Crew resource management (CRM) training

‘AMC and GM to Part-ARO — Issue 3, Amendment 1; AMC and GM to Part-ORO — Issue 2, Amendment 3; and AMC and GM to Part-SPA — Amendment 2’

RELATED NPA/CRD 2014-17 — RMT.0411 (OPS.094) — 25.9.2015

EXECUTIVE SUMMARY
This Decision addresses a safety issue related to crew resource management (CRM) training. The Safety Recommendations linked to this issue were addressed during the development of this proposal.

The objective of this proposal is to establish and maintain a high uniform level of safety in air operations by reviewing, amending and expanding the Acceptable Means of Compliance (AMC)/Guidance Material (GM) on CRM training.

This Decision introduces new items to be incorporated in the present applicable framework for CRM training. Such items are provisions for qualification and training of inspectors of competent authorities, expanded provisions for CRM trainers, provisions for computer-based training, CRM training and management system, competency-based CRM training, resilience development, surprise and startle effect, CRM training for single-pilot and single cabin crew operations, etc. In addition, with this Decision the present AMC/GM have been restructured and rephrased to improve the clarity and readability of the text.

The proposed amendments are considered to establish a more practicable and more effective framework for CRM training. These amendments will provide operators with more reliable tools to mitigate further CRM-related risks and hazards and, therefore, are expected to increase safety during all phases of flight.


<table>
<thead>
<tr>
<th>Affected regulations and decisions:</th>
<th>Process map</th>
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<tr>
<td>Decision 2014/025/R (Part-ARO); Decision 2014/017/R (Part-ORO); Decision 2012/019/R (Part-SPA)</td>
<td>Concept Paper: No</td>
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<tr>
<td>Affected stakeholders: Air operators; training organisations; personnel/licence and certificate holders; EASA Member States</td>
<td>Terms of Reference: 12.11.2012</td>
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<tr>
<td>Driver/orign: Safety; stakeholder request</td>
<td>Rulemaking group: Yes</td>
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<tr>
<td>Reference: Safety Recommendations SPAN-2011-026; SPAN-2011-027; FRAN-2012-042; FRAN-2012-043; FRAN-2012-044; FRAN-2012-021; FRAN-2013-019</td>
<td>RIA type: Light</td>
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<tr>
<td>Technical consultation during NPA drafting: No</td>
<td>Publication date of the NPA: 26.6.2014</td>
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<tr>
<td>Duration of NPA consultation: 3.5 months</td>
<td>Review group: Yes</td>
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<td>Focussed consultation: No</td>
<td>Publication date of the Opinion: N/A</td>
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1. **Procedural information**

1.1. **The rule development procedure**

The European Aviation Safety Agency (hereinafter referred to as the ‘Agency’) developed this Decision in line with Regulation (EC) No 216/2008\(^1\) (hereinafter referred to as the ‘Basic Regulation’) and the Rulemaking Procedure\(^2\).

This rulemaking activity is included in the Agency’s 4-year Rulemaking Programme under RMT.0411 (OPS.094). The scope and timescale of the task were defined in the related Terms of Reference (see process map on the title page).

The draft AMC/GM have been developed by the Agency based on the input of the Rulemaking Group RMT.0411 (OPS.094). All interested parties were consulted through NPA 2014-17 ‘Crew resource management (CRM) training’\(^3\), which was published on 26 June 2014. 406 comments were received from interested parties including industry, national aviation authorities, training organisations and aviation associations.

The Agency has reviewed the comments received on the NPA. The comments received and the Agency’s responses thereto are presented in the related Comment-Response Document (CRD) 2014-17.

The final text of this Decision with the AMC/GM has been developed by the Agency based on the input of the Review Group NPA 2014-17 (RMT.0411 (OPS.094)).

The process map on the title page summarises the major milestones of this rulemaking activity.

1.2. **Structure of the related documents**

Chapter 1 contains the procedural information related to this task. Chapter 2 explains the core technical content. Chapter 3 summarises the findings from the Regulatory Impact Assessment. The text of the AMC/GM is annexed to the ED Decision.

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2. The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency’s Management Board and is referred to as the ‘Rulemaking Procedure’. See Management Board Decision 01-2012 of 13 March 2012 concerning the procedure to be applied by the Agency for the issuing of Opinions, Certification Specifications and Guidance Material (Rulemaking Procedure).

2. **Explanatory Note**

2.1. **Overview of the issues to be addressed**

In many incidents and accidents, human factors are a significant contributing factor. Human factors encompass CRM which is described as the effective utilisation of all available resources (e.g. human resources, hardware, and information) to achieve safe and efficient operation. The objective of CRM is to enhance the communication and management skills of the crew members concerned. Emphasis is placed on the non-technical aspects of crew performance.

As described in more detail in the NPA, the analysis performed by the International Civil Aviation Organization (ICAO), UK Civil Aviation Authority (UK CAA) and the European Helicopter Safety Team (EHEST) indicate that there is a need to develop and enhance CRM capabilities. To fulfil this need, appropriate CRM training has to be provided. One major prerequisite for more practicable and more effective CRM training is a further improved European Union applicable framework, which is the subject of the present rulemaking task.

When envisaging the present rulemaking task, the Agency saw no need to amend the Implementing Rules on CRM training. Instead, the Agency amended the AMC/GM associated with the Implementing Rules.

Based on the input received\(^4\), the Agency concluded that the following main measures are needed in order to improve the present applicable framework for CRM training:

- modernisation by incorporating new items which address recent developments and experience gained; and
- restructuring and rephrasing the AMC/GM to improve their clarity and readability.

In detail, the Agency incorporated the following new items, among others, in the AMC/GM:

- qualification and training for inspectors of competent authorities;
- checklist for the oversight of CRM training by inspectors of competent authorities;
- provisions concerning computer-based training;
- expansion of combined CRM training;
- CRM training and management system;
- competency-based CRM training\(^5\);
- monitoring and intervention;
- resilience development;
- surprise and startle effect;
- effective communication and coordination with personnel outside the aircraft;

\(^4\) The input received includes the rulemaking proposals; input from the Agency’s Rulemaking Group and from external, recognised experts; input from commentators; results of the survey; etc.

\(^5\) The competency-based CRM training, as proposed in NPA 2014-17 (for details see below), is kept general and can be seen as a first step. The Agency plans to introduce the concept of competency-based training in a more general manner through a future rulemaking task. In this context, the provisions concerning competency-based CRM training may be expanded.
— CRM training for single-pilot operations and for single cabin crew operations;
— qualification, training, assessment and recency of CRM trainer;
— training environment, flight crew CRM trainer vs flight crew instructor;
— design, delivery and evaluation of CRM training; and
— non-technical skills (NOTECHS) assessment for flight crew.

As already pointed out in the NPA, the applicability of the AMC/GM is not limited any longer to commercial air transport (CAT) operations. Instead, the applicability is expanded to include all operations where Part-ORO applies (for applicability see ORO.GEN.005 of Commission Regulation (EU) No 965/2012). This includes non-commercial operations with complex motor-powered aircraft (NCC operations). However, it should be noted that for NCC operations the procedure to use alternative means of compliance to the AMC is simpler than for CAT operations: according to (c) of ORO.GEN.120, the operator shall only notify the competent authority of the list of the alternative means of compliance it uses. No competent authority approval, as for CAT operations, is needed.


2.2. Objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in this chapter.

The specific objective of this proposal is to establish and maintain a high uniform level of safety in air operations by reviewing, amending and expanding the AMC/GM on CRM training. This includes, as mentioned above:
— its modernisation by incorporating new items; and
— restructuring and rephrasing the AMC/GM to improve their clarity and readability.

2.3. Outcome of the public consultation

During the public consultation phase, 10 main topics of discussion were identified which are described in detail in Chapter 2 of the CRD. These topics are the following:

1. Computer-based training

In the NPA, the Agency introduced provisions concerning computer-based training (CBT) as follows:
— for multi-pilot and multi cabin crew operations, CBT is introduced as complementary training;

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2. Explanatory Note

In the NPA, the Agency proposed AMC for the introduction of minimum training times for the combined training, the (initial) operator’s CRM training, and the training of CRM trainer. This topic triggered a large number of comments. Based on the input received, the Agency decided to consider in this context 6 training hours (without breaks) being 1 day. Therefore, compared to the proposal made in the NPA, e.g. ‘8 hours’ was changed to ‘6 training hours’. Similar changes have been made to other numbers. In addition, the Agency decided that the minimum training times should be provided as GM, and not as AMC. The Agency is of the opinion that nowadays, when ‘classic’ compliance-based training is more often replaced by a competency-based approach, it is not appropriate any longer to prescribe minimum training times using AMC.

3. Resilience development

In the NPA, the Agency introduced provisions on resilience development for flight crew and for cabin crew. Considering the input received, the Agency decided to keep the AMC/GM on resilience development as a new training element.

4. Surprise and startle effect

The Agency introduced provisions on surprise and startle effect for flight crew and for cabin crew as a new training element. Based on the comments received, and having especially in mind that several Safety Recommendations are related to the subject (for details see the discussion in the NPA), the Agency decided to keep these provisions.

5. Proportionality

In the context of proportionality issues, the Agency introduced the following measures in the NPA:

- The CRM training may be outsourced to a training organisation.
- For single-pilot and single cabin crew operations simplified provisions are foreseen, e.g. accepting CBT as a stand-alone training method.
- Instructors for other-than complex motor-powered aircraft are qualified as flight crew CRM trainers for this aircraft category with no additional training.

In addition, based on the input received, the Agency added the following measure for single-pilot operations: for ELA2 aircraft9 the relevant CRM training and its duration should be determined by the operator, based on the aircraft type and the complexity of the operation.

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8 For aircraft with a maximum operational passenger seating configuration of 19 or less.
9 ELA2 aircraft are defined in Annex I to Commission Regulation (EU) No 965/2012 as the following manned European light aircraft:
   - an aeroplane with a maximum take-off mass (MTOM) of 2 000 kg or less not being a complex motor-powered aircraft;
   - a sailplane or powered sailplane with an MTOM of 2 000 kg or less;
   - a balloon;
   - a very light rotorcraft with an MTOM of 600 kg or less with simple design, designed to carry not more than 2 persons, not powered by turbine and/or rocket engines and restricted to VFR day operations.
6. Knowledge of relevant flight operations — flight crew CRM trainer vs cabin crew CRM trainer

Several commentators identified and questioned the following imbalance between flight crew CRM trainer and cabin crew CRM trainer: while a flight crew CRM trainer does not necessarily need to be a (former) pilot, at first sight a cabin crew CRM trainer need to have experience as cabin crew member. Based on the input received, the Agency concluded that flight experience should not necessarily be a requirement to become a classroom CRM trainer. Consequently, the text on cabin crew has been amended to be in line with the text for flight crew.

7. Assessment — agreement with flight crew representatives

In the NPA, the Agency proposed to delete the following statement: ‘In order to enhance the effectiveness of the programme, this methodology should, where possible, be agreed with flight crew representatives’. However, the Agency also asked explicitly to comment on whether this statement should stay or not. 10 commentators explicitly expressed that they prefer the statement to be included, while 6 commentators explicitly requested its deletion. Nevertheless, after further discussion the Agency finally decided to delete the statement. Such a statement might have been appropriate in the early years of CRM training, but nowadays it is in substance of no real use within a technical rule. This especially holds for a ‘just culture’ environment with an open form of communication and participation. Instead, State laws regulated agreements between company owners and employee representatives.

8. Assessment — ‘validated and generally accepted method’

During the public consultation, the following questions were raised:

— What is a ‘validated and generally accepted method’ of assessment?
— Should only NOTECHS or should also other methods be mentioned and described as GM?

Since the phrase ‘validated and generally accepted’ obviously causes confusion, the Agency decided to switch back to the wording used in the provisions applicable today, namely ‘accepted method’. The Agency also decided that the GM describing NOTECHS will remain to provide information on one assessment scheme to support the operator, and that no other assessment method is explicitly mentioned. This is since NOTECHS can be described as the only method with an ‘independent’ standing over a long period of time.

9. Assessment/recurrent training — ‘reduction in safety margins’

In the NPA, the Agency proposed to introduce the following statement concerning assessment: ‘Assessments should include behaviour that contributes to a significant reduction in safety margins’, and a similar wording in the context of recurrent training. Taking into consideration the comments received, the Agency decided to change the text to be in line with an appropriate statement in ICAO Doc 9995:\footnote{International Civil Aviation Organization, ‘Manual of evidence-based training’, ICAO Doc 9995-AN/497.} ‘Assessments should include behaviour that results in an unacceptable reduction in safety margins’. Concerning recurrent training, the text has been amended accordingly (‘...could lead to an unacceptable reduction in safety margins’).
10. Assessment of cabin crew

In the NPA, the Agency proposed the assessment of flight crew in the operational environment, but not to introduce assessment for cabin crew. Based on the comments received, the Agency decided not to change this approach. However, the Agency rephrased the provisions on the senior cabin crew member course to emphasise that senior cabin crew members have to demonstrate certain abilities during the training.

2.4. Summary of the Regulatory Impact Assessment (RIA)

The complete RIA related to the present rulemaking task can be found in Chapter 4 of the NPA. The options identified in the RIA are as follows:

— Option 0: Baseline option (no change to the AMC/GM; risks remain as outlined in the issue analysis);
— Option 1: Encourage operators to develop alternative means of compliance; and
— Option 2: Review and amend the AMC/GM on CRM training, as appropriate.

The most important impacts identified in the RIA for each option are safety and economic impacts. In the RIA, it is concluded that Option 2 is the preferred one. The main reason is that this option is the only one which is expected to contribute to a higher reduction in the existing safety risks, when compared to Options 0 and 1, while also providing for a standardised application of the CRM training. Option 2 is the preferred one although the costs for operators are expected to be higher when compared to the other two options. In addition, costs are foreseen for competent authorities. However, these costs for operators and competent authorities are reasonable, as it has been confirmed by the majority of the Agency’s Rulemaking Group members.

Option 0 would lead to no change concerning the safety risks, while Option 1 would only result in a minor reduction in the safety risks. Therefore, these options have not been considered further.

2.5. Overview of the amendments

NPA 2014-17 provides a detailed description of the amendments originally proposed by the Agency. Following the comments received, the Agency amended the AMC/GM as described below. In addition, editorial changes have been made. The final text is provided in three separate annexes to this Decision.

Part-ARO (see Annex I to this Decision)

Compared to NPA 2014-17, the AMC/GM have not been amended.

Part-ORO (see Annex II to this Decision)

AMC1 ORO.FC.115

(a)(6) Combined CRM training: The minimum training times have been moved from AMC to GM level (see No 2 of paragraph 2.3). The provision to further reduce the minimum training times, when evidenced by the operator’s management, has been deleted.
(a)(6)(iv) Combined CRM training: To give operators more flexibility, the following provision has been added: ‘Combined CRM training should be conducted by flight crew CRM trainer or cabin crew CRM trainer’.

(a)(9) Contracted CRM training: Based on a comment received and to avoid confusion, the following statement has been added: ‘If the operator chooses not to establish its own CRM training, another operator, a third party or a training organisation may be contracted to provide the training’.

(b) Initial operator’s CRM training: The minimum training times have been moved from AMC to GM level (see No 2 of paragraph 2.3).

(b)(1) Initial operator’s CRM training: Based on the input received, a provision has been added for clarification explaining that a flight crew member normally need to complete the initial operator’s CRM training only once.

(d) Annual recurrent CRM training: The wording has been amended to be in line with the provisions for cabin crew.

(f)(1)(iii) Automation and philosophy on the use of automation: To improve clarity, the paragraph has been partly rephrased.

(f)(4)(ii) Surprise and startle effect: To keep the standard terminology, ‘crisis management’ has been changed to ‘management of abnormal and emergency situations’.

(g) CRM training syllabus: ‘and strengthen’ has been added in (1), ‘instructional or’ has been added in (2).

(h) Assessment of CRM skills: The former paragraph (2) has been deleted: ‘A validated and generally accepted method of assessment should be used. The non-technical skills (NOTECHS) framework is such a method.’ The Agency came to the conclusion that this provision is superfluous (see also the discussion in No 8 of paragraph 2.3).

(h)(3)(iii) Assessment of CRM skills: ‘de-identified’ has been reintroduced.

(h)(4) Assessment of CRM skills: ‘the required CRM standards’ has been added.

AMC2 ORO.FC.115

(a) Single-pilot helicopter operations: The Agency came to the conclusion that for all single-pilot operations with technical crew, due to extensive coordination and cooperation, advanced CRM capabilities are needed. Therefore, not only for HEMS operations (as laid down in the NPA), but for all helicopter operations with technical crew, the provisions for multi-pilot operations are to be fulfilled.

Former (b) Initial operator’s CRM training: The minimum training times have been moved from AMC to GM level (see No 2 of paragraph 2.3). The specific provision for other-than complex motor-powered aircraft has been deleted (instead, the new paragraph (b)(4) for ELA2 operations has been introduced, see below). Therefore, the whole paragraph on initial operator’s CRM training has been deleted.

(b)(4) Operation with ELA2 aircraft: A new provision for ELA2 aircraft has been added, leaving it to the operator to decide on the CRM training (see No 5 in paragraph 2.3).

AMC3 ORO.FC.115
General: The term ‘flight crew CRM examiner’ has been deleted throughout AMC3 ORO.FC.115 (see also below under ‘former (f)’).

(a)(2)(ii) Applicability: A new provision has been added to clarify that AMC3 ORO.FC.115 is not applicable to trainers or instructors who deliver training other than CRM training, but integrating CRM elements of CRM into this training.

(b)(2)(i) Knowledge of relevant flight operations: The second part of the provision (‘..., preferably gained through current experience as flight crew member’) has been deleted.

(c) Training of flight crew CRM trainer: The minimum training times have been moved from AMC to GM level (see No 2 of paragraph 2.3).

(c)(4) Refresher training of flight crew CRM trainer: A provision has been added to explain that instructors can combine the CRM refresher training with instructor refresher training covering the same content.

(d) Assessment of flight crew CRM trainer: The responsibility of the operator instead of the flight crew CRM trainer examiner has been emphasised.

(e) Recency and renewal of qualification as flight crew CRM trainer: The responsibility of the operator instead of the flight crew CRM trainer examiner has been emphasised.

Former (f) Flight crew CRM trainer examiner: The provisions for the examiner have been deleted completely. The reason is that the ‘additional layer’ of an examiner is seen as overregulation; e.g. even for instructors holding a certificate in accordance with Commission Regulation (EU) No 1178/2011, no such provisions exist. Instead, GM is introduced suggesting that the assessment of CRM trainers is conducted by experienced CRM trainers (see GM7 ORO.FC.115).

GM3 ORO.FC.115

Training hours: GM3 ORO.FC.115 has been included with guidance on minimum training times for combined CRM training, initial operator’s CRM training, and training for CRM trainers.

GM5 ORO.FC.115

(c) Resilience development: The introduction has been shortened.

GM7 ORO.FC.115

(a) Assessment of CRM trainers: GM has been introduced suggesting that the assessment of CRM trainers is conducted by experienced CRM trainers. This GM is meant to replace to a certain extent the provisions for the CRM trainer examiner.

(b) Assessment by a contractor: GM on contracting the assessment of CRM trainers has been introduced (former (f)(2) of AMC3 ORO.FC.115).

Table 1 CRM trainer assessment checklist: The fifth question has been rephrased to clarify that the CRM trainer does not provide technical training and line operations.

Former GM7 ORO.FC.115

CRM training: The guidance explaining that a CRM trainer can work in all Member States has been deleted since it is considered superfluous.
2. Explanatory Note

AMC1 ORO.FC.230

(b)(3)(iii) Recurrent checking — line checks: The provision has been amended by introducing a modified wording as follows: ‘...could lead to an unacceptable reduction in safety margins’ (see No 9 in paragraph 2.3).

AMC1 ORO.CC.115(e)

(a)(4) Cabin training devices and aircraft: The phrase ‘whenever practical’ has been added to lift the burden from operators which cannot (always) provide a representative cabin training device.

(a)(6) Combined CRM training: The minimum training times have been moved from AMC to GM level (see No 2 of paragraph 2.3). The provision to further reduce the minimum training times, when evidenced by the operator’s management, has been deleted.

(a)(iii) Combined CRM training: To give operators more flexibility, the following provision has been added: ‘Combined CRM training should be conducted by flight crew CRM trainer or cabin crew CRM trainer’.

(a)(9) Contracted CRM training: Based on a comment received and to avoid confusion, the following statement has been added: ‘If the operator chooses not to establish its own CRM training, another operator, a third party or a training organisation may be contracted to provide the training’.

(b) Operator’s CRM training: The minimum training times have been moved from AMC to GM level (see No 2 of paragraph 2.3).

(e)(2) Senior cabin crew member course: The Agency rephrased the provisions on the senior cabin crew member course to emphasise that senior cabin crew members have to demonstrate certain abilities during the training (see also No 10 in paragraph 2.3).

(g) CRM training syllabus: ‘and strengthen’ has been added in (1), ‘instructional or’ has been added in (2).

AMC2 ORO.CC.115(e)

Former (a) Operator’s CRM training: The minimum training times have been moved from AMC to GM level (see No 2 of paragraph 2.3); the paragraph has been deleted.

AMC3 ORO.CC.115(e)

General: The term ‘cabin crew CRM examiner’ has been deleted throughout AMC3 ORO.CC.115(e) (see also below under ‘former (f)’).

(a)(2) Applicability: A new provision has been added to clarify that AMC3 ORO.CC.115(e) is not applicable to trainers or instructors who deliver training other than CRM training, but integrating CRM elements of CRM into this training. However, the former paragraph (a)(4) on provisions for trainers or instructors providing aircraft type training, recurrent training or senior cabin crew member training (see the NPA) has been included here.

(b)(2)(i) Qualification of cabin crew CRM trainer: Following No 6 of paragraph 2.3, the provisions concerning the knowledge of relevant flight operations have been adjusted to be in line with the provisions of flight crew.
(c) **Training of cabin crew CRM trainer:** The minimum training times have been moved from AMC to GM level (see No 2 of paragraph 2.3).

(d) **Assessment of cabin crew CRM trainer:** The responsibility of the operator instead of the cabin crew CRM trainer examiner has been emphasised.

(e) **Recency and renewal of qualification as cabin crew CRM trainer:** The responsibility of the operator instead of the cabin crew CRM trainer examiner has been emphasised.

**Former (f) Cabin crew CRM trainer examiner:** The provisions for the examiner have been deleted completely. The reason is that the ‘additional layer’ of an examiner is seen as overregulation; e.g. even for instructors holding a certificate in accordance with Commission Regulation (EU) No 1178/2011, no such provisions exist. Instead, GM is introduced suggesting that the assessment of CRM trainers is conducted by experienced CRM trainers (see GM5 ORO.CC.115(e)).

**GM2 ORO.CC.115(e)**

**Training hours:** GM2 ORO.CC.115(e) has been included with guidance on minimum training times for combined CRM training, operator’s CRM training, and training for CRM trainers.

**GM4 ORO.CC.115(e)**

(c) **Resilience development:** The introduction has been shortened.

**GM5 ORO.CC.115(e)**

(a) **Assessment of CRM trainers:** GM has been introduced suggesting that the assessment of CRM trainers is conducted by experienced CRM trainers. This GM is meant to replace to a certain extent the provisions for the examiner.

(b) **Assessment by a contractor:** GM on contracting the assessment of CRM trainers has been introduced (former (f)(2) of AMC3 ORO.CC.115(e)).

**Table 1 CRM trainer assessment checklist:** The fifth question has been rephrased to clarify that the CRM trainer does not provide technical training.

**Former GM5 ORO.FC.115(e)**

**CRM training:** The guidance explaining that a CRM trainer can work in all Member States has been deleted since it is considered superfluous.

**Part-SPA (see Annex III to this Decision)**

Compared to NPA 2014-17, AMC1 SPA.HEMS.135(a) has not been amended.
3. References

3.1. Related regulations


3.2. Affected decisions


All Decision are available at http://easa.europa.eu/document-library/agency-decisions