Update of flight simulation training devices requirements

RMT.0196 — ISSUE 2

Issue/rationale

The main purpose of this task is to include in the European provisions elements from ICAO Doc 9625 for the use of FSTDs in flight training. The task will also address three safety recommendations (SRs) and aims at including results and findings from the loss of control avoidance and recovery training (LOCART) and RMT.0581 working group results. Harmonisation with the FAA should be considered.

Subtask 1:
The main objective of Work Package 1 (WP1) is to increase the fidelity of the provisions to support the approach-to-stall training, as well as of the new upset prevention and recovery training (UPRT) requirements as proposed by Opinion No 06/2017 (RMT.0581).

Subtask 2:
The main objective for Work Package 2 (WP2) is to review the technical requirements for training devices to reflect their actual capability and technology advancement.

Subtask 3:
The main objective for Work Package 3 (WP3) is to address any relevant and appropriate emerging issues that are relevant to CS-FSTD(A) and (H) including the feasibility for developing CS-FSTD requirements for power-lift/tilt rotor aircraft.

Action area: Human factors and competence of personnel
Affected rules: Part-ARA, Part-ORA, Part-ORO, AMC/GM to Part-FCL, Part-ORA and Part-ARA, Part-ORO, CS-FSTD(A), CS-FSTD(H), CS-SIMD
Affected stakeholders: Competent authorities (CAs), Air Operator Certificate (AOC) holders, approved training organisations (ATOs), declared training organisations (DTOs), pilots, instructors, examiners, FSTD operators, FSTD and aircraft original equipment manufacturers (OEMs)
Driver: Safety; cater for new technologies
Impact assessment: Full
Rulemaking group: Yes
Rulemaking Procedure: Standard

EASA rulemaking process milestones

14.7.2016 (Issue 1)              2019/Q2
7.3.2019 (Issue 2)              2019/Q3
                           2OX/QX
                           2020/Q1
1. Why we need to change the rules — issue/rationale

The European Union Aviation Safety Agency (EASA) stated in the European Plan for Aviation Safety (EPAS)\(^1\) the importance to adapt training tools to cope with new technologies. Also it underlines the need for aviation personnel to take advantage of the safety opportunities presented by new technologies. RMT.0196 is part of the safety actions related to aviation personnel.

As stated in EPAS, the driver for this task is the commitment to improve safety. EPAS is the documented output of an evidence-based proactive approach to safety risks and provides the reader with a picture of the risks of the aviation safety system in Europe. Therefore, EPAS identifies the risks and establishes priorities for the European region. It supports the management of safety at European level by complementing existing safety regulations and investigations.

This rulemaking task (RMT) aims to address the technological changes to Flight Simulation Training Devices (FSTD) since the last certification specifications (CSs) were transposed from the JAA regulations in 2009. While the fidelity of modern FSTDs has experienced a major advancement, CS-FSTD\(^2\) has not encompassed this advancement. Therefore, some of the rules have become obsolete, as they do not meet the technological changes that have arisen since 2009. In addition, the fact that the rules do not keep pace with the technological advancement it affects the training of pilots whose training needs, in some cases, cannot be fully addressed through FSTDs that are qualified in accordance with the existing CS-FSTD requirements. Therefore, this RMT will tackle this main problem by amending CS-FSTD taking into account the evolution of the technology and the development of the pilot’s training needs.

Furthermore, the task is also driven by another major issue, namely supporting the international cooperation and ICAO harmonisation. Currently, CS-FSTD rules are not harmonised with ICAO Doc 9625\(^3\), nor with Federal Aviation Administration (FAA) Part 60\(^4\), thus impeding the reciprocity of the FSTD qualifications. If the European Union (EU) regulatory framework is not changed, other (non-European) States aligning their rules with the recent updates of ICAO Doc 9625, will likely lead to having two different standards to be followed by data suppliers, FSTD manufacturers and FSTD operators in European and non-European countries. This exposes the industry to unnecessary financial and administrative burden. The harmonisation with the elements from ICAO Doc 9625 will ensure consistent application of the relevant FSTD requirements when qualifying FSTDs. A (partial) alignment with FAA Part 60 is also considered to be of importance to improve the reciprocity of qualifications.

The task also responds to safety risks that are identified in the safety recommendations (SRs) pursing amendment of the rules due to some related incidents/accidents (see point 1.3 below). The FAA also acknowledges that low FSTD fidelity or lack of ability for an FSTD to conduct certain training tasks may

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2. ED Decision 2012/010/R of the Executive Director of the European Aviation Safety Agency of 4 July 2012 on Certification Specifications for Aeroplane Flight Simulation Training Devices (‘CS-FSTD(A)’).
3. ED Decision 2012/011/R of the Executive Director of the European Aviation Safety Agency of 26 June 2012 on Certification Specifications for Helicopter Flight Simulation Training Devices (‘CS-FSTD(H)’).
have been a contributing factor in recent air carrier accidents\(^5\). Additionally, the FAA supports the adoption of elements of ICAO Doc 9625 Edition 4 leading to a change in FAA Part 60.

The EU regulatory framework, related to the competent authority’s technical inspectors requirements in evaluating FSTD, is another issue that requests reconsideration of the current rules. Due to unclear requirements (prerequisites) for the inspectors in the evaluation of the FSTD, Member States\(^6\) use different practices and use inconsistent application of these rules, which could contribute to safety risks.

This RMT is aiming to resolve the following issues that could have undesired consequences:

— FSTDs that are not meeting the advancement of technologies due to the obsolete rules, need to be enhanced to facilitate the current and future training needs;
— Exposure to safety risks due to the fact that low FSTD fidelity or lack of ability for an FSTD to conduct certain training tasks that may have been a contributed to previous incidents and accidents;
— Difficult acknowledgement of reciprocity of qualifications between EASA Member States (MS) and other third country states;
— Financial burden for the industry due to two different standards to be followed by data suppliers, FSTD manufacturers and, FSTD operators within the EASA MSs and third-country states.

Finally, this task is interlinked with RMT.0581 — ‘Loss of Control Prevention and Recovery Training’, as well as RMT.0188 — ‘Update of EASA FCL implementing rules’, which may forward recommendations to RMT.0196 working group for their further consideration. This will also ensure that the outcome of the RMT.0581 consultation is considered when CS-FSTD is amended.

In this context, the first update to CS-FSTD should facilitate the already published acceptable means of compliance (AMC) and guidance material (GM) to Part-ORO, which requires upset prevention and recovery training (UPRT) during operator recurrent and conversion training from May 2016.

**Related safety issues**

The following safety recommendations (SRs) addressed to EASA through aircraft accident investigation reports published by the designated safety investigation authority\(^7\) will be considered during this RMT. New SRs related to this task may be considered after the publication of this ToR, where appropriate.

| FRAN-2012-045 | The BEA recommends that EASA modifies the basis of the regulations in order to ensure better fidelity for simulators in reproducing realistic scenarios of abnormal situations. |

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\(^6\) EASA standardisation reports.

<table>
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<tr>
<th>Reference</th>
<th>Description</th>
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<tbody>
<tr>
<td>RUSF-2013-002</td>
<td>IAC recommends EASA and other simulator certification authorities to consider the possibility to add into the simulator data-package the capability to simulate an unexpected or sudden aircraft stall at any stage of flight.</td>
</tr>
<tr>
<td>SPAN-2011-020</td>
<td>It is recommended that the EASA establishes requirements for flight simulators so as to allow simulator training to cover sustained take-off stalls that reproduce situations that could exceed the flight envelope limits. (REC 20/11).</td>
</tr>
<tr>
<td>SPAN-2011-020</td>
<td>EASA evaluates the possibility of developing an alternative programme for complex high-performance single-pilot aeroplanes for which there is no adequate flight simulator, for example by using a flight simulator from a similar aeroplane.</td>
</tr>
<tr>
<td>FRAN-2016-006</td>
<td>EASA should require for helicopter pilots a flight simulation training including a sufficient and dedicated training on „Loss of tail rotor effectiveness” (LTE) and recovery actions for all training, examination and proficiency check flights (on appropriate and certified simulators).</td>
</tr>
</tbody>
</table>

Exemptions" in accordance with Article 70 ‘Safeguard provisions’/Article 71 ‘Flexibility provisions’ and/or Article 76 ‘Agency measures’ of Regulation (EU) 2018/1139\(^9\) (if applicable) pertinent to the scope of this RMT are:

No exemptions pertinent to the scope of this RMT.

Alternative means of compliance (AltMoC) relevant to the content of this RMT (if applicable)

Alternative means of compliance (AltMoC) having an impact on the development of this RMT content are:

No relevant AltMoC considerations.

ICAO and third countries references relevant to the content of this RMT (if applicable)

References considered for alignment of the content of this RMT with ICAO Standards and Recommended Practices (SARPs), Federal Aviation Regulations (FARs), etc.

\(^{8}\) Exemptions having an impact on the development of this RMT content and referring to:

- Article 70(1): Measures taken as an immediate reaction to a safety problem
- Article 71(1): Limited in scope and duration exemptions from substantive requirements laid down in Regulation (EU) 2018/1139 and its implementing rules in the event of urgent unforeseeable affecting persons or urgent operational needs of those persons
- Article 71(3): Derogation from the rule(s) implementing Regulation (EU) 2018/1139 where an equivalent level of protection to that attained by the application of the said rules can be achieved by other means
- Article 76(7): Individual flight time specifications schemes deviating from the applicable certification specifications which ensure compliance with essential requirements and, as appropriate, the related implementing rules

2. What we want to achieve — objective

The overall objectives of the EASA system are defined in Article 1 of Regulation (EU) 2018/1139. This project will contribute to the achievement of the overall objectives by addressing the issues outlined in Section 1.

The specific objectives of this proposal are:

1. to ensure that FSTDs better facilitate current and future training needs by establishing the necessary simulation fidelity levels required to support training tasks;
2. to ensure that CS-FSTD paves the way for new technologies;
3. to reinforce the level of safety by addressing the low FSTD fidelity or lack of ability for an FSTD to conduct certain training tasks that may have been a contribution to previous incidents and accidents;
4. to harmonise CS-FSTD with elements of the latest revision of ICAO Doc 9625 and FAA Part 60, as appropriate;
5. to ensure consistent application of the relevant FSTD regulations when qualifying FSTDs; and
6. to align CS-FSTD to the outcome of RMT.0581 – Loss of Control Prevention and Recovery Training.

How we want to achieve it

In order to implement the above-mentioned objectives the activities have been split in three work packages. The output of each work package will be an EASA Decision which will be published in 2018, 2020 and 2022.

In parallel, an EASA-led Training Task Force (TTF) will develop guidance on the capability of each FSTD to define the use of the appropriate FSTDs in training in support of the changes to the latest amendment of Regulation (EU) 2018/1974 of 14 December 2018 (changes to Appendix 9 of Part-FCL), which will become applicable on the 20 December 2019. The TTF will also consider any other emerging training matters resulting from the RMT.0196 or other sources in the context of the use of training devices.
Some activities that were foreseen in the ToR Issue 1 have changed priority and have been moved to a different work package, or have been amended.

For **Work Package 1 (WP1)** the following activities should be considered:

- To determine the appropriateness of full flight simulators (FFS)’ capability to facilitate UPRT;
- To develop a definition for the term ‘validated training envelope (VTE)’;
- To specify requirements for instructor operating station (IOS) feedback tools such as on the interpretation of the V-n and alpha/beta diagrams;
- To review the inspector competency framework;
- To ensure that the gap analysis between ICAO Doc 9625 Edition 4 and CS-FSTD(A) Initial issue is performed;
- In coordination with the RMT.0379 — ‘All weather operations’, to determine the amendments to CS-FSTD needed to facilitate the all weather operations training needs.
- To develop guidance on the use of each device qualification level. For this activity, a Task Force will be designated; and

For **Work Package 2 (WP2)** the following activities should be considered:

- To support the matrix and methodology developed by the Training Task Force (TTF) by:
  - Confirming the scope of ICAO 9625 Volume I Fourth edition 2015 Part III transfer into EU regulation format, whether to transfer all Part III material or limit the transfer to the recurrent training tasks defined in the points above. The transfer will need to consider at least the following:
    - Part-ARA – Qualification certificate detail and format, evaluation report and format, where to make the detailed DNA\[10\] information for users who might need to see and/or use it. AMC and GM information may need to be defined.
    - Part-ORA – Qualification certificate application detail and format, guidance on the process of determining fidelity levels and qualification criteria for the construct of a QTG. AMC and GM information may need to be defined. In addition possible declaration by FSTD operator in regard of additional capabilities.
    - CS-FSTD(A) – Relevant placement of information into General Requirements, to include statements of compliance (SOCs), objective test requirements and functions and subjective checklist requirements. AMC and GM information may need to be defined.
  - Developing AMC and GM information to aid both regulators (Part-ARA) and operators (Part-ORA) in how to re-categorise an existing FSTD against these new requirements in order to maximise its potential usage based on its real capability;
- In the context of the matrix and methodology, to determine the use of other FSTDs for complex high-performance single-pilot aeroplanes type rating training and checking, when no full flight simulator (FFS) qualified in accordance with CS-FSTD exist for that type or is not readily available and/or accessible.
- To explore and introduce ways of enabling the introduction of new technologies in training for the various aircraft categories (fixed wing and rotary wing), such as virtual reality, based on the concept paper developed on aviation blended learning environments (ABLE) developed by

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\[10\] DNA refers to feature and fidelity level criteria
RMT.0599, provisions of Regulation (EU) 2018/1139, and related to ICAO Doc 9625 Part II, Appendix D;

— To review the validation data roadmap (VDR) requirements for suitability;
— To align the CS-FSTD elements already present in the CS-SIMD as one constituent of operational suitability data (OSD) to avoid duplication of information;
— To assess the requirement and impact on the training for ARINC 610 compliance with avionics software;
— To review the functional/subjective testing requirements to better represent modern-day aircraft and operating environment;
— To review and consolidate visual requirements in CS-FSTD;
— To develop requirements for industry advancements in visual technologies;
— To review regulatory oversight issues with the management of visual databases;
— To develop guidance on multi-configuration devices and their master (M) qualification test guide (QTG) requirements;
— To review the requirements for the update of databases, such as FMS, GPS and EGPWS databases;
— To review the gap analysis between ICAO Doc 9625 Edition 4 and CS-FSTD (A) — Initial issue, whilst taking into account the FAA Part 60 Change 2, and consider the elements for incorporation into CS-FSTD(A) (to be continued in WP3).

For Work Package 3 (WP3) the following activities should be considered:

— To develop standards for the new technologies based on the enablers introduced in WP2;
— To develop guidance for using FSTDs with a temporary systems degradation;
— To develop multi-crew cooperation (MCC) requirements for helicopters;
— To mitigate the requirements for FSTD for helicopters certified prior January 1992;
— To develop guidance on what is required for Qualification Test Guide (QTG);
— To develop a temporary guidance leaflet (TGL) in relation to close loop followers\(^\text{11}\).
— To enhance loss of tail-rotor effectiveness (LTE) simulation aspects on helicopter FSTDs;
— To review the need and feasibility for developing CS-FSTD requirements for Power-lift/Tilt rotor/Vertical take-off and landing (VTOL) aircraft, as appropriate;
— Any other relevant and appropriate emerging issues relevant to the CS-FSTDs; and
— If required, to develop an equivalence matrix with the impact of the new ICAO Doc 9625 defined qualification levels on Regulations (EU) No 1178/2011 and (EU) No 965/2012.

3. What are the deliverables

For Work Package 1 (WP1):

— A notice of proposed amendment (NPA) on CS-FSTD (A) (2017/Q2); (NPA 2017-013 published 25 July 2017)
— A comment-response document (CRD) (2018/Q1); (CRD 2017-013 published 3 May 2018)
— An ED Decision amending CS-FSTD(A) (2018/Q1); (ED Decision 2018/006/R published 3 May 2018)

For Work Package 2 (WP2):

\(^{11}\) It is proposed that manufacturers using terms not explained in CS-FSTD describe them, for example in the QTG definition.
— An NPA on CS-FSTD (A) & CS-SIMD (2019/Q2);
— A CRD (2020/Q1);
— An ED Decision amending to CS-FSTD(A) and CS-SIMD (2020/Q1);
— An ED Decision amending AMC/GM to Part-ARA (2020/Q1)- delayed due to additional consultation needed, possible earlier publication within 2019;
— An ED Decision related to the TTF work to AMC/GM to Part-FCL, Part-ORA, Part-ARA, and Part-ORO (2020/Q1)

For Work Package 3 (WP3):
— An NPA on CS-FSTD(A), CS-FSTD(H), CS-FSTD(PL) (2021/Q2);
— A CRD (2022/Q4);
— An ED Decision amending CS-FSTD(A) & CS-FSTD(H) (2022/Q4);
— An ED Decision amending CS-FSTD(PL) (2022/Q4)
— An ED Decision with new requirements and/or amendments as applicable.

The foreseen timelines in terms of project planning would be as follows:

![Project plan – Timelines](image-url)
In detail for WP2 and WP3:

### Project plan – Timelines

#### WP2

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**Rulemaking Group Meetings**

- NPA
- CS-STD(EU)
- CS-STD(PL)
- CS-STD(OL)
- CS-STD(PA)
- CRD

**Opinion**

- Part-80A
- Part-25A

**Decision**

- AMICOM Part-PC
- AMICOM Part-OSA
- AMICOM Part-40A
- AMICOM Part-44A
- AMICOM Part-60D
- CS-STD(M) Issue 2
- CS-STD(T) Issue 2

**Forseen applicability**

February 2019

RMT.0196 - Updating CS-PSTD

#### WP3

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**Rulemaking Group Meetings**

- NPA
- CS-STD(EU)
- CS-STD(PL)

**CRD**

**Decision**

- CS-STD(EU) Issue 4
- CS-STD(T) Issue 2
- CS-STD(PL) Issue 1
4. **How we consult**

N/A

5. **Interface issues**

- EASA Opinion No 03-2015 — Revision of operational approval criteria for Performance-Based Navigation (PBN);
- EASA Opinion No 05-2017 – Update to Part-FCL
- EASA Opinion No 06-2017 – Upset Prevention and Recovery Training (UPRT);
- RMT.0599 – Update of ORO.FC, including Evidence Based Training (EBT)
- RMT.0379 – All weather operations;
- RMT.0599 – Evidence-based and competency-based training; and
- RMT.0587 — Regular update of Regulations (EU) No 1178/2011 and (EU) No 965/2012 regarding pilot training and licensing and the related oversight
- RMT.0194 – improving the pilot training system
- EASA Rotorcraft Safety Roadmap
- eVTOL sub-group of the electrical and hybrid aviation (EHAP) project

6. **Profile and contribution of the rulemaking group**

The profile of the rulemaking group and its members should consist of the following:

- Competent authority (CA) FSTD experts;
- Subjective matter experts (SME) for FSTD evaluators;
- FSTD operators;
- Approved training organisations (ATOs);
- AoC holders;
- FSTD manufacturers and aircraft original equipment manufacturers (OEM);
- extensive knowledge of the ICAO Doc 9625 Edition 4;
- extensive knowledge of the FAA Part 60 Change 2 (to be published soon).

**Note:** The final group composition (GC) should consist of appropriately balanced expertise.
7. Reference documents

7.1. Affected regulations


7.2. Affected decisions

— ED Decision 2012/010/R of the Executive Director of the European Aviation Safety Agency of 4 July 2012 on Certification Specifications for Aeroplane Flight Simulation Training Devices (‘CS-FSTD(A)’)

— ED Decision 2012/011/R of the Executive Director of the European Aviation Safety Agency of 26 June 2012 on Certification Specifications for Helicopter Flight Simulation Training Devices (‘CS-FSTD(H)’)


— BASA\textsuperscript{12} Annex 4.


7.3. Reference documents

— Regulation (EU) No 2018/1139\textsuperscript{13}, Article 25
— Regulation (EU) No 1178/2011\textsuperscript{14}, as amended;
— Regulation (EU) No 965/2012\textsuperscript{15}, as amended;
— EASA Opinion 03-2015- Revision of operational approval criteria for Performance-Based Navigation (PBN);
— ICAO Doc 9625 fourth edition;
— ICAO Doc 10011 first edition;
— FAA Part 60, as amended;
— Safety Recommendation RUSF-2013-002 (AIB): ATR — ATR72 VP-BYZ 02/04/2012 Roschino (Tyumen) airport;
— Safety Recommendation FRAN-2016-006 (PIPER — PA31 OE-FKG);
— Safety Recommendation AUST-2017-001

\textsuperscript{12} Council Decision of 7 March 2011 concerning the conclusion of the Agreement between the United States of America and the European Community on cooperation in the regulation of civil aviation safety.

