATA

(a) The information on average wind contained in METAR/SPECI/ATIS reports should be the basis for the landing performance calculations, while instant wind information, if reported, should be monitored during the approach to ensure that the wind speed does not exceed the assumptions made for landing performance calculations.

(b) Where the AFM so requires, the operator should use instant wind information for landing performance calculations.

AMC3 UAM.OP.VCA.300 Approach and landing conditions

IN-FLIGHT DETERMINATION OF THE FATO CONDITION — VCA INTENDING A VERTICAL LANDING

The in-flight determination of the final approach and take-off area (FATO) suitability for a safe approach, landing or missed approach should be based on the latest available meteorological or runway condition report, preferably no more than 30 minutes before the expected landing time.

GM1 UAM.OP.VCA.315 Flight hours — reporting

FLIGHT HOURS — REPORTING

Flight hours may be reported either:

(a) as flight hours flown by each VCA — identified by its serial number and registration mark — during the previous calendar year; or

(b) as total flight hours of each VCA — identified by its serial number and registration mark — on the 31st of December of the previous calendar year.

GM1 UAM.OP.MVCA.100 Use of air traffic services

IN-FLIGHT OPERATIONAL INSTRUCTIONS

When coordination with an appropriate air traffic service (ATS) unit has not been possible, in-flight operational instructions do not relieve the PIC of the responsibility for obtaining an appropriate clearance from an ATS unit, if applicable, before making a change in flight plan.

AMC1 UAM.OP.MVCA.100 Use of air traffic services

ELECTRONIC CONSPICUITY DEVICE

(a) A manned VCA entering an airspace designated as U-space but not provided with an air traffic control service by the ANSP should comply with point (c) of SERA.6005 of Regulation (EU) No 923/2012.

(b) The PIC should ensure that the electronic conspicuity device of the VCA is correctly operating before entering the U-space airspace until the VCA is leaving the U-space airspace.

(c) An e-Conspicuity device/system compliant with the ADS-L 4 SRD-860 technical specification or equivalent specification as determined by the Agency meets UAM.OP.MVCA.100(d).

GM1 UAM.OP.MVCA.100 Use of air traffic services (ATS)

IN-FLIGHT OPERATIONAL INSTRUCTIONS

When coordination with an appropriate air traffic service (ATS) unit has not been possible, in-flight operational instructions do not relieve the PIC of the responsibility to obtain an appropriate clearance from an ATS unit, if applicable, before making a change in the flight plan.

AMC1 UAM.OP.MVCA.107 Adequate vertiport and adequate diversion location

SELECTION OF ADEQUATE VERTIPORTS AND DIVERSION LOCATIONS

(a) The policy and procedures for selection of adequate vertiports, diversion locations and VEMS operating sites should be part of the approved operator's fuel/energy scheme in accordance with UAM.OP.VCA.190 and selected vertiports, diversion locations or VEMS operating sites should comply with UAM.OP.MVCA.192.

(b) When the VCA is certified for operations on floating surfaces in accordance with UAM.IDE.MVCA.300(d), the operator may include floating surfaces in the fuel/energy scheme.

GM 1 UAM.OP.MVCA.107 Adequate vertiport and adequate diversion location

ADEQUATE VERTIPORTS

(a) The operator may use PTS-VPT-DSN (EASA 'Prototype technical specifications for the design of VFR vertiports for operation with manned VCA certified in the Enhanced category or equivalent) for the purpose of assessing the adequacy of vertiports for normal operations and for diversion from the planned route.

(b) An aerodrome or heliport meeting UAM.OP.MVCA.107(c) is considered to be an adequate vertiport for the operations of VCA.

(c) For practical reasons, requirements for adequacy of a site used for emergency landing cannot be specified.

AMC2 UAM.OP.MVCA.107 Adequate vertiport and adequate diversion location

ADEQUATE DIVERSION LOCATIONS

The operator's policy and procedure for selection of diversion locations should contain the criteria for adequacy of UAM.OP.MVCA.107(d) and at least the following elements:

(a) Data provided by the VCA manufacturer including:

(1) certified minimum performance (CMP) including wind limitations;

(2) the radial component of the downwash (outwash) around the VCA;

(3) diversion location required characteristics:

(i) size of the landing area;

(ii) surface characteristics;

(iii) slope;

(iv) obstacles clearance areas;

(4) firefighting information, if any.

(b) The operating conditions under which the flight is to be conducted including:

(1) anticipated masses;

(2) anticipated VCA fuel/energy consumption;

(3) anticipated meteorological conditions.

(c) Observations during the process of pre-surveillance of diversion locations by a competent person; the operator should also take into account possible changes to the characteristics of diversion locations that may have taken place since last surveyed.

(d) The means to have an indication on wind speed and direction.

(e) Ground markings, if available.

(f) The means to achieve an acceptable level of RFFS protection, including equipment, or agreement with the local firefighting brigade or any other adequate arrangement.

(g) In the case of cross-border operations, the relevant requirements published by the competent authority of the place of operation stemming from air space management, air traffic management, national security, environmental regulations and administrative regulations.

AMC3 UAM.OP.MVCA.107 Adequate vertiport or adequate diversion location

DOCUMENTATION OF DIVERSION LOCATIONS

(a) Any diversion location selected by the IAM operator and planned to be used, as well as any subsequent change to selected diversion locations, should be notified to the competent authority in accordance with the procedure referred to in ORO.GEN.115(b) and ORO.GEN.130(c) along with the criteria for the selection.

(b) The operations manual or another manual of the IAM operator should contain diagrams or ground and aerial photographs, depiction (pictorial) and description of the selected diversion location including:

(1) its overall dimensions;

(2) its suitability with reference to VCA performance as well as the radial component of the downwash (outwash) around the VCA;

(3) the location and height of relevant obstacles in the approach and take-off flight paths and in the manoeuvring area, of any diversion location ;

(4) the approach and take-off flight paths;

(5) its surface condition (blowing dust/snow/sand);

(6) the provision of control of third parties on the ground, if applicable;

(7) current firefighting arrangements (equipment or agreement with the local firefighting brigade or any other adequate arrangement);

(8) existing means indicating wind speed and direction;

(9) the procedure for its activation in accordance with national regulations, if applicable;

(10) other useful information; for example, details of the appropriate ATS agency and frequency;

(11) the evacuation paths for the passengers taking into account the VCA hazard areas; and

(12) the means to remove a VCA from a diversion location.

GM2 UAM.OP.MVCA.107 Adequate vertiport and adequate diversion location

USE OF EN-ROUTE DIVERSION LOCATIONS

(a) Adequate diversion locations while en-route should be used to ensure:

(1) a CSFL of the VCA following a CFP or another abnormal condition or situation; and/or

(2) compliance with the final fuel/energy reserve requirements.

(b) Diversion locations should not be used for planned embarking and disembarking of passengers or for loading and unloading cargo.

(c) After having landed at a diversion location, the operator may resume the flight that has already started at a vertiport, perform a ferry flight or remove the VCA from the diversion location by other means, as the case may be.

(d) A diversion location should not be understood as a diversion vertiport.

GM3 UAM.OP.MVCA.107 Adequate vertiport and adequate diversion location

ABNORMAL CONDITION OR SITUATION

AMC 25.1581 contains the following definition for abnormal procedure in the context of AFM:

'A procedure requiring flight crew action, due to failure of a system or component, to maintain an acceptable level of airworthiness for continued safe flight and landing.'

This definition is fully applicable to a CFP in the context of a VCA. In addition, in flight operations other abnormal situations may arise, such as pilot incapacitation, ground proximity warning, windshear, etc., in which flight crew should be using abnormal (i.e. non-normal) procedures to ensure that the safety of the aircraft or persons on board or on the ground is not in danger.

AMC5 UAM.OP.MVCA.107 Adequate vertiport and adequate diversion location

DIVERSION LOCATIONS IN CROSS-BORDER OPERATIONS

(a) Cross-border operation means an operation in a State other than the State where the operator has its principal place of business (the State of the operator).

(b) For the purpose of using one or more adequate diversion locations in another State operator should ensure that the relevant local requirements and information for the planned locations have been considered. When satisfied that the planned diversion location(s) meet(s) the applicable requirements the operator should notify the competent authority accordance with ORO.GEN.130 (c).

(c) When notified by the operator in accordance with ORO.GEN.130(c) of the selection of one or more diversion locations in a State other than the State where the operator has its principal place of business for the purpose of cross-border operations, the competent authority of the State of the operator should review the operator's policy and procedures for selection of adequate diversion locations and associated documentation in coordination with the competent authority of the place where the operation is planned to be conducted. Both authorities should be satisfied that applicable requirements UAM.OP.MVCA. 107 of have been met before the operator start the planned cross-border operation.

AMC6 UAM.OP.MVCA.107 Adequate vertiport or adequate diversion location

RESCUE AND FIREFIGHTING SERVICES (RFFS)

The VCA operator should:

(a) as part of its safety management system, assess the level of RFFS protection available at the vertiport or diversion location intended to be used, to ensure that an acceptable level of protection is available for the intended operation; and

(b) include relevant information related to the RFFS protection that is deemed acceptable by the operator in the operations manual.

GM4 UAM.OP.MVCA.107 Adequate vertiport or adequate diversion location

RESCUE AND FIREFIGHTING SERVICES (RFFS) AND OTHER SERVICES AND FACILITIES

(a) An adequate vertiport or diversion location should be provided with rescue and firefighting services (RFFS). This means that the vertiport or diversion location are equipped for firefighting (e.g. fire extinguishers, fire hoses, fire and welding blankets) or an agreement is established with a local firefighting unit or there is another adequate arrangement.

(b) The operator should assess which other services and facilities are necessary for the intended operation, such as air traffic services, lighting, communications, weather reporting, navigation aids, charging equipment, sound protection, etc.

AMC1 UAM.OP.MVCA.111 Visibility and distance from cloud minima — VFR flights

GENERAL

(a) When establishing visibility and distance from cloud minima, the operator shall take the following into account:

(1) meteorological conditions appropriate to the intended flight;

(2) take-off and landing area condition;

(3) location and height of all obstacles that could hinder take-off or landing;

(4) VCA performance and capability related to obstacle clearance, take-off and landing and any flight restrictions;

(5) ATC communications, if required;

(6) ATC instructions and clearances in controlled airspace, if applicable; and

(7) availability of ground infrastructure and equipment required for take-off, landing and taxiing or ground movement.

(b) Where there is a specific need to see and avoid obstacles and/or other VCA on take-off, additional conditions, e.g. ceiling, should be specified.

AMC1 UAM.OP.MVCA.155 Carriage of special categories of passengers (SCPs)

GENERAL

Persons requiring special conditions, assistance and/or devices when carried on a flight should be considered as SCPs including at least:

(a) persons with reduced mobility (PRMs) who, without prejudice to Regulation (EC) No 1107/2006, are understood to be any person whose mobility is reduced due to any physical disability, sensory or locomotory, permanent or temporary, intellectual disability or impairment, any other cause of disability, or age;

(b) infants and unaccompanied children; and

(c) deportees, inadmissible passengers or prisoners in custody.

AMC1 UAM.OP.MVCA.160 Stowage of baggage and cargo

STOWAGE PROCEDURES

Procedures established by the operator to ensure that baggage and cargo are adequately and securely stowed should take account of the following:

(a) each item should be stowed only in a location that is capable of restraining it;

(b) weight limitations placarded on or adjacent to stowages should not be exceeded;

(c) under seat stowages should not be used unless the seat is equipped with a restraint bar and the baggage is of such size that it may adequately be restrained by this equipment;

(d) baggage and cargo should not be placed where they can impede access to emergency equipment.

AMC2 UAM.OP.MVCA.160 Stowage of baggage and cargo

CARRIAGE OF CARGO IN THE PASSENGER COMPARTMENT

The following should be observed when carrying cargo in the passenger compartment of VCA:

(a) dangerous goods should not be allowed;

(b) the mass of cargo should not exceed the structural loading limits of the floor or seats;

(c) the number/type of restraint devices and their attachment points should be capable of restraining the cargo; and

(d) the location of the cargo should be such that, in the event of an emergency evacuation, it will neither hinder egress nor impair the crew's view.

GM1 UAM.OP.MVCA.160 Stowage of baggage and cargo

THE TERM 'CARGO'

The term 'cargo' in UAM.OP.MVCA.160(b) refers to anything that belongs to a passenger travelling but is not a piece of luggage (e.g. a musical instrument that may have to be restrained to the seat). Thus, UAM.OP.MVCA.160(b) is not intended to facilitate the use of the cabin as a cargo compartment.

AMC1 UAM.OP.MVCA.165 Passenger seating

Passengers who, because of their condition, might hinder other passengers during an evacuation or who might impede the crew in carrying out their duties, should not be allocated seats that permit direct access to emergency exits.

AMC1 UAM.OP.MVCA.170 Passenger briefing

PASSENGER BRIEFING AND DEMONSTRATIONS

(a) Passenger briefings and demonstrations should contain instructions on the following items, as applicable for the intended operation:

(1) the use of safety belts or restraint systems, including how to fasten and unfasten the safety belts or restraint systems;

(2) the location of emergency exits;

(3) the location and use of oxygen equipment, if carried on board. Passengers should also be briefed on how to extinguish all smoking materials when oxygen is being used;

(4) the location and use of life jackets, if carried on board;

(5) the location and use of the hand fire extinguisher, if carried in the passenger compartment;

(6) emergency lighting and marking;

(7) any cabin secured aspects, e.g. required position of seatbacks, tray tables, footrests, window blinds, etc. as applicable;

(8) correct stowage of baggage and the importance of leaving baggage behind in case of evacuation;

(9) the use and stowage of portable electronic devices (PEDs), including in-flight entertainment (IFE) systems;

(10) non-smoking instructions;

(11) the radial component of the downwash around the VCA;

(12) the use of life rafts and survival equipment, if carried on board.

(b) Passengers occupying seats with direct access to emergency exits should receive an additional briefing on the operation and use of the exit.

(c) In addition to (a) and (b), passengers should be instructed during flight in case of emergency, as appropriate to the circumstances.

AMC2 UAM.OP.MVCA.170 Passenger briefing

PASSENGER BRIEFING AND DEMONSTRATIONS

(a) The operator may replace the briefing/demonstrations specified in point (a) of AMC1 CAT.OP.MPA.170 with a passenger training programme covering all safety and emergency procedures for a given type of aircraft.

(b) Only passengers who have been trained according to this programme and have flown on the aircraft type within the last 90 days may be carried on board without receiving a briefing/demonstrations.

AMC3 UAM.OP.MVCA.170 Passenger briefing

PASSENGER BRIEFING IN SINGLE-PILOT OPERATIONS

(a) In single-pilot operations, passenger briefing should be provided:

(1) by ground personnel designated by the operator; or

(2) by the pilot except during the critical phases of flight.

(b) In single-pilot operations, passenger briefing may be delivered as audio instruction and/or safety video provided on ground or in the aircraft.

AMC4 UAM.OP.MVCA.170 Passenger briefing

IN-FLIGHT ENTERTAINMENT (IFE) SYSTEMS

When IFE systems are available by means of equipment that can be handled by passengers, including PEDs, provided by the operator for the purpose of IFE, appropriate information containing at least the following should be made available to passengers:

(a) instructions on how to safely operate the IFE system for personal use in normal conditions;

(b) restrictions, including stowage of retractable or loose items of equipment (e.g. screens or remote controls) during taxiing, take-off and landing, and in abnormal or emergency conditions.

GM1 UAM.OP.MVCA.170 Passenger briefing

BRIEFING OF PASSENGERS OCCUPYING SEATS WITH DIRECT ACCESS TO EMERGENCY EXITS

The emergency exit briefing should contain instructions on the operation of the exit, assessment of surrounding conditions for the safe use of the exit, and recognition of emergency commands given by the crew.

GM2 UAM.OP.MVCA.170 Passenger briefing

SAFETY BRIEFING MATERIAL

(a) Safety briefing material may be provided by means of a safety video or a safety briefing card. The information in the safety briefing material should be relevant to the aircraft type and the installed equipment and should be consistent with the operator's procedures. The information in the safety briefing material should be presented in a clear and unambiguous manner and in a form easily understandable to passengers.

(b) The safety briefing card should be designed, and the information should be provided, in a size easily visible to the passenger. The safety briefing card should be stowed in a location from where it is easily visible and reachable to the seated passenger and from where it cannot easily fall out. The passenger should be briefed about the location of the safety briefing card. The safety briefing card should be presented in a pictographic form and should be consistent with the placards used in the aircraft. Written information should be kept to the necessary minimum. The safety briefing card should only contain information relevant to safety. Where practicable, safety briefing card can be provided in the form of a sticker.

(c) The safety video should be structured at a pace that allows a continuous ability to follow the information presented. The operator may consider including sign language or subtitles to simultaneously complement the soundtrack.

(d) For passengers occupying seats with direct access to emergency exits, the operator should consider providing a separate briefing card or a sticker which contains exit instructions. If so, the passenger should be informed about the location of the separate briefing card or the sticker.

(e) The operator should consider including the following information in its safety briefing material, as applicable for the intended operations:

(1) baggage — correct versus forbidden stowage locations (e.g. exits, aisles, etc.);

(2) safety belts and other restraint systems:

(i) when and how to use safety belts and other restraint systems;

(ii) restraint of infants and children;

(iii) additional installed systems, e.g. airbag;

(3) drop-down oxygen system:

(i) location;

(ii) activation;

(iii) indication of active oxygen supply;

(iv) correct and timely donning of oxygen mask;

(v) assisting others;

(4) flotation devices:

(i) stowage locations (including if different in various cabin sections);

(ii) use for adult, child and infant;

(iii) features, e.g. straps, toggles, tubes, signalling light, whistle;

(iv) when and where to inflate a life jacket;

(v) flotation devices for infants;

(5) emergency exits:

(i) number and location;

(ii) method of operation, including alternative operation in case of ditching;

(iii) surrounding conditions prior to opening (e.g. fire, smoke, water level, etc.);

(iv) unusable exit;

(v) alternative egress routes in case of unusable exit(s);

(vi) leaving baggage behind;

(vii) method of egress through exit including with infants and children;

(viii) awareness of exit height;

(ix) awareness of lift/thrust units;

(6) escape routes: depiction of routes:

(i) to the exits (inside the aircraft);

(ii) on the ground away from the aircraft;

(7) assisting evacuation means:

(i) location of available equipment (e.g. life raft, installed slide/raft, etc.);

(ii) awareness of the evacuation equipment's features;

(iii) operation of the available equipment (activation, detachment, etc.);

(iv) method of boarding the device including with infants and children;

(v) use of shoes;

(vi) method of evacuation through exits with no assisting evacuation means;

(8) brace position:

(i) appropriate method to the applicable facing direction;

(ii) alternative brace positions for e.g. expectant mothers, passengers with lap-held infants, tall or large individuals, children, etc.;

(9) PEDs, including spare batteries:

(i) allowed versus forbidden devices;

(ii) use in various flight phases including during safety briefing;

(iii) stowage;

(iv) danger of fire in case the device is damaged;

(v) the need to call for immediate assistance in case a device is damaged, hot, produces smoke, is lost, or falls into the seat structure (including advice to refrain from manipulating the seat);

(vi) the need to monitor devices during charging;

(10) cabin secured aspects:

(i) required position of seatbacks, headrests, tray tables, footrests, window blinds, in-seat video screens and their control gadgets, etc.;

(ii) caution when opening baggage compartments;

(11) non-smoking instructions (e.g. phase of flight, electronic smoking devices, pipes, etc.)

(12) emergency lighting and marking (as installed in accordance with UAM.IDE.MVCA.275 and AMC1 UAM.IDE.MVCA.275)

(i) location;

(ii) purpose in case of darkness or smoke;

(13) hand fire extinguisher(s):

(i) location;

(ii) use;

(14) actions in case of an emergency (e.g. remove sharp objects, fasten seat belt, open window blind, etc.);

(15) any other safety aspects.

AMC1 UAM.OP.MVCA.175 Flight preparation

OPERATIONAL FLIGHT PLAN

(a) The operational flight plan used and the entries made during flight should contain the following items:

(1) VCA registration;

(2) VCA type and variant;

(3) date of flight;

(4) flight identification;

(5) name(s) of the flight crew member(s);

(6) duty assignment of the flight crew member(s);

(7) place (vertiport) of departure;

(8) time of departure (actual off-block time, take-off time);

(9) place (vertiport) of arrival (planned and actual);

(10) time of arrival (actual landing and on-block time);

(11) type of operation (VFR day; commercial air transport operation, VEMS, non-commercial operations, training flights, etc.);

(12) route and route segments with checkpoints/waypoints, distances, time and tracks;

(13) planned cruising speed and flying times between checkpoints/waypoints (estimated, revised, and actual times overhead);

(14) minimum flight altitudes and minimum levels;

(15) planned altitudes and flight levels;

(16) fuel/energy calculations (records of in-flight fuel/energy checks);

(17) fuel/energy on board when powering on lift and thrust units;

(18) safe landing options at the point of commitment;

(19) vertiports or diversion locations along the route for the purpose of diversion;

(20) initial ATS flight plan clearance and subsequent reclearance, if applicable;

(21) in-flight replanning calculations; and

(22) meteorological information, as specified in point (a) of point MET.TR.215 of Part-MET.

(b) Items that are readily available in other documentation or from another acceptable source or are irrelevant to the type of operation may be omitted from the operational flight plan.

(c) The operational flight plan and its use should be described in the operations manual.

(d) All entries on the operational flight plan should be made concurrently and be permanent in nature.

OPERATIONAL FLIGHT PLAN —VEMS AND LOCAL OPERATIONS

(e) For VEMS and local operations with VCA, the operational flight plan may be established in a simplified form. Local operations should be defined in the operations manual.

(f) No entries should be made in the operational flight plan during the flight.

OPERATIONAL FLIGHT PLAN PRODUCED BY A COMPUTERISED FLIGHT-PLANNING SYSTEM

(g) When the IAM operator uses a computerised flight-planning system to produce an operational flight plan, the functionality of this system should be described in the operations manual.

(h) If the computerised flight-planning system is used in conjunction with energy level calculations and checks, the proper functionality of the software should be tested after each upgrade. The test should verify that the changes to the software do not affect the final output.

GM1 UAM.OP.MVCA.175 Flight preparation

CONVERSION TABLES

The documentation should include any conversion tables necessary to support operations where metric heights, altitudes and flight levels are used.

AMC1 UAM.OP.VCA.177 Submission of an air traffic services (ATS) flight plan

FLIGHTS WITHOUT ATS FLIGHT PLAN

(a) When unable to submit or close the ATS flight plan, the operator should establish procedures, instructions, and a list of nominated persons to be responsible for alerting search and rescue (SAR) services.

(b) To ensure that each flight is located at all times, these instructions should:

(1) provide the nominated person with at least the information required to be included in a VFR flight plan, and the location, date, and estimated time for re-establishing communications;

(2) if an VCA is overdue or missing, ensure that the appropriate ATS or SAR service is notified; and

(3) ensure that the information will be retained at a designated place until the completion of the flight.

AMC1 UAM.OP.MVCA.192 Fuel/energy scheme — selection of vertiports and diversion locations

ACCESS TO INFORMATION

The IAM operator should ensure that the PIC has access to up-to-date information regarding vertiports and diversion locations, including their operational status and meteorological conditions.

AMC2 UAM.OP.MVCA.192 Fuel/energy scheme — selection of vertiports and diversion locations

POINT OF COMMITMENT

The point of commitment at the destination is a reference point that should be defined based on all the following:

(a) the planned safe landing options can be reached from that point taking into account the CMP following a CFP;

(b) after that point, landing at the committed landing site should be guaranteed;

(c) the safe landing options should be weather-permissible i.e. for the anticipated time of use, meteorological reports, or forecasts, or any combination thereof, should indicate that the meteorological conditions will be at or above the VMC visibility and distance from cloud as specified in SERA.5001 of Regulation (EU) No 923/2012 for the airspace class being flown, unless operating as a special VFR flight.

GM1 UAM.OP.MVCA.192 Fuel/energy scheme — selection of vertiports and diversion locations

POINT OF COMMITMENT

When the planned safe landing options at the destination are minimum two, they may include:

(a) the destination vertiport and another vertiport; or

(b) the destination vertiport and a diversion location; or

(c) two separate runways/FATO/TLOF at the destination vertiport.

AMC3 UAM.OP.MVCA.192 Fuel/energy scheme — selection of vertiports and diversion locations

PLANNING MINIMA AND SAFETY MARGINS FOR THE DEPARTURE VERTIPORT

(a) To allow for a safe landing in case of an abnormal or emergency situation after take-off, the appropriate meteorological information to the PIC should indicate that the actual and forecast meteorological conditions at the vertiport of departure are expected to remain at or above the visibility and distance from cloud minima as specified in SERA.5001 of Regulation (EU) No 923/2012 for the airspace class being flown, unless operating as a special VFR flight.

PLANNING MINIMA AND SAFETY MARGINS FOR THE DESTINATION VERTIPORT OR ANOTHER SAFE LANDING OPTION AT DESTINATION

(b) The PIC should ensure that the duration of the flight and the actual and forecast meteorological conditions, based on appropriate meteorological information, are such that during a period commencing 1 hour before and ending 1 hour after the estimated time of arrival at the destination vertiport or at another planned safe landing option, an approach and landing are possible at or above visibility and distance from cloud minima as specified in SERA.5001 of Regulation (EU) No 923/2012 for the airspace class being flown, unless operating as a special VFR flight.

(c) As some of the meteorological information specified in point (e) of point MET.TR.215 of Part-MET is airfield-specific, the PIC should exercise caution when associating it with nearby vertiports or diversion locations.

PLANNING MINIMA FOR VERTIPORTS AND DIVERSION LOCATIONS ALONG THE ROUTE

(d) The planning minima, in terms of visibility and distance from cloud, for an approach and landing at vertiports or diversion locations along the route may be below those specified in SERA.5001 of Regulation (EU) No 923/2012 for the airspace class being flown. In any case, the PIC should ensure that the VFR flight is conducted in conditions of visibility and distance from clouds equal to or greater than those specified in SERA.5001 or SERA.5005, unless operating as a special VFR flight.

GM2 UAM.OP.MVCA.192 Fuel/energy scheme — selection of vertiports and diversion locations

APPROPRIATE METEOROLOGICAL INFORMATION

Useful guidance material as regards the appropriate meteorological information can be found in:

— GM1 CAT.OP.MPA.192(c)&(d), on the use of aerodrome reports and forecasts;

— GM2 CAT.OP.MPA.192(c)&(d), on supplemental meteorological information using digital imagery.

AMC1 UAM.OP.MVCA.193 Safe landing options at the destination

TRAFFIC AND OTHER OPERATIONAL CONDITIONS

(a) The PIC should commit to land at one of the safe landing options:

(1) following an energy system check and prediction indicating that the remaining energy is sufficient to perform a safe landing at the committed landing option; and

(2) after checking that the landing option is available.

(b) If the landing options are collocated at the destination vertiport, the PIC should ensure that no other aircraft is taking off or landing at any of them at the same time when the landing of the VCA is expected, unless the landing options are independent and operation on one of them does not affect safe landing at the other one.

GM1 UAM.OP.MVCA.200 Special refuelling or defuelling of VCA

SCOPE

The requirements on special refuelling or defuelling of VCA apply to VCA using conventional fuels.

GM2 UAM.OP.MVCA.200 Special refuelling or defuelling of VCA

RISK ASSESSMENT

(a) The risk assessment required by UAM.OP.MVCA.200(a)(1) should explain why special refuelling/defuelling is needed, identify any additional hazards, and describe how the additional risks are controlled.

(b) The operators' risk assessment may include, but not be limited to, the following risks, hazards and mitigation measures:

(1) risk related to refuelling with lift and thrust units powered on;

(2) risk related to the shutting down of the lift and thrust units, including the risk of failures during start-up;

(3) environmental conditions, such as wind limitations, displacement of exhaust gases, and blade sailing;

(4) risk related to human factors and fatigue management, especially for single-pilot operations for long periods of time;

(5) risk mitigation, such as the safety features of the fuel installation, rescue and firefighting (RFF) capability, number of personnel members available, ease of emergency evacuation of the VCA, etc.;

(6) assessment of the use of radio transmitting equipment;

(7) determination of the use of passenger seat belts;

(8) assessment of the use of the PED(s);

(9) if passengers are to disembark, consideration of their disembarking before rather than after the refuelling; and

(10) if passengers are to embark, consideration of their embarking after rather than before the refuelling.

AMC1 UAM.OP.MVCA.200 Special refuelling or defuelling of VCA

REFUELLING WHEN LIFT AND THRUST UNITS ARE POWERED ON

(a) Refuelling when lift and thrust units are powered on should only be conducted:

(1) with no passengers embarking or disembarking; however, passengers may be on board;

(2) if allowed by the operator of vertiport or diversion location, as applicable;

(3) in accordance with any specific procedures and limitations in the AFM;

(4) using JET A or JET A-1 fuel types; and

(5) with the appropriate RFF facilities or equipment available.

(b) In addition, operational procedures in the operations manual should specify that at least the following precautions are taken:

(1) all necessary information should be exchanged in advance with the vertiport or diversion location operator, and with the refuelling operator;

(2) the procedures to be used by crew members should be defined;

(3) the procedures to be used by the operator's ground operations personnel that are in charge of refuelling or assisting in emergency evacuations should be described;

(4) the operator's training programmes for crew members and for the operator's ground operations personnel should be described;

(5) the minimum distance between the VCA turning parts and the refuelling vehicle or installations should be defined when the refuelling takes place outside a vertiport;

(6) a handheld fire extinguisher with the equivalent of 5 kg of dry powder should be immediately available and ready for use;

(7) a means for a two-way communication between the crew and the person in charge of refuelling should be defined and established;

(8) if fuel vapour is detected inside the VCA, or any other hazard arises, refuelling/defuelling should be stopped immediately;

(9) one pilot should stay at the controls, constantly monitor the refuelling, and be ready to shut off the lift and thrust units and evacuate at all times; and

(10) any additional precautions should be taken, as determined by the operator's risk assessment.

AMC2 UAM.OP.MVCA.200 Special refuelling or defuelling of VCA

REFUELLING WHEN LIFT AND THRUST UNITS ARE POWERED ON WITH PASSENGERS ON BOARD

In addition to AMC1 UAM.OP.MVCA.200, for refuelling with passengers on board, the operational procedures in the operations manual should specify that at least the following precautions are taken:

(a) the positioning of the VCA and the corresponding evacuation strategy should be defined taking into account the wind as well as the refuelling facilities or vehicles;

(b) on a vertiport or diversion location, the ground area beneath the exits that are intended for emergency evacuation should be kept clear;

(c) an additional passenger briefing as well as instructions should be defined, and the 'No smoking' signs should be on unless 'No smoking' placards are installed;

(d) interior lighting should be set to enable identification of emergency exits;

(e) the use of doors during refuelling should be defined: doors on the refuelling side should remain closed, while doors on the opposite side should remain unlocked or, weather permitting, open, unless otherwise specified in the AFM;

(f) at least one suitable person capable of implementing emergency procedures for firefighting, communications, as well as for initiating and directing an evacuation, should remain at a specified location; this person should not be the qualified pilot at the controls or the person performing the refuelling; and

(g) unless passengers are regularly trained in emergency evacuation procedures, an additional crew member or ground crew member should be assigned to assist in the rapid evacuation of the passengers.

AMC3 UAM.OP.MVCA.200 Special refuelling or defuelling of VCA

REFUELLING OR DEFUELLING WITH PASSENGERS EMBARKING, ON BOARD OR DISEMBARKING

(a) The VCA should 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 should be taken and qualified personnel should be ready to initiate and direct passenger evacuation from the VCA using the most practical and expeditious means available.

AMC4 UAM.OP.MVCA.200 Special refuelling or defuelling of VCA

REFUELLING WITH PASSENGERS DISEMBARKING OR EMBARKING WHEN THE LIFT AND THRUST UNITS ARE POWERED OFF

When the lift and thrust units are powered off, the efficiency and speed of passengers disembarking from and re-embarking on board VCA should be such that disembarking before refuelling and re-embarking after refuelling is the general practice, except for VEMS.

A VEMS operator should refer to Subpart O of Part-SPA.

AMC5 UAM.OP.MVCA.200 Special refuelling or defuelling of VCA

REFUELLING OR DEFUELLING WITH WIDE-CUT FUEL

Refuelling/defuelling with wide-cut fuel should be conducted only if the operator has established appropriate procedures, taking into account the high risk of using wide-cut fuel types.

GM3 UAM.OP.MVCA.200 Special refuelling or defuelling of the VCA

PROCEDURES FOR REFUELLING/DEFUELLING WITH WIDE-CUT FUEL

The IAM operator should refer to GM3 CAT.OP.MPA.200, if applicable.

AMC1 UAM.OP.MVCA.205 Charging or swapping of VCA batteries while passengers embark, are on board, or disembark

RISK ASSESSMENT AND NECESSARY PRECAUTIONS

(a) The operator should assess as a minimum the following risks, hazards and mitigation measures related to charging or swapping of batteries while passengers are embarking, on board or disembarking, as applicable:

(1) fires;

(2) overcharging of batteries;

(3) battery short circuit;

(4) stability of electrical currents when charging batteries;

(5) ambient conditions in which battery charging will take place;

(6) available mitigation, such as the safety features of the charging installation, RFF capability, fire extinguishers that are specifically designed to combat a battery fire, available personnel, ease of emergency evacuation of the VCA, etc.

(b) The operator should take the necessary precautions to avoid or mitigate the risks of overcharging, overheating, short circuit and fire when charging or swapping batteries with passengers embarking, on board, or disembarking.

(c) Qualified personnel should be ready to initiate and direct passenger evacuation from the VCA using the most practical and expeditious means available, where necessary.

GM1 UAM.OP.MVCA.205 Charging or swapping of VCA batteries while passengers embark, are on board, or disembark

POTENTIAL RISKS

Overcharging of batteries may lead to heat generation and in some cases, to a so-called thermal runaway. In the case of batteries based on Lithium-Ion technology, this can lead to the cell opening and possibly fire and explosion.

Battery short circuit is a serious safety hazard that can be prevented with proper precautions. A short circuit may occur when the battery gets in touch with some metallic parts or when it is not properly installed. As a result, a large current flows through the short circuit, creating heat and possibly causing the battery to leak or explode.

Unstable electrical currents when charging Lithium-ion batteries may lead to their cells becoming unstable and causing a fire.

POSSIBLE PRECAUTIONS

The operator should make sure that any staff member or contractor, who is tasked with charging or swapping batteries, is trained to understand and minimise the associated risks.

The operator should provide its staff member or contractor with information regarding the maximum outside temperatures at which charging may take place and the correct charging voltage in order to avoid overcharging.

To avoid overheating, batteries should not be exposed or charged in direct sunlight or near any type of hot work, heated surface, open flame or ignition source. The environment in which the batteries are being charged should also be free from extreme humidity, as any moisture in the air or environment can also affect the stability of the battery.

Precautions should be taken to avoid high charge and discharge currents when Li-ion batteries are being charged.

As battery fires can burn quickly and fiercely, the operator may consider using fire extinguishers that are specifically designed to contain a battery fire at the place of charging or swapping batteries, to at least extend the time for the passengers to evacuate the VCA.

GM2 UAM.OP.MVCA.205 Charging or swapping of VCA batteries while passengers embark, are on board, or disembark

CHARGING OF BATTERIES

Electromagnetic exposure during charging of the battery packs mounted on VCA may have a negative impact on people wearing pacemakers, implantable defibrillators or other implanted devices.

AMC2 UAM.OP.MVCA.205 Charging or swapping of VCA batteries while passengers embark, are on board, or disembark

SWAPPING OF BATTERIES

The removal/installation of a battery on the VCA (swapping of batteries) with passengers embarking, on board, or disembarking, and in any other case of batteries swapping, should be certified by a person authorised as 'certifying staff' in accordance with Regulation (EU) No 1321/2014.

GM1 UAM.OP.VCA.295 Use of airborne collision avoidance system (ACAS)

OPERATIONAL PROCEDURES AND TRAINING PROGRAMMES

When ACAS is installed and serviceable, useful guidance material as regards the operational procedures and training programmes established by the operator can be found in GM1 CAT.OP.MPA.295.

AMC1 UAM.POL.VCA.100 Type of operation

TYPE CERTIFICATION FOR IAM OPERATIONS

The VCA should have a type certification meeting the requirements of SC VTOL Enhanced category or an equivalent certification basis. The equivalency is determined by the Agency.

GM1 UAM.POL.VCA.100 Type of operation

SC VTOL

VCA type certification in Enhanced category, according to SC VTOL, is required for commercial and non-commercial operations over congested areas.

The type certification under SC VTOL applies to a small VCA with a maximum operational passenger seating configuration (MOPSC) of 9 or less and a maximum certified take-off mass of 5 700 kg or less.

AMC1 UAM.POL.VCA.105 VTOL-capable aircraft (VCA) performance data

PERFORMANCE MATERIAL

Performance material that provides the necessary data for compliance with the performance requirements prescribed in Annex IX (Part-IAM) should be included in the AFM. If performance data, as required for the VCA operations, are not available in the AFM, then other data should be included in the OM-B.

AMC1 UAM.POL.VCA.110 General performance requirements

CORRECTION FOR WIND

The PIC should apply the correction required in accordance with UAM.POL.VCA.110(c) on the reported wind component and use the resulting value for correcting other performance parameters (e.g. TODRV, LDRV) as specified in the AFM.

GM1 UAM.POL.VCA.110 General performance requirements

DENSITY ALTITUDE

Point (c)(3)(i) of UAM.POL.VCA.110 refers to the pre-flight performance calculation of density altitude, essentially but not only for take-off and landing, using reported pressure altitude and temperature. For in-flight replanning, if necessary, the pressure altitude and temperature of the destination as reported would be used, not the altitude read by the sensors. Therefore, neither the pressure altitude nor the GNSS altitude available in flight will ever be used for the purpose of UAM.POL.VCA.110 (c)(3)(i).

GM2 UAM.POL.VCA.110 General performance requirements

REPORTED HEADWIND COMPONENT

The reported headwind component should be interpreted as being the one reported at the time of flight planning and may be used, provided that there is no significant change of unfactored wind prior to take-off.

GM1 UAM.POL.VCA.115 Obstacle accountability

DIMENSION 'D'

The diameter 'D' is defined in MOC VTOL.2115, point (6). It should be published in metres and feet, rounded up to the next tenth. If the VCA changes its dimensions during taxi or parking (e.g. folding wings), a corresponding D_{taxi} and $D_{parking}$ should also be provided.

GM2 UAM.POL.VCA.115 Obstacle accountability

DISTANCE DR

For the purpose of obstacle accountability in the take-off flight path or the missed approach flight path, the DR distance is the horizontal distance that the VCA has travelled from the end of the TODA or when a backup take-off procedure is being used, from the back of the FATO.

AMC1 UAM.POL.VCA.120 Take-off

TAKE-OFF PROCEDURE

(a) The procedure used for take-off should be compatible with the certified performance for take-off obtained during the type certification of the VCA.

(b) The VCA certified take-off performance may allow for conventional take-offs (ConvTO) and/or vertical take-offs (VTO) and/or elevated conventional (eConvTO), as described in MOC VTOL.2115 (see Figure 1).

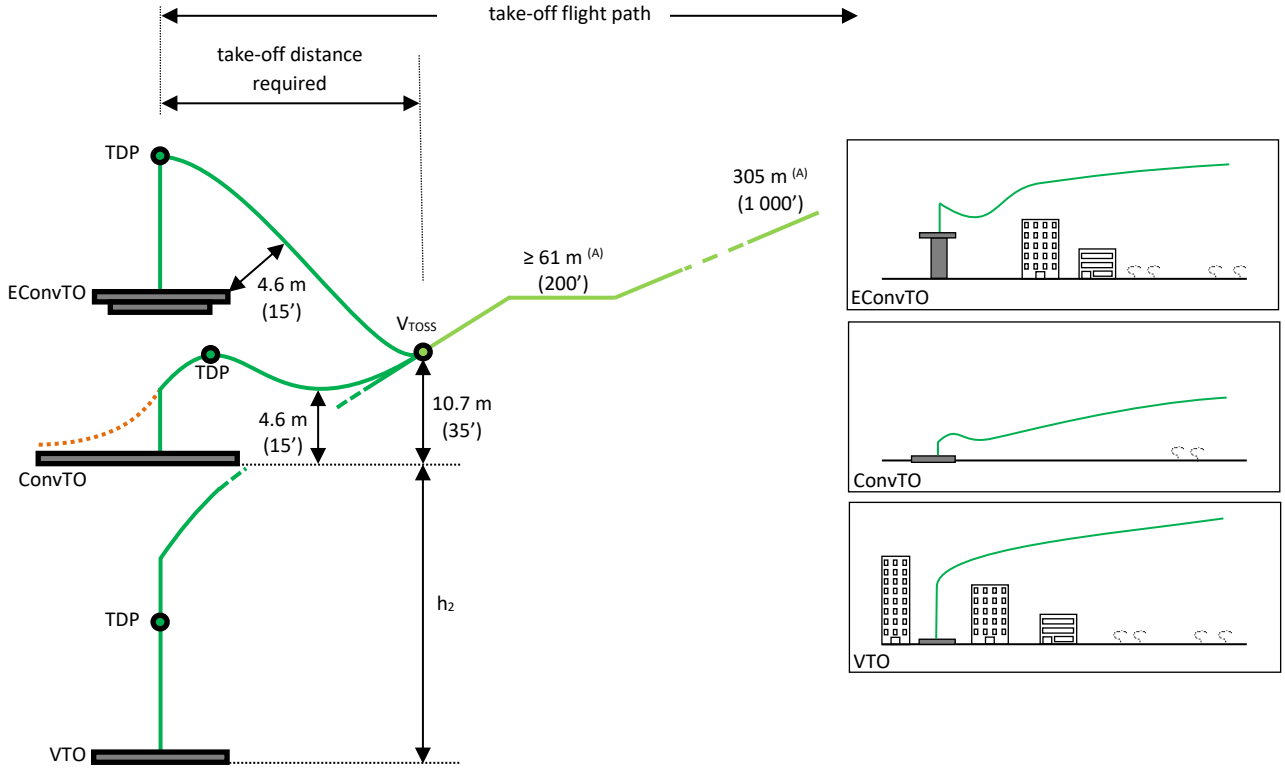


Figure 1: Possible take-off paths

GM1 UAM.POL.VCA.120 Take-off

TAKE-OFF PROCEDURES

The take-off procedures define profiles and scheduled data for various environmental conditions and masses.

Associated with these profiles and conditions are minimum operating surfaces, take-off distances, climb performance distances; these are provided (usually in graphic form) with the take-off mass and the take-off decision point (TDP).

The minimum dimensions of the take-off surface should be compatible with the chosen take-off procedure. For example, for a vertical take-off (VTO) procedure the minimum FATO dimensions should be 1.5 D, while for a forward take-off procedure the minimum FATO dimensions should be the length of the rejected take-off distance required (RTODRV).

The landing surface and the height of the TDP are directly related to the ability of the VCA to reject the take-off and land on the surface, following a CFP event before or at TDP.

Following a CFP event at or after the TDP, a CMP should exist to perform a continued take-off (CTO) which provides obstacle clearance and distance to reach a point from where climb performance in the first and subsequent segments is assured.

The operator should be aware that if the TDP is lower than the top of the vertical segment, it is possible that the rejected take-off (RTO) cannot be performed safely from a given height upwards while meeting the CMP following a CFP. If the RTO is not a foreseen option, then the TDP may be set at the bottom of the vertical segment.

Where the TDP is shifted upwards, it will not affect the shape of the continued take-off profile but should shift the min-dip upwards by the same amount that the revised TDP has been increased — with respect to the basic TDP.

Such assertions are concerned only with the vertical or the backup procedures and can be regarded as achievable under the following circumstances:

— when the procedure is flown, it is based upon a profile contained in the AFM — with the exception of the necessity to perform an RTO;

— the TDP, if shifted upwards (or upwards and backward in the backup procedure) will be the height at which performance is available to perform CTO following a CFP; and

— if obstacles are permitted in the backup area, they should continue to be permitted with a revised TDP.

AMC2 UAM.POL.VCA.120 Take-off

THE APPLICATION OF TODRV

The selected height at which safe obstacle clearance and a positive climb gradient are achieved, following a CFP recognised before or at the TDP should be determined with the use of AFM data, and be at least 10.7 m (35 ft) above:

(a) the take-off surface; or

(b) as an alternative, a level height defined by the highest obstacle in the take-off distance required.

GM2 UAM.POL.VCA.120 Take-off

THE APPLICATION OF TODRV

The TODRV provides safe obstacle clearance following a CFP being recognised at TDP. It is the projected horizontal distance from the start of a take-off procedure to:

(a) for conventional take-off (ConvTO), the point where the VCA reaches 10,7 m (35 ft) above the take-off surface with the minimum climb gradient of 4.5 %;

(b) for elevated conventional take-off (EConvTO): after the dropdown segment, the point where the VCA reaches 10,7 m (35 ft) above the take-off surface with the minimum climb gradient of 4.5 %;

(c) for vertical take-off (VTO), the point where the VCA reaches 10,7 m (35 ft) above the high hover height (h2) established in the AFM with the minimum climb gradient of 4.5 %.

AMC3 UAM.POL.VCA.120 Take-off

OBSTACLE CLEARANCE IN THE BACKUP AREA

(a) For ConvTO and EConvTO using a backup or lateral transition procedure in accordance with UAM.POL.VCA.120(d), the PIC should take into account the following factors:

(1) in the backup: the PIC has few visual cues and should rely upon the altimeter and sight picture through the front or floor window (if flight path guidance is not provided) to achieve an accurate rearward flight path;

(2) in the rejected take-off (RTO): the PIC should be able to manage the descent against a varying forward speed whilst still ensuring an adequate clearance from obstacles until the VCA gets in close proximity for landing on the FATO;

(3) in the continued take-off (CTO): the PIC should be able to accelerate to V_{TOSS} whilst ensuring an adequate clearance from obstacles.

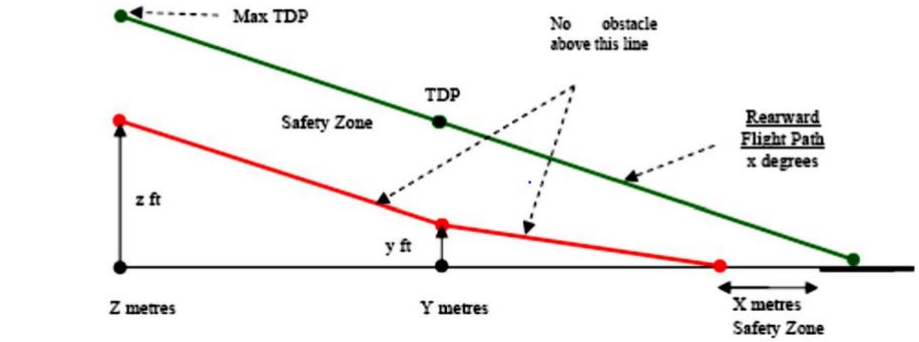
(b) UAM.POL.VCA.120(d) may be achieved by establishing that:

(1) in the backup area no obstacles are located within the safety zone below the rearward flight path when described in the AFM (see Figure 1); in the absence of such data in the AFM, the operator should contact the manufacturer in order to define a safety zone; or

(2) during the backup, the RTO and the CTO manoeuvres, obstacle clearance is demonstrated to the competent authority.

Figure 1

Rearward flight path

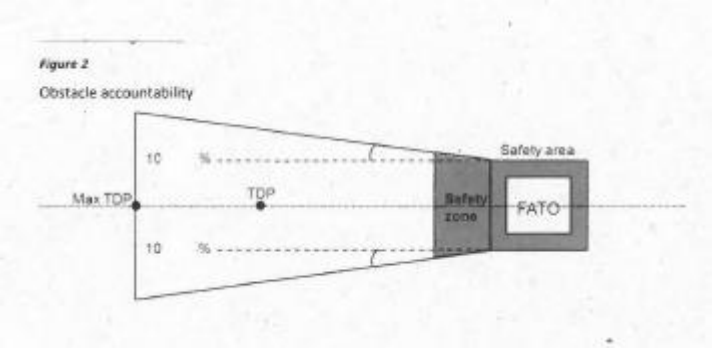


(c) An obstacle in the backup area is considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

(1) 0.75 × D; plus

(2) 0.25 × D or 3 m, whichever is greater; plus

(3) 0.10 × DR for VFR day; DR is in this case the distance travelled from the back of the FATO (see Figure 2).



GM1 UAM.POL.VCA.125 Take-off flight path

END OF THE TAKE-OFF FLIGHT PATH

The take-off flight path ends at 1 000 ft above the highest obstacle in congested areas or whenever the VCA reaches the minimum flight altitude/height as established in accordance with Part-SERA of Regulation (EU) No 923/2012.

AMC1 UAM.POL.VCA.135 Landing

LANDING PROCEDURE

The procedure used for landing should be compatible with the certified performance for landing obtained during the type certification of the VCA (ref. MOC VTOL.2130).

GM1 UAM.POL.VCA.135 Landing

LANDING PROCEDURE

The VCA certified landing performance may allow for a conventional landing (ConvL) procedure or a vertical landing (VL) procedure.

(a) A ConvL path starts at a landing decision point (LDP) and ends at the point where the aircraft reaches a stop at the FATO on the ground (after which it may taxi).

(b) A VL might be required when landing on a vertiport in a congested environment. The operator may choose to have, from a point along the approach after the LDP, a pure vertical trajectory.

(c) certified performance additional to (a) or (b), allowing a conventional landing with a roll-on.

GM2 UAM.POL.VCA.135 Landing

START OF THE LANDING FLIGHT PATH

The landing flight path starts at 1 000 ft above the highest obstacle in congested areas or at the minimum flight altitude/height as established in accordance with Part-SERA of Regulation (EU) No 923/2012.

GM3 UAM.POL.VCA.135 Landing

LANDING DECISION POINT (LDP)

The LDP is identified with a combination of height, vertical speed and airspeed and/or ground speed.

(a) The LDP is defined as the last point from which a balked landing can be performed. After the LDP, a balked landing is not assured.

(b) Following a CFP before or after the LDP, the VCA should be capable of a CFSL.

LANDING DISTANCE REQUIRED (LDRV)

(c) The LDRV is the horizontal distance required to land and come to a stop from a point 15 m (50 ft) above the landing surface (Figure 1).

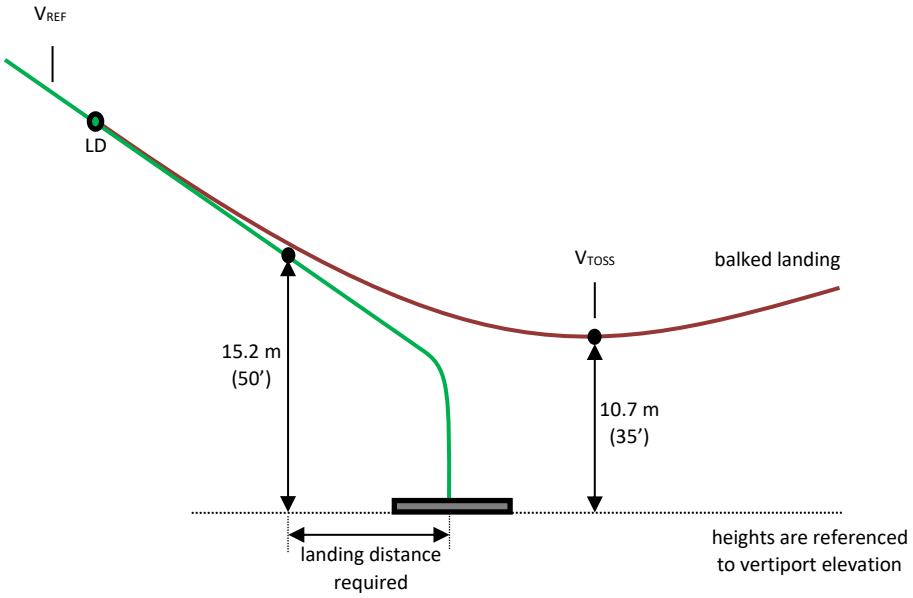


Figure 1: Landing path

AMC1 UAM.POL.VCA.140 Mass and balance, loading

CENTRE OF GRAVITY (CG) LIMITS — OPERATIONAL CG ENVELOPE AND IN-FLIGHT CG

In the AFM, forward and aft CG limits are specified. These limits ensure that the certification stability and control criteria are met throughout the whole flight and allow the proper trim setting for take-off. The operator should ensure that these limits are respected by:

(a) defining and applying operational margins to the certified CG envelope in order to compensate for the following deviations and errors:

(1) deviations of the actual CG at empty or operating mass from published values due, for example, to weighing errors, unaccounted modifications and/or equipment variations;

(2) deviations in the distribution of baggage and cargo in the various compartments as compared with the assumed load distribution as well as inaccuracies in the actual mass of baggage and cargo;

(3) deviations in the actual passenger seating from the seating distribution assumed when preparing the mass and balance documentation. Large CG errors may occur when 'free seating', i.e. freedom of passengers to select any seat when entering the VCA, is permitted;

(4) deviations of the actual CG of cargo and passenger load within individual cargo compartments or cabin sections from the normally assumed mid position;

(5) deviations of the CG caused by any configuration change, unless already covered by the certified limits;

(6) deviations caused by in-flight change of loading;

(7) deviations caused by the difference between the actual passenger masses and standard passenger masses when such masses are used; and

(b) defining and applying operational procedures in order to:

(1) ensure an even distribution of passengers in the cabin;

(2) take into account any significant CG travel during flight caused by passenger/crew movement; and

(3) take into account any significant CG travel during flight caused by fuel consumption, if applicable.

AMC2 UAM.POL.VCA.140 Mass and balance, loading

WEIGHING OF A VCA

(a) New VCA that have been weighed at the factory may be placed into operation without reweighing if the mass and balance records have been adjusted for alterations or modifications to the VCA. VCA transferred from one EU operator to another EU operator do not have to be weighed prior to use by the receiving operator unless more than 4 years have elapsed since the last weighing.

(b) The mass and CG position of a VCA should be revised whenever the cumulative changes to the dry operating mass or CG exceed ±0.5 % of the maximum landing mass or CG envelope respectively. This may be done by weighing the VCA or by calculation.

(c) When weighing a VCA, normal precautions should be taken consistent with good practices such as:

(1) checking for completeness of the VCA and equipment;

(2) determining that fluids are properly accounted for;

(3) ensuring that the VCA is clean; and

(4) ensuring that weighing is accomplished in an enclosed building.

(d) Any equipment used for weighing should be properly calibrated, zeroed, and used in accordance with the manufacturer's instructions. Each scale should be calibrated either by the manufacturer, by a civil department of weights and measures or by an appropriately authorised organisation within 2 years or within a time period defined by the manufacturer of the weighing equipment, whichever is less. The equipment should enable the mass of the VCA to be

established accurately. One single accuracy criterion for weighing equipment cannot be given. However, the weighing accuracy is considered satisfactory if the accuracy criteria in Table1 are met by the individual scales/cells of the weighing equipment used.

Table 1: Accuracy criteria for weighing equipment

For a scale/cell load	An accuracy of below
2 000 kg	±1 %
from 2 000 kg to 20 000 kg	±20 kg
above 20 000 kg	±0.1 %

AMC3 UAM.POL.VCA.140 Mass and balance, loading

DRY OPERATING MASS OF THE VCA

The dry operating mass includes:

(a) the pilot(s), technical crew member(s) and their baggage as applicable;

(b) catering and removable passenger service equipment, if applicable.

AMC4 UAM.POL.VCA.140 Mass and balance, loading

MASS VALUES FOR THE PILOT(S) AND THE TECHNICAL CREW MEMBER(S), IF APPLICABLE

(a) The operator should use the following mass values for the pilot(s) and the technical crew member(s), as applicable, to determine the dry operating mass:

(1) actual weighted masses including baggage; or

(2) standard masses, including baggage, of 85 kg.

(b) The operator should correct the dry operating mass to account for any additional baggage. The position of this additional baggage should be accounted for when establishing the CG of the VCA.

AMC5 UAM.POL.VCA.140 Mass and balance, loading

MASS VALUES FOR PASSENGERS, THEIR CLOTHING AND PERSONAL BELONGINGS AND FOR BAGGAGE

(a) When the actual number of passenger seats in the VCA is less than six, passenger mass may be calculated on the basis of a statement by, or on behalf of, each passenger plus a predetermined mass to account for clothing and personal belongings.

The predetermined mass for clothing and personal belonging should be established by the operator on the basis of studies relevant to its particular operation. In any case, it should not be less than 4 kg for clothing and personal belongings such as an overcoat, an umbrella, a small handbag or purse, reading material or a small camera or laptop.

The passengers' stated mass and the mass of passengers' clothing and personal belongings should be checked prior to boarding and adjusted, if necessary. The operator should establish a procedure in the operations manual on when to select actual or standard masses and the procedure to be followed when using verbal statements.

(b) When determining the actual mass by weighing, the passengers' mass and the mass of passengers' clothing and personal belongings should be weighted immediately prior to boarding the VCA.

(c) When using standard mass values, the standard mass values in Table 1 below should be used. The standard masses include the mass of any infant carried by an adult on one passenger seat. Infants occupying separate passenger seats should be considered as children for the purpose of this AMC.

Table 1: Standard masses for passengers — VCA with a total number of passenger seats of 19 or less

Passenger seats:	1–5	6–9	10–19
Male	104 kg	96 kg	92 kg
Female	86 kg	78 kg	74 kg
Children	35 kg	35 kg	35 kg

(1) As the baggage is weighed separately, 6 kg may be deducted from male and female masses in Table 1.

(2) For operations in which a survival suit is provided to passengers, 3 kg should be added to the passenger mass value.

(d) Mass values for baggage

For VCA with 19 passenger seats or less, the actual mass of any passenger baggage carried in the VCA should be determined by weighing.

(e) Other standard masses may be used provided that they are calculated on the basis of a detailed weighing survey plan and that a reliable statistical analysis method is applied. The operator should advise the competent authority about the intent of the passenger weighing survey and explain the survey plan in general terms. The revised standard mass values should only be used in circumstances comparable with those under which the survey was conducted. Where the revised standard masses exceed those in Table 1, then such higher values should be used.

(f) On any flight identified as carrying passengers whose masses, including clothing and personal belongings, are expected to significantly deviate from the standard passenger mass, the operator should determine the actual mass of such passengers by weighing or by adding an adequate mass increment.

AMC6 UAM.POL.VCA.140 Mass and balance, loading

PROCEDURE FOR ESTABLISHING REVISED STANDARD MASS VALUES FOR PASSENGERS AND BAGGAGE

To establish revised standard mass values for passengers and baggage, the IAM operator should refer to the procedure described in AMC2 CAT.POL.MAB.100(e).

GM1 UAM.POL.VCA.140 Mass and balance, loading

ADJUSTMENT OF STANDARD MASSES

In accordance with point (f) of AMC5 UAM.POL.VCA.140, when standard mass values are used, the IAM operator should identify and adjust the passenger masses in cases where passengers are suspected of significantly deviating from the standard values. Therefore, the operations manual should contain instructions to ensure that:

(a) relevant personnel report or take appropriate action when a flight is identified as carrying passengers whose masses, including clothing and personal belongings, are expected to significantly deviate from the standard passenger mass; and

(b) VCA pilots pay special attention to the load and its distribution and make proper adjustments.

GM2 UAM.POL.VCA.140 Mass and balance, loading

STATISTICAL EVALUATION OF PASSENGERS AND BAGGAGE DATA

The IAM operator may use the statistical method described in GM2 CAT.POL.MAB.100(e) to establish the mass of the traffic load.

GM3 UAM.POL.VCA.140 Mass and balance, loading

GUIDANCE ON PASSENGER WEIGHING SURVEYS

The IAM operator may use the guidance on passenger weighing surveys as provided in GM3 CAT.POL.MAB.100(e).

AMC1 UAM.POL.VCA.145 Mass and balance data, documentation

CONTENT OF THE MASS AND BALANCE DOCUMENTATION

The mass and balance documentation should include advice to the PIC whenever a non-standard method has been used for determining the mass of the load.

AMC2 UAM.POL.VCA.145 Mass and balance data, documentation

CG POSITION

The CG position may not need to be in the mass and balance documentation if:

(a) the load distribution is in accordance with a pre-calculated balance table; or

(b) it can be shown that for the planned operations a correct balance can be ensured, whatever the real load is.

AMC3 UAM.POL.VCA.145 Mass and balance data, documentation

INTEGRITY

The operator should verify the integrity of mass and balance data and documentation generated by a computerised mass and balance system at intervals not exceeding 6 months. The operator should establish a system to check that amendments to its input data are incorporated properly in the system and that the system operates correctly on a continuous basis.

AMC4 UAM.POL.VCA.145 Mass and balance data, documentation

SIGNATURE OR EQUIVALENT

Where a signature by hand is impracticable or it is desirable to arrange the equivalent verification by electronic means, the following conditions should be applied in order to render an electronic signature equivalent to a conventional handwritten signature:

(a) electronic ‘signing’ by entering a personal identification number (PIN) code with appropriate security, etc.;

(b) entering the PIN code generates a print-out of the individual's name and professional capacity on the relevant document(s) in such a way that it is evident to anyone having a need for that information, who has signed the document;

(c) the computer system logs information to indicate when and where each PIN code has been entered;

(d) the use of the PIN code is, from a legal and responsibility point of view, considered to be fully equivalent to a handwritten signature;

(e) the requirements for record-keeping remain unchanged; and

(f) all personnel concerned are made aware of the conditions associated with electronic signature and this is documented.

GM1 UAM.IDE.VCA.100 Instruments and equipment

REQUIRED INSTRUMENTS AND EQUIPMENT THAT DO NOT NEED TO BE APPROVED IN ACCORDANCE WITH COMMISSION REGULATION (EU) No 748/2012

The functionality of non-installed instruments and of the equipment required by this Subpart and that do not need an equipment approval, as listed in UAM.IDE.VCA.100(a), should be checked against recognised industry standards appropriate to the intended purpose. The operator is responsible for ensuring the maintenance of these instruments and equipment.

GM2 UAM.IDE.VCA.100 Instruments and equipment

NOT REQUIRED INSTRUMENTS AND EQUIPMENT THAT DO NOT NEED TO BE APPROVED IN ACCORDANCE WITH COMMISSION REGULATION (EU) No 748/2012, BUT ARE CARRIED ON A FLIGHT

(a) Point UAM.IDE.VCA.100 does not exempt any installed instrument or item of equipment from complying with Commission Regulation (EU) No 748/2012. In this case, the installation should be approved as required in Commission Regulation (EU) No 748/2012 and should comply with the applicable Certification Specifications as required under the same Regulation.

(b) The failure of additional non-installed instruments or equipment not required by this Part or by Commission Regulation (EU) No 748/2012 or any applicable airspace requirements should not adversely affect the airworthiness and/or the safe operation of the VCA. Examples may be the following:

(1) portable EFB;

(2) PEDs carried by flight crew or cabin crew; and

(3) non-installed passenger entertainment equipment.

AMC1 UAM.IDE.VCA.105 Minimum equipment for a flight

MANAGEMENT OF THE STATUS OF CERTAIN INSTRUMENTS, EQUIPMENT OR FUNCTIONS

The operator should control and retain the status of the instruments, equipment or functions required for the intended operation, which are not controlled for the purpose of continuing airworthiness management.

GM1 UAM.IDE.VCA.105 Minimum equipment for a flight

MANAGEMENT OF THE STATUS OF CERTAIN INSTRUMENTS, EQUIPMENT OR FUNCTIONS

(a) The operator should define responsibilities and procedures to retain and control the status of instruments, equipment or functions required for the intended operation, which are not controlled for the purpose of continuing airworthiness management.

(b) Examples of such instruments, equipment or functions may be, but are not limited to, equipment related to navigation approvals as FM immunity or certain software versions.

AMC1 UAM.IDE.MVCA.115 Operating lights

ANTI-COLLISION LIGHTS

(a) An anti-collision light system should be installed to attract attention to the VCA and provide sufficient visibility in a timely manner for another aircraft to avoid a collision, especially in congested areas. The system should consist of one or more approved anti-collision lights. Each anti-collision light should be either aviation red or aviation white.

(b) Where installed, red flashing anti-collision lights (rotating beacons) should not affect the vision of the pilot or detract from the visibility of the position lights. The red flashing lights should be turned on when the lift and thrust units are powered on prior to taxiing or movement of the VCA on the ground and should be turned off at the end of the flight.

(c) Where installed, white flashing anti-collision lights (strobes) should be so located that the pilot's vision is not impaired. The white flashing lights should be turned on prior to take-off and turned off immediately after landing.

GM1 UAM.IDE.MVCA.125 Flight instruments and associated equipment

TYPE CERTIFICATION APPROVAL

A reference to the type certification approval, including the required flight instruments, should be available in the VCA flight manual and/or TCDS.

AMC1 UAM.IDE.MVCA.140 Fuel/energy measuring and displaying equipment

EQUIPMENT REQUIREMENTS

(a) The VCA should be equipped with means of:

(1) measuring the remaining usable amount of fuel/energy;

(2) providing a conservative estimate in flight of the amount of fuel/energy necessary to complete the remaining part of the flight considering the individual fuel/energy scheme;

(3) displaying to the pilot the comparison between (1) and (2) updated at regular intervals, as well as upon request; and

(4) warning the pilot when the amount of fuel/energy necessary to complete the flight estimated in (2) is greater than the remaining usable fuel/energy measured in (1).

(b) The calculation in (a)(2) should:

(1) be updated at intervals allowing the VCA to reach the destination following the actual flight routing with the onset of the warning in (a)(4);

(2) take into account the actual wind conditions, and updated weather information through dedicated service providers; and

(3) take into account any existing or possible failure or malfunction of the VCA system or any existing or possible abnormal flight condition.

(c) The VCA should be equipped with an in-flight replanning function that indicates to the pilot the area where a diversion is possible and indicate vectors to a suitable diversion location.

(d) As an alternative to points (a)(2), (a)(3), (a)(4), (b) and (c), the operator may implement a procedure in accordance with AMC1 UAM.OP.VCA.195.

AMC1 UAM.IDE.MVCA.145 Height-determination equipment

RADIO ALTIMETER

A radio altimeter capable of emitting an audio warning below a preset height and a visual warning at a height selectable by the pilot may be used to meet the safety objective of UAM.IDE.MVCA.145.

GM1 UAM.IDE.MVCA.145 Height-determination equipment

TAWS

A VCA equipped with a TAWS capable of determining the height and capable of emitting an audio warning below a preset value and a visual warning at a height selectable by the pilot does not need to be equipped with a separate radio altimeter.

AMC2 UAM.IDE.MVCA.145 Height-determination equipment

AUDIO AND VISUAL WARNING

(a) The audio warning should be a voice warning. The voice warning alert should be distinguishable from other warnings and should contain a clear and concise voice message. The height at which the audio warning is triggered should be such as to provide adequate time for the pilot to take corrective action.

(b) The visual warning should require a minimal interpretation by the pilot for both an instantaneous impression of absolute height and rate of change of height. The voice warning should be triggered only whilst descending through the preset datum height and be inhibited whilst ascending.

AMC1 UAM.IDE.MVCA.170 Crew interphone system

TYPE OF CREW INTERPHONE

The crew interphone system should not be of a handheld type.

AMC1 UAM.IDE.MVCA.180 Public address system (PAS)

PAS SPECIFICATION

Where required, the PAS should:

(a) operate independently of the crew interphone systems except for handsets, headsets, microphones, selector switches and signalling devices;

(b) following a total failure of its primary electrical system, provide reliable operation for a minimum of 10 minutes.

AMC1 UAM.IDE.MVCA.185 Cockpit voice recorder (CVR)

OPERATIONAL PERFORMANCE REQUIREMENTS

The operational performance requirements for cockpit voice recorders (CVRs) should be those laid down in EUROCAE Document 112B dated (…) or any later equivalent standard accepted by EASA.

The date of the document publication is expected to be available before the EDD issuing these AMC & GM.

AMC1 UAM.IDE.MVCA.190 Flight data recorder (FDR)

OPERATIONAL PERFORMANCE REQUIREMENTS

(a) The operational performance requirements for FDRs should be those laid down in EUROCAE Document 112B dated (…) or any later equivalent standard accepted by EASA.

(b) The FDR should, with reference to a timescale, record the parameters established in Table 1 and Table 2, as applicable, and any parameters that have been established during the type certification of the VCA.

Table 1: FDR — VCA

No	Parameter
1	Time
2	Altitude
3	Latitude
4	Longitude
5	Indicated airspeed or calibrated airspeed
6	Ground speed
7	Outside air temperature (OAT)
8	Heading (magnetic or true)
9	Track
10	Vertical speed
11	Pitch attitude
12	Roll attitude

13	Longitudinal acceleration (body axis)
14	Normal acceleration
15	Lateral acceleration
16	Roll rate or roll acceleration
17	Pitch rate or pitch acceleration
18	Yaw rate or yaw acceleration
19	Electric engines:
19a	Rotation speed of each rotor or propeller (in rpm)
19b	Health status of each electric engine controller
19c	Temperature of each electric engine
19d	Temperature of each electric engine controller
19e	Measured electrical current for each electric engine
19f	For liquid cooled electric engines: pressure and temperature of the cooling liquid
20	Flight controls:
20a	Pilot input positions on all axes and corresponding flight control
20b	Outputs (e.g. target rpm for each electric engine, flight surface positions, etc.)
21	Status or each flight control computer
22	Wings angle (if applicable)
23	Nacelles angle (if applicable)
24	Propeller pits (for every variable pitch propeller)
25	Air-ground status such as weight on wheels or equivalent parameter
26	Alerts (including master warning and master caution status)
27	Manual voice transmission keying (if voice communications are used)
28	Each battery used for propulsion and/or flight controls:

28a	Health status
28b	State of charge (SOC)
28c	Voltage
28d	Temperature
28e	Current flow
28f	State of power (SOP) (if available)
28g	Each battery used for propulsion and/or flight controls: calculated remaining flight time (if available)
29	Each electrical distribution unit (e.g. distribution units, converters) contributing to the propulsion and/or flight controls: health status
30	Status of the battery management system (if any)
31	Combustion engines:
31a	Fuel parameters
31b	Oil pressure and temperature
31c	Parameters required to determine propulsive thrust or power delivered
31d	Turbine rpm (if applicable)
31e	FADEC health status (if applicable)
31f	VCA inputs used by the FADEC (if applicable)
31g	Any electrical current generation
31h	Any other parameter subject to a limitation

Table 2: FDR — VCA for which the data source for the parameter is either used by VCA systems or is available for use by the pilot to operate the VCA

No	Parameter
1	Active AFCS mode
2	Radio altitude or terrain elevation

3	Current navigation source
4	Vertical and lateral deviation with respect to the current active navigation path
5	DME 1 & 2 distances
6	Drift angle
7	Wind speed
8	Wind direction
9	Landing gear position
10	Ice: ice detection
11	Ice: status of de-icing or anti-icing system
12	Electric engine: vibration level
13	Traffic advisory or alerts (if applicable)
14	Obstacle and terrain alerts (if applicable)

AMC1 UAM.IDE.MVCA.191 Flight recorder

OPERATIONAL PERFORMANCE REQUIREMENTS

(a) The flight recorder should record the parameters established in point (b) or point (c) below and any parameters that have been established during the type certification of the VCA.

(b) If the flight recorder records flight data, it should record at least the following parameters:

(1) relative time count;

(2) pitch attitude or pitch rate;

(3) roll attitude or roll rate;

(4) heading (magnetic or true) or yaw rate;

(5) latitude;

(6) longitude;

(7) positioning system: estimated error (if available);

(8) pressure altitude or altitude from a positioning system;

(9) time;

(10) ground speed;

(11) positioning system: track (if available);

(12) normal acceleration;

(13) longitudinal acceleration; and

(14) lateral acceleration.

(c) If the flight recorder records images, it should capture views of the main instrument displays at the pilot station(s). The recorded image quality should allow reading the following indications during most of the flight, as applicable:

(1) magnetic or true heading;

(2) time (if presented on the front instrument panel);

(3) pressure altitude;

(4) indicated airspeed;

(5) vertical speed;

(6) slip;

(7) OAT;

(8) attitude (if displayed);

(9) stabilised heading (if displayed);

(10) lift and thrust unit status; and

(11) fuel/energy status.

(d) If the flight recorder records a combination of images and flight data, each flight parameter listed in (b) should be recorded as flight data or by means of images.

(e) The parameters to be recorded as flight data should meet the performance specifications (range, sampling intervals, accuracy limits and resolution in read-out) as defined in the relevant tables of EUROCAE Document 112B or any later equivalent standard accepted by EASAor EUROCAE Document ED-155 'Minimum Operational Performance Specification for Lightweight Flight Recording Systems', dated July 2009, or any later equivalent standard accepted by EASA.

(f) The operational performance requirements for flight recorders should be those laid down in:

(1) EUROCAE Document ED-155 or any later equivalent standard accepted by EASA for lightweight flight recorders; or

(2) in EUROCAE Document 112B or any later equivalent standard accepted by EASA for crash-protected flight recorders.

GM1 UAM.IDE.MVCA.191 Flight recorder

The operator should refer to the following guidance material:

— GM1 CAT.IDE.H.191 as regards additional useful information on lightweight flight recorders;

— GM2 CAT.IDE.H.191 as regards the installation of cameras;

— GM3 CAT.IDE.A.191 as regards recording accuracy of attitude rate parameters;

— GM1 CAT.IDE.A.191(e) as regards the function to modify image and audio recordings.

AMC1 CAT.IDE.H.200 Flight data and cockpit voice combination recorder

GENERAL

A flight data and cockpit voice combination recorder is a flight recorder that records:

(a) all voice communications and the aural environment required by UAM.IDE.MVCA.185 regarding CVRs; and

(b) all the parameters required by UAM.IDE.MVCA.190 regarding FDRs, with the associated specifications detailed in UAM.IDE.MVCA.190.

AMC1 UAM.IDE.MVCA.205 Seats, seat safety belts, restraint systems and child restraint devices (CRDs)

UPPER TORSO RESTRAINT SYSTEM

The upper torso restraint system and the seat belt may be used independently.

AMC2 UAM.IDE.MVCA.205 Seats, seat safety belts, restraint systems and child restraint devices (CRDs)

CHILD RESTRAINT DEVICES (CRDs)

The CRD should comply with AMC1 CAT.IDE.H.205.

AMC3 UAM.IDE.MVCA.205 Seats, seat safety belts, restraint systems and child restraint devices (CRDs)

FOUR-POINT UPPER TORSO RESTRAINT SYSTEM

A four-point upper torso restraint system may also be used on passengers' seats.

AMC1 UAM.IDE.MVCA.210 'FASTEN SEAT BELT' and 'NO SMOKING' signs

PERMANENT SIGNS

If the seat belts are supposed to be fastened throughout the flight, a permanent sign is acceptable. Passengers should be instructed accordingly.

AMC1 UAM.IDE.MVCA.220 First-aid kits

CONTENT OF FIRST-AID KITS

First-aid kits should be equipped with appropriate and sufficient medications and tools.

The minimum content of the first-aid kit should comply with points (b)(1), (b)(2) and (b)(3) of AMC1 CAT.IDE.H.220.

AMC1 UAM.IDE.MVCA.240 Supplemental oxygen — non-pressurised VCA

DETERMINATION OF OXYGEN

The amount of supplemental oxygen for sustenance for a particular operation should be determined on the basis of flight altitudes and flight duration, consistent with the operating procedures, including emergency procedures, established for each operation and the routes to be flown as specified in the operations manual.

AMC1 UAM.IDE.MVCA.250 Handheld fire extinguishers

NUMBER, LOCATION, AVAILABILITY AND TYPE

(a) The number and location of handheld fire extinguishers should be such as to provide adequate availability for use in each compartment accessible in flight, account being taken of the need to minimise the hazard of toxic gas concentrations.

(b) The handheld fire extinguisher should be checked for being:

(1) in place and secured;

(2) charged and pressurised; and

(3) kept up to date.

(c) Unless an extinguisher is clearly visible, its location should be indicated by a placard or sign. Appropriate symbols may also be used to supplement such a placard or sign.

(d) The handheld fire extinguisher should be suitable for the kinds of fire likely to occur in the compartment where the handheld fire extinguisher is intended to be used.

(e) Dry chemical fire extinguishers should not be used in the flight crew compartment or in any passenger cabin not separated by a partition from the flight crew compartment, because of the adverse effect on vision during discharge and, if conductive, interference with electrical contacts by the chemical residues.

(f) The passengers should be instructed on how to use the handheld fire extinguisher when necessary.

AMC1 UAM.IDE.MVCA.260 Marking of break-in points

MARKINGS — COLOUR AND CORNERS

(a) The colour of the markings should be red or yellow and, if necessary, should be outlined in white to contrast with the background.

(b) If the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm should be inserted so that there is no more than 2 m between adjacent markings

AMC1 UAM.IDE.MVCA.275 Emergency lighting and marking

GENERAL

Compliance with UAM.IDE.MVCA.275(a) of VCA operating in VFR day may be achieved by:

(a) a floor proximity emergency escape path marking system, such as photoluminescent strips on the floor or lights on the seats, providing visual guidance along the cabin floor to the emergency exit(s) in darkness or a smoke-filled cabin; or

(b) for a VCA with a maximum operational passenger seating configuration (MOPSC) of six or less, illumination of the instruments or illumination of the emergency-exit marking and locating signs if such illumination provides visual guidance to the emergency exit(s) in darkness and in a smoke-filled cabin and is independent of the VCA normal electric power supply.

AMC1 UAM.IDE.MVCA.280 Emergency locator transmitters (ELTs)

AUTOMATIC ELT OR AUTOMATIC TRACKING DEVICE

(a) The automatic ELT fitted on the VCA should be compliant with the applicable ETSO and able to transmit an encoded position of the VCA from an internal GNSS receiver.

(b) The airborne system used to comply with UAM.IDE.MVCA.280 when not based on an automatic ELT should:

(1) be combined with an ELT(S) or a PLB;

(2) comply with the applicable ETSO;

(3) comply with the Certification Specifications for Airborne Communications, Navigation and Surveillance (CS-ACNS) issued by EASA, or equivalent; and

(4) the transmission service provider should be certified in accordance with Regulation (EU) 2017/373(the 'ATM/ANS Regulation').

(c) The ground part of the VCA tracking system should automatically identify an abnormal lack of position reporting and provide alert to the operator. It should also be capable of automatically transmitting tracking data and alerting signals to search and rescue services.

GM1 UAM.IDE.MVCA.280 Emergency locator transmitters (ELTs)

AUTOMATIC ELT OR AUTOMATIC TRACKING DEVICE

ELT compliant with the applicable ETSO means either compliant with ETSO-C126c or be part of an overall VCA approval.

Tracking system compliant with the applicable ETSO means either compliant with a particular ETSO or be part of an overall VCA approval.

AMC2 UAM.IDE.MVCA.280 Emergency locator transmitters (ELTs)

TYPES OF ELTs AND GENERAL TECHNICAL SPECIFICATIONS

(a) Point (a) of AMC2 CAT.IDE.H.280 lists the applicable types of ELTs. An 'automatic ELT' means an ELT(AF), ELT(AP) or ELT(AD).

(b) To minimise the possibility of damage in the event of crash impact, the automatic ELT should be rigidly fixed to the VCA structure, as far as is practicable, with its antenna and connections arranged so as to maximise the probability of the signal being transmitted after a crash.

(c) Any ELT carried should operate in accordance with the relevant provisions of ICAO Annex 10, Volume III, and should be registered with the national agency responsible for initiating search and rescue or other nominated agency.

AMC3 UAM.IDE.MVCA.280 Emergency locator transmitters (ELTs)

PLB TECHNICAL SPECIFICATIONS

(a) A personal locator beacon (PLB) should have a built-in GNSS receiver with a search and rescue satellite-aided tracking (COSPAS-SARSAT) type approval number. However, devices with a COSPAS-SARSAT number belonging to series 700 are excluded as this series of numbers identifies the special-use beacons not meeting all the technical requirements and all the tests specified by COSPAS-SARSAT.

(b) Any PLB carried should be registered with the national agency responsible for initiating search and rescue or other nominated agency.

AMC4 UAM.IDE.MVCA.280 Emergency locator transmitters (ELTs)

BRIEFING ON PLB USE

When a PLB is carried by a passenger, the PIC should brief that passenger, prior to the flight, on the PLB characteristics and use.

AMC5 UAM.IDE.MVCA.280 Emergency locator transmitters (ELTs)

BATTERIES

(a) All batteries used in ELTs or PLBs should be replaced (or recharged, if the battery is rechargeable) when the equipment has been in use for more than 1 cumulative hour or in the following cases:

(1) Batteries specifically designed for use in ELTs and having an airworthiness release certificate (EASA Form 1 or equivalent) should be replaced or recharged before the end of their useful life in accordance with the maintenance instructions applicable to the ELT.

(2) Standard batteries manufactured in accordance with an industry standard and not having an airworthiness release certificate (EASA Form 1 or equivalent), when used in ELTs should be replaced or recharged when 50 % of their useful life, as established by the battery manufacturer, has expired.

(3) All batteries used in PLBs should be replaced or recharged when 50 % of their useful life, as established by the battery manufacturer, has expired.

(4) The battery useful life criteria in (1), (2) and (3) do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

(b) The new expiry date for a replaced or recharged battery should be legibly marked on the outside of the equipment.

AMC1 UAM.IDE.MVCA.300 & 310 & 311 Flights over water / Life rafts / Survival equipment

SURVIVAL ELT (ELT(S))

(a) The survival ELT (ELT(S)) is an ELT removable from a VCA, stowed so as to facilitate its ready use in an emergency. An ELT(S) may be activated manually by a survivor or automatically. The automatic activation of an ELT(S) should result from water immersion.

(b) The ELT(S) should be carried in one of the following locations on the VCA:

(1) on the person of a crew member; or

(2) on the person of a passenger or in a life raft; or

(3) adjacent to an emergency exit used for evacuation of the VCA in an emergency.

(c) An automatic portable ELT (ELT(AP)) may be used to replace one required ELT(S) provided that it meets the ELT(S) requirements. A water-activated ELT(S) is not an ELT(AP).

GM1 UAM.IDE.MVCA.300 Flights over water

LIMITED OVERWATER OPERATIONS

For limited overwater operations, the term ‘water’ refers to all types of waterbodies, including hostile seas, non-hostile seas, lakes, rivers, etc.

GM2 UAM.IDE.MVCA.300 Flights over water

TOTAL FLYING TIME

The total flying time is meant to be the cumulative time of all periods during which the VCA is operated over water.

GM3 UAM.IDE.MVCA.300 Flights over water

LANDING OR TAKE-OFF IS PERFORMED OVER WATER

The condition ‘landing or take-off is performed over water’ may include one of the following:

(a) taking off from or landing at a vertiport, diversion location or VEMS operating site where the take-off or approach path is over water;

(b) landing on or taking off from a fixed or floating platform in the water or a vessel suitable for that purpose.

AMC1 UAM.IDE.MVCA.305 Life jackets and other equipment

ELECTRIC ILLUMINATION

The means of electric illumination include a survivor locator light as defined in the applicable ETSO issued by EASA or equivalent.

GM1 UAM.IDE.MVCA. 305 Life jackets and other equipment

SEAT CUSHIONS

Seat cushions are not considered flotation devices.

GM2 UAM.IDE.MVCA Life jackets and other equipment

SUPPORT ACTIVITIES

Flights under point UAM.IDE.MVCA.305(c) include operations for the purpose of:

— support of offshore oil, gas and mineral exploration, production, storage and transport;

— support to offshore wind turbines and other renewable-energy sources; or

— support to ships including sea pilot transfer.

AMC1 UAM.IDE.MVCA.310 Life rafts

LIFE RAFTS AND EQUIPMENT FOR MAKING DISTRESS SIGNALS

(a) Each required life raft should conform to the following specifications:

(1) be of an approved design and stowed so as to facilitate its readily use in an emergency;

(2) be radar conspicuous to standard airborne radar equipment;

(b) In addition to the specifications under point (a):

(1) when carrying more than one life raft on board, at least 50 % should be able to be deployed by the crew while seated at their normal station, where necessary by remote control; and

(2) life rafts that are not deployable by remote control or by the crew should be of such weight as to permit handling by one person. 40 kg should be considered a maximum weight.

(c) Each required life raft should contain at least the following:

(1) one approved survivor locator light;

(2) one approved visual signalling device;

(3) one canopy (for use as a sail, sunshade or rain catcher) or other means to protect occupants from the elements;

(4) one radar reflector;

(5) one 20-m retaining line designed to hold the life raft near the VCA but to release it if the VCA becomes totally submerged;

(6) one sea anchor;

(7) one survival kit, appropriately equipped for the route to be flown, which should contain at least the following:

(i) one life raft repair kit;

(ii) one bailing bucket;

(iii) one signalling mirror;

(iv) one police whistle;

(v) one buoyant raft knife;

(vi) one supplementary means of inflation;

(vii) sea sickness tablets;

(viii) one first-aid kit;

(ix) one portable means of illumination;

(x) 500 ml of pure water and one sea water desalting kit; and

(xi) one comprehensive illustrated survival booklet in an appropriate language.

AMC1 UAM.IDE.MVCA.311 Survival equipment

ADDITIONAL SURVIVAL EQUIPMENT

(a) The following additional survival equipment should be carried when required:

(1) 500 ml of water for each 4, or fraction of 4, persons on board;

(2) one knife;

(3) first-aid equipment; and

(4) one set of air/ground codes.

(b) If any item of equipment contained in the above list is already carried on board the VCA in accordance with another requirement, there is no need for this to be duplicated.

GM1 UAM.IDE.MVCA.311 Survival equipment

SIGNALLING EQUIPMENT

The signalling equipment for making distress signals is described in ICAO Annex 2, Rules of the Air.

GM2 UAM.IDE.MVCA.311 Survival equipment

AREAS WHERE SEARCH AND RESCUE WOULD BE PARTICULARLY DIFFICULT

The expression 'areas in which search and rescue would be particularly difficult' should be interpreted, in this context, as meaning:

(a) areas so designated by the authority responsible for managing search and rescue; or

(b) areas that are largely uninhabited and where:

(1) the authority referred to in (a) has not published any information to confirm whether search and rescue would be or would not be particularly difficult; and

(2) the authority referred to in (a) does not, as a matter of policy, designate areas as being particularly difficult for search and rescue.

GM1 UAM.IDE.MVCA.315 Equipment for on-water operations

INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA

International Regulations for Preventing Collisions at Sea are those that were published by the International Maritime Organisation (IMO) in 1972.

AMC1 UAM.IDE.MVCA.325 Headsets

GENERAL

(a) A headset consists of a communication device that includes two earphones to receive and a microphone to transmit audio signals to the VCA communication system. To comply with the minimum performance requirements, the earphones and microphone should match the communication system's characteristics and the cockpit environment. The headset should be adequately adjustable in order to fit the pilot's head. Headset boom microphones should be of the noise cancelling type.

(b) If the intention is to utilise noise cancelling earphones, the operator should ensure that the earphones do not attenuate any aural warnings or sounds necessary for alerting the flight crew on matters related to the safe operation of the VCA.

GM1 UAM.IDE.MVCA.325 Headsets

GENERAL

The term 'headset' includes any aviation helmet incorporating headphones and microphone worn by a flight crew member.

GM1 UAM.IDE.MVCA.345 Navigation equipment

APPLICABLE AIRSPACE REQUIREMENTS

The applicable airspace requirements are contained in the Single European Sky legislation.

AMC1 UAM.IDE.MVCA.350 Transponders

SSR TRANSPONDER

Airspace requirements for the carriage and operation of SSR transponders in VCA operated in accordance with VFR day are those contained in Regulation (EU) No 923/2012.

AMC1 UAM.IDE.MVCA.355 Management of aeronautical databases

AERONAUTICAL DATABASES

When the operator of an VCA uses an aeronautical database that supports an airborne navigation application as a primary means of navigation used to meet the airspace usage requirements, the database provider should be a Type 2 DAT provider certified in accordance with Regulation (EU) 2017/373 or equivalent.

GM1 UAM.IDE.MVCA.355 Management of aeronautical databases

AERONAUTICAL DATABASE APPLICATIONS

(a) Applications using aeronautical databases for which Type 2 DAT providers should be certified in accordance with Regulation (EU) 2017/373 may be found in GM1 DAT.OR.100 of the AMC & GM to Part-DAT of Regulation (EU) 2017/373.

(b) The certification of a Type 2 DAT provider in accordance with Regulation (EU) 2017/373 ensures data integrity and compatibility with the certified VCA application/equipment.

GM2 UAM.IDE.MVCA.355 Management of aeronautical databases

TIMELY DISTRIBUTION

The operator should distribute current and unaltered aeronautical databases to all VCA requiring them in accordance with the validity period of the databases or in accordance with a procedure established in the operations manual if no validity period is defined.

8. Annex II — Proposed amendments to the AMC & GM to FCL and rationale

The amendments are arranged as follows to show deleted, new, and unchanged text:

— deleted text is ~~struck through~~;

— new text is highlighted in blue;

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

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

Draft AMC & GM to Regulation (EU) No 1178/2011

AMC1 Article 4f(2) and (3) Type ratings for VCA

TYPE RATING COURSES — VTOL-CAPABLE AIRCRAFT

(a) General

The means of compliance established for the design and the conduct of helicopter type rating training courses, as contained in AMC3 ORA.ATO.125 of ED Decision 2012/007/R, should be followed when designing and conducting type rating training courses for VTOL-capable aircraft.

(b) Theoretical knowledge instruction and examination

The theoretical knowledge instruction and examination should be based on the syllabus set out in Section II of AMC1 FCL.725(a) (theoretical knowledge instruction for helicopter type rating training), with amendments and complements, as applicable for the relevant type of VTOL-capable aircraft. Particularly, all the following should be appropriately addressed:

(1) engine and propulsion system of the VTOL-capable aircraft;

(2) knowledge related to the capabilities of the VTOL-capable aircraft to be operated in U-space airspace (instrumentation, flight planning and monitoring, abnormal and emergency procedures).

Rationale

This AMC is proposed to make a link to existing AMC on how to generally design and conduct type rating training courses. For this purpose, AMC3 ORA.ATO.125 (type rating courses for helicopters) is used as a basis.

As regards the content of the theoretical knowledge instruction, reference is made to the already existing AMC1 FCL.725(a) Section II (theory syllabus for helicopter type rating training courses), which comprehensively sets out the necessary training elements for type rating theoretical knowledge. The content of that AMC should be the basis for designing a VTOL-capable aircraft type rating training programme, with adaptations as necessary due to the innovative aircraft design and the aircraft type. In that context, specific areas that need to be considered in the type rating training programme are highlighted.

AMC1 Article 4f(8)(a) Type ratings for VCA

INSTRUCTOR REFRESHER TRAINING FOR VTOL-CAPABLE AIRCRAFT TYPE RATING INSTRUCTIONAL PRIVILEGES

(a) When applicants for the revalidation of an instructor certificate wish to revalidate their instructor privileges for VTOL-capable aircraft as per Article 4f(8), they should complete instructor refresher training in the form of a seminar.

(b) When applicants for the renewal of an instructor certificate wish to renew their instructor privileges for VTOL-capable aircraft as per Article 4f(8), they should complete instructor refresher training following an individual training programme that is established by an ATO, after that ATO has determined on a case-by-case basis the amount of refresher training needed, based on an assessment of the candidate. Such individual training programmes should be based on the content of the training referred to in Article 4f(7)(c).

Rationale

This AMC is proposed to illustrate the necessary arrangements for instructor refresher training related to instructor privileges for VTOL-capable aircraft. Since 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, these arrangements related to VTOL-capable aircraft instructor privileges are 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.

9. Annex III — Proposed amendments to the AMC & GM to SERA

The amendments are arranged as follows to show deleted, new and unchanged text:

— deleted text is ~~struck through~~;

— new text is highlighted in blue;

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

9.1. Draft AMC & GM to Regulation (EU) No 923/2012 (SERA)

GM1 SERA.5001 (***)(b) VMC visibility and distance from cloud minima

FLIGHT VISIBILITY — MANNED VCA

Until sufficient safety data related to operations of manned VCA is available, manned VCA should not be operated with less than 1 500 m flight visibility.

GM1 SERA.11012 Minimum fuel and fuel emergency

The declaration by the pilot of ~~MINIMUM FUEL~~ minimum fuel/energy using the phrase 'MINIMUM FUEL' informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing, and any change to the existing clearance may result in landing with less than the planned final reserve fuel/energy. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

GM2 SERA.11015 Interception

[…]

3. Guidance of an intercepted aircraft

[…]

3.3 In the exceptional case where an intercepted civil aircraft is required to land in the territory overflown, care must also be taken that:

(a) the designated aerodrome is suitable for the safe landing of the aircraft type concerned, especially if the aerodrome is not normally used for civil air transport operations;

(b) the surrounding terrain is suitable for circling, approach and missed approach manoeuvres;

(c) the intercepted aircraft has sufficient fuel/energy remaining to reach the aerodrome;

(d) if the intercepted aircraft is a civil transport aircraft, the designated aerodrome has a runway with a length equivalent to at least 2 500 m at MSL and a bearing strength sufficient to support the aircraft; and

(e) whenever possible, the designated aerodrome is one that is described in detail in the relevant AIP.

[…]

GM2 SERA.13001(c) Operation of an SSR transponder

AIRCRAFT WITHOUT SUFFICIENT ELECTRICAL POWER

This exemption addresses aircraft having electrical power supply only for the operation of on-board equipage, supporting notably communication, navigation and surveillance, e.g. sailplanes, which is not sufficient for permanent operation of SSR transponder.

Aircraft whose engines are electrically powered are not subject to this exemption since their certification provides for sufficient electrical power supply to cover both aircraft propulsion and other on-board supporting systems.

Appendix 1 to AMC1 SERA.14001 General

1. ATS PHRASEOLOGIES

[…]

1.1.3 Minimum fuel/energy …indication of minimum fuel/energy *Note. — A flight information service (FIS) unit will not provide information on delay.*	*a) MINIMUM FUEL~~:~~; b) ROGER [NO DELAY EXPECTED or EXPECT *(delay information)*]. '*' denotes pilot transmission.	*	☑	☐

[…]

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

Any other useful information may consist of information such as but not limited to remaining aircraft endurance/fuel/energy, number of persons on board, possible presence of hazardous materials and the nature thereof, aircraft colour/markings, survival aids, etc.~~.~~, and may also be transmitted in situation of distress.