European Aviation Safety Agency

Notice of Proposed Amendment 2018-07(B)

Update of ORO.FC — evidence-based training subtask

RMT.0599

EXECUTIVE SUMMARY

The European Aviation Safety Agency (EASA) identified the need to ensure that aviation personnel have the right competencies and training methods to cope with new challenges. This is one of the most significant systemic issues in the European Plan for Aviation Safety (EPAS) 2018-2022.

The objective of this notice of proposed amendment (NPA) is to update the flight crew training requirements to improve pilot competencies. At the same time, it provides additional efficiency in the field of flight crew training and achieves a smooth transition to competency-based training.

The International Civil Aviation Organization (ICAO), in a joint effort with the International Air Transport Association (IATA), the International Federation of Air Line Pilots' Associations (IFALPA) and other industry partners, developed a new paradigm for competency-based recurrent assessment and training of flight crew, which is based on evidence (evidence-based training (EBT)). The EBT project is a global safety initiative whose objective is to determine the relevance of existing pilot training according to aircraft generation. The EBT methodology identifies areas for improvement and allows the re-prioritisation of training topics. EBT is intended to enhance the confidence and capability of flight crews to operate the aircraft in all flight regimes and to be able to recognise and manage unexpected situations.

This NPA is a second step in the European rulemaking actions that help competent authorities, commercial air transport (CAT) operators and approved training organisations (ATOs) to implement EBT. The first step was completed in 2015 with the publication of ED Decision 2015/027/R that provided guidance material to allow the implementation of 'mixed EBT' which maintains the current operator proficiency check (OPC) and licence proficiency check (LPC). This NPA proposes further changes to the Air OPS and Air Crew Regulations to allow the full implementation of EBT, replacing OPC and LPC. This will allow a single philosophy of recurrent training within the airline. Further work is foreseen in rulemaking task (RMT).0599 to allow expansion of EBT to the operator conversion course and initial type rating, while expanding the EBT concept to other types of aircraft (e.g. helicopters and business jets).

The impact assessment (IA) shows that the implementation of EBT on a voluntary basis by the operator is the preferred option in regulating recurrent training and checking of flight crew. It provides an opportunity for the air operator certificate (AOC) holders to implement EBT for recurrent training and checking of the flight crew. The IA illustrates that the proposed rules contribute to significant improvement in safety by strengthening the competencies of flight crews while providing a cost-efficient and socially acceptable framework.

NPA 2018-07 is divided in two parts. The present sub-NPA(B) includes the proposed draft rules (implementing rules, acceptable means of compliance and guidance material).

Sub-NPA(A) includes:

— the presentation of the issue under discussion;

— the impact assessment; and

— the proposed actions to support implementation.

Action area:	Human factors and competence of personnel		
Affected rules:	Definitions, Part-ARO and Part-ORO of the Air OPS Regulation, Part-FCL and Part-ARA of the Aircrew Regulation (and the associated AMC & GM)		
Affected stakeholders:	Member States, pilots, instructors, examiners, ATOs and operators		
Driver:	Safety	**Rulemaking group:**	Yes
Impact assessment:	Full	**Rulemaking Procedure:**	Standard

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1. About this NPA

1.1. How this NPA was developed

EASA developed this NPA 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 European Plan for Aviation Safety (EPAS) 2018-2022 under rulemaking task (RMT).0599. The text of this NPA has been developed by EASA based on the input of Rulemaking Group (RMG) RMT.0599. This group is divided in the:

(a) Main Group[3], which ensures consistency across the different tasks of RMT.0599. It also develops an aviation blended learning environment (ABLE) concept and deals with other updates of ORO.FC including interoperability solutions;

(b) Evidence-based training (EBT) subgroup[4], that is responsible for developing the EBT concept; and

(c) Helicopter subgroup[5] that is developing and updating the helicopter training requirements including EBT.

This NPA is primarily based on the inputs provided by the EBT subgroup. Due to the novelty of the EBT concept, EASA also consulted the Main group RMT.0599 on a regular basis, organised a workshop[6] with the participation of industry representatives in February 2017 and performed 4 rounds of focus consultation with:

(1) the Netherlands Aerospace Centre (NLR)[7] with regard to instructor concordance and grading;

(2) the Spanish competent authority (AESA)[8] and Iberia group[9] for the implementation of the EBT programme;

(3) the Italian competent authority (ENAC)[10] and Alitalia[11] with regard to equivalency of malfunctions; and

(4) CAA Denmark (Trafik)[12] and Thomas Cook Scandinavia[13] on the oversight and follow-up of the EBT programme.

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1 Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1467719701894&uri=CELEX:32008R0216).

2 EASA is bound to follow a structured rulemaking process as required by Article 52(1) of Regulation (EC) No 216/2008. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure).

3 Chaired by Yann Renier (IATA) and Phill Adrian (AIA). Members: Enrique Monzón (AESA España), Rogier Leeflang (IACA), Ståle Rosland (CAA Norway), David Lord (GAMMA). Project management Francisco Arenas Alvariño EASA.

4 Chaired by Phil Cullen (UK CAA). Secretariat Ascanio Russo EASA.

5 Chaired by Tim Rolfe (Heli-offshore).

6 1st Workshop on the Implementation of the Evidence-based Training

7 Focal point: Frederik Mohrmann.

8 Focal point: Carlos Artiles and Enrique Monzón.

9 Focal point: Captain Ignacio Gallego Alemany and Jaime Salva Munar.

10 Focal point Mario Tortorici and Sandro Apolloni.

11 Focal point: Massimo Giavalisco and Fabio Polloni.

12 Focal point Lise-Lotte Olsen Deigaard

13 Focal point: Henrik Lyngse

The text of this NPA is hereby submitted to all interested parties[14] for consultation.

1.2. How to comment on this NPA

Please submit your comments using the automated **Comment-Response Tool (CRT)** available at **http://hub.easa.europa.eu/crt/**[15].

The deadline for submission of comments is **31 October 2018.**

1.3. The next steps

Following the closing of the public commenting period, EASA will review all comments.

Based on the comments received, EASA will develop an opinion containing the proposed amendments to Regulation (EU) No 965/2012[16] (hereinafter referred to as the 'Air OPS Regulation') and to Regulation (EU) No 1178/2011[17] (hereinafter referred to as the 'Aircrew Regulation'). The opinion will be submitted to the European Commission, which will use it as a technical basis in order to prepare an EU regulation.

Following the adoption of the regulation, EASA will issue a decision containing the related acceptable means of compliance (AMC) and guidance material (GM).

The comments received and the EASA responses thereto will be reflected in a comment-response document (CRD). The CRD will be annexed to the opinion.

The following future efforts in relation to EBT are foreseen:

— Operator conversion course (OCC) and type rating training for CAT. This activity will ensure a single philosophy of training in the operator. An NPA pertaining to this activity is scheduled to be published in the course of 2021.

— EBT for helicopters and non-commercial complex motor-powered aircraft (NCC). This activity will ensure a single philosophy of training across the industry. This may also allow training data exchange across the industry. An NPA pertaining to this activity is scheduled to be published in the course of 2021.

[14] In accordance with Article 52 of Regulation (EC) No 216/2008 and Articles 6(3) and 7) of the Rulemaking Procedure.

[15] In case of technical problems, please contact the CRT webmaster (crt@easa.europa.eu).

[16] 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) (http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R0965&rid=1).

[17] 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/?qid=1528301490110&uri=CELEX:32011R1178).

2. Proposed amendments and rationale in detail

The text of the amendment is arranged to show deleted text, new or amended text as shown below:

— deleted text is ~~struck through~~;

— new or amended text is highlighted in grey;

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

Due to the volume of the explanatory notes for the proposed rules and the novelty of the EBT concept, the structure of the NPA is as follows:

— *Section 2.1 provides the set of implementing rules (IRs) only.*

— *Section 2.2 provides the IRs, the associated AMC and GM as well as the rationale behind the proposed change. To differentiate them from the proposed rules, the font colour used for the explanatory notes is blue.*

2.1. Draft regulation (draft EASA opinion)

Annex I (Definitions) to Regulation (EU) No 965/2012

Definitions for terms used in Annexes II to VIII

For the purpose of this Regulation, the following definitions shall apply:

[…]

(23a) 'competency' means a dimension of human performance that is used to reliably predict successful performance on the job. A competency is manifested and observed through behaviours that mobilise the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions;

(23b) 'competency-based training' means assessment and training programmes that are characterised by a performance orientation, emphasis on standards of performance and their measurement and the development of training to the specified performance standards.

(23c) 'competency framework' means a complete set of identified competencies, used in the operator's EBT programme to develop, train and assess competencies utilising scenarios that are relevant to operations. The chosen competency framework should be wide enough to prepare flight crews for both known and unforeseen threats and errors.

(42a) 'EBT module' means a combination of sessions in a qualified flight simulation training device as part of the 3-year period of recurrent assessment and training.

(47a) 'enrolment' means the administrative act of being approved to participate in the EBT recurrent training programmes by the operator.

(47b) 'enrolled flight crew member' means crew member participating in the EBT recurrent training programme.

(47c) 'equivalency of approaches' (approach clustering) means all the approaches that place an additional demand on a proficient crew regardless whether they are used or not in the EBT modules.

(47d) 'equivalency of malfunctions' (malfunction clustering) means all the malfunctions that put a significant demand on a proficient crew regardless whether they are used or not in the EBT modules.

(47e) 'evaluation phase (EVAL)' means one of the phases of an EBT module. The evaluation phase is a line-orientated flight scenario, representative of the operator's environment during which there are one or more occurrences to evaluate key elements of the defined competency framework. The root cause rather than the symptoms in any deficiency should be identified, in order to determine training needs.

(47f) 'evidence-based training (EBT)' means assessment and training based on operational data that is characterised by developing and assessing the overall capability of a trainee across a range of a competency framework rather than by measuring the performance in individual events or manoeuvres.

(69a) 'in-seat instruction (ISI)' means part of the scenario-based training phase. ISI contains predetermined scripted scenarios within the scenario-based training phase where the instructors can:

(a) provide confidentially simple instructions to one pilot; or

(b) perform predetermined exercises acting, in a pilot seat, as pilot flying (PF) or pilot monitoring (PM) for the purposes of demonstration and of intervention by the other pilot.

(76a) 'manoeuvres training phase (MT)' means one of the phases of an EBT module. During this phase, according to aircraft generation, crews have time to practise and improve performance in largely psychomotor skill-based exercises by achieving a prescribed flight path or performing a prescribed event to a prescribed outcome. These exercises or events should place a significant demand on a proficient flight crew. Flight path control may be accomplished by a variety of means including manual aircraft control and the use of auto flight systems.

(98a) 'proficient' means demonstration of the necessary skills, knowledge and attitudes required to perform any defined tasks to the prescribed standard.

(104a) 'scenario-based training phase (SBT)' means one of the phases of an EBT module. This phase is designed to focus on the development of competencies, whilst training to mitigate the most critical risks identified for the aircraft generation. It should include the management of specific operator's threats and errors in a real-time line-orientated environment.

Annex II (Part-ARO) to Regulation (EU) No 965/2012

ARO.OPS.226 Approval and oversight of evidence-based training programmes

(a) Where a competent authority grants an approval for EBT programmes, inspectors must receive qualification and training in EBT principles, application, approval processes and continuing oversight.

(b) The competent authority shall assess and oversee the EBT programme, together with the processes that support the implementation of the EBT programme.

(c) Before approving an EBT programme, the competent authority shall:

(1) ensure the resolution of significant findings in the areas that will support the application of the EBT programme;

(2) assess the capability of the operator to support the implementation of the EBT programme. The following elements shall be considered as a minimum:

(i) the maturity and capability of the operator's management system, and this programme's suitability;

(ii) the operator's ability to maintain reliable and accurate flight crew training records;

(iii) the suitability of the operator's grading and assessment scheme;

(iv) the experience of the relevant personnel, fundamentally of the flight crew instructors, in the use of the processes and procedures that support the implementation of the EBT programme; and

(v) the operator's implementation plan and a safety risk assessment supporting the EBT programme in order to demonstrate how an equivalent level of safety to that of the current training programme can be achieved;

(d) The competent authority shall amend or revoke the approved EBT programme if continuing compliance is not ensured.

Annex III (Part-ORO) to Regulation (EU) No 965/2012

ORO.FC.145 Provision of training

(a) All the training required in this Subpart shall be conducted:

(1) in accordance with the training programmes and syllabi established by the operator in the operations manual;

(2) by appropriately qualified personnel. In the case of flight and flight simulation training and checking, the personnel providing the training and conducting the checks shall be qualified in accordance with Annex I (Part-FCL) to Regulation (EU) No 1178/2011;

(3) in addition to the above, for an approved EBT programme:

(i) personnel providing assessment and training shall hold an Annex I (Part-FCL) instructor or examiner certificate; and

(ii) have completed the operator's EBT instructor standardisation.

Successful completion of the operator's EBT standardisation will qualify the instructor to perform practical assessment in competencies.

ORO.FC.231 Evidence-based training

(a) EBT PROGRAMME

(1) The operator may substitute the requirements of ORO.FC.230 by implementing an EBT programme approved by the competent authority. The operator shall demonstrate its capability to support the implementation and perform a safety risk assessment demonstrating how an equivalent level of safety is achieved.

(2) Features of the operator's approved EBT programme

The operator's approved EBT programme shall:

(i) assess and develop the competencies required by flight crew members for safe, effective and efficient operations of aircraft;

(ii) ensure flight crew members are exposed to assessment and training topics derived from a large-scale analysis of operational data, distributed across a 3-year period at a defined frequency relevant to the type or variant of aircraft on which they operate;

(iii) consist of modules conducted in the following sequence:

(A) evaluation phase, comprising a line-orientated flight scenario (or scenarios) to assess competencies and identify individual training needs;

(B) manoeuvres training phase, comprising training to proficiency in certain defined manoeuvres; and

(C) scenario-based training phase, a comprising line-orientated flight scenario (s) and in-seat instruction to develop competencies and address individual training needs; and

(iv) be delivered by instructors trained and qualified to ensure the effectiveness of learning.

(3) The operator shall ensure that each flight crew member:

(i) is enrolled in the EBT programme;

(ii) completes a minimum of 2 modules within the validity period of 12 months, separated by a period of not less than 3 months. The module is completed when:

(A) the content of the approved EBT programme is completed for that module; and

(B) an acceptable level of performance in all observed competencies has been demonstrated; and

(C) will not continue line operations if during a module the performance observed was below the minimum acceptable level. The flight crew member continues line operations when a module is completed.

(4) The operator shall establish an instructor concordance assurance programme.

(iii) Relevant metrics must be used to support this programme.

(iv) All instructors must be subject to this programme.

(v) Sufficient instructor concordance must be demonstrated.

(5) The operator shall include contingency procedures for unforeseen circumstances that may affect the delivery of the modules. It may include a different separation period between modules.

(b) COMPETENCY FRAMEWORKS

The operator shall use a competency framework for all aspects of assessment and training within an approved EBT programme. The competency framework shall:

(1) include observable behaviours required for safe, effective and efficient operations; and

(2) be comprehensive, accurate, and usable.

(c) TRAINING SYSTEM PERFORMANCE

(1) The EBT system performance shall be measured and evaluated through a feedback system in order to:

(i) validate and refine the operator's approved EBT programme; and

(ii) ascertain that the operator's approved EBT programme develops pilot competencies.

(2) The feedback system shall be included in the operator's management system.

(d) GRADING SYSTEM

(1) The operator shall use a grading system to assess flight crew, which ensures:

(i) sufficient level of detail to enable accurate and useful measurements of individual performance;

(ii) a performance scale for each competency, with a point on the scale which determines the minimum acceptable level to be achieved for the conduct of line operations; and

(iii) data integrity.

(2) The operator shall verify in regular intervals the accuracy of the grading system against a criterion-referenced system.

(e) SUITABLE TRAINING DEVICES AND VOLUME TO COMPLETE THE OPERATOR'S APPROVED EBT PROGRAMME

(1) Each EBT module shall be conducted in an FSTD with a qualification level adequate to complete proficiency check/training.

(2) The operator shall provide sufficient volume of hours in a suitable training device for the pilot to complete the operator's approved EBT programme.

(f) EQUIVALENCY OF MALFUNCTIONS

(1) Each flight crew member shall receive assessment and training in the management of aircraft system malfunctions.

(2) Aircraft system malfunctions that place a significant demand on a proficient crew shall be organised by reference to the following characteristics:

(i) immediacy;

(ii) complexity;

(iii) degradation of aircraft control;

(iv) loss of instrumentation; and

(v) management of consequences.

(3) Crew shall be exposed to at least one malfunction for each characteristic at the frequency determined by the table of assessment and training topics.

(4) Demonstrated proficiency in the management of one malfunction is considered equivalent to demonstrated proficiency in the management of other malfunctions with the same characteristics.

(g) EQUIVALENCY OF APPROACHES RELEVANT TO OPERATIONS

The operator shall ensure that flight crew members receive regular training in the conduct of approach types and approach methods relevant to operations that:

(1) place an additional demand on a proficient crew.

(2) require specific approval.

(h) LINE EVALUATION OF COMPETENCE

(1) Each enrolled flight crew member shall periodically undertake a line evaluation of competence in an aircraft in flight to demonstrate the safe, effective and efficient conduct of normal operations specified in the operations manual.

(2) The validity period of a line evaluation of competence shall be 12 months. The validity period shall be counted from the end of the month when the line evaluation of competence was undertaken. When the line evaluation of competence is undertaken within the last 6 months of the validity period, the new validity period shall be counted from the original expiry date.

(3) The operator approved for EBT may, with the approval of the competent authority, extend the validity of the line evaluation of competence to:

(i) 2 years; or

(ii) 3 years, subject to a feedback system for the monitoring of line operations.

(4) Evaluation of competencies during line operations shall be conducted by a suitably qualified commander nominated by the operator and trained in EBT concepts and the assessment of competencies.

(5) For successful completion, each flight crew member shall demonstrate each competency at or above the minimum acceptable level of performance.

(i) GROUND TRAINING

(1) Each flight crew member shall undergo ground training and training on the location and use of all emergency and safety equipment carried on the aircraft at least every 12 calendar months.

(2) The operator may, with the approval of the competent authority, extend the period of training on the location and use of all emergency and safety equipment carried on the aircraft to 24 months.

Appendix II to Part-ORO of Regulation (EU) No 965/2012

APPENDIX II — EBT PROGRAMME

The EBT programme shall ensure that flight crew members are exposed to assessment and training topics relevant to the type or variant of aircraft on which they operate. Aircraft types not included shall not apply EBT.

Annex I (Part-FCL) to Regulation (EU) No 1178/2011

FCL.625 IR — Validity, revalidation and renewal

(a) […]

(b) […]

(c) Renewal. If an IR has expired, in order to renew their privileges applicants shall:

(1) go through refresher training at an ATO to reach the level of proficiency needed to pass the instrument element of the skill test in accordance with Appendix 9 to this Part; and

(2) complete a proficiency check in accordance with Appendix 9 or Appendix 10 to this Part, in the

relevant aircraft category.

(d) […]

FCL.625.A IR(A) — Revalidation

(a) Revalidation. Applicants for the revalidation of an IR(A):

(1) when combined with the revalidation of a class or type rating, shall pass a proficiency check in accordance with Appendix 9 or Appendix 10 to this Part;

[…]

FCL.740 — Validity and renewal of class and type ratings

(a) […]

(b) Renewal. If a class or type rating has expired, the applicant shall:

(1) take refresher training at an ATO, or an AOC approved for such refresher, when necessary to reach the level of proficiency necessary to safely operate the relevant class or type of aircraft; and

(2) pass a proficiency check in accordance with Appendix 9 or Appendix 10 to this Part.

[…]

FCL.740.A — Revalidation of class and type ratings — aeroplanes

(a) Revalidation of multi-engine class ratings and type ratings. For revalidation of multi-engine class ratings and type ratings, the applicant shall:

(1) pass a proficiency check in accordance with Appendix 9 or Appendix 10 to this Part in the relevant class or type of aeroplane or an FSTD representing that class or type, within the 3 months immediately preceding the expiry date of the rating;

[…]

FCL.905.TRI TRI — Privileges and conditions

(a) The privileges of a TRI are to instruct for:

~~(a)~~ (1) the revalidation and renewal of an EIR or an IR, provided the TRI holds a valid IR;

[…]

~~(f)~~ (6) in the case of the TRI for powered-lift aircraft:

~~(1)~~ (i) the issue, revalidation and renewal of powered-lift type ratings;

~~(2)~~ (ii) MCC training.

(b) After successful completion of the operator's EBT instructor standardisation in accordance with Part ORO, the TRI has additionally the privilege to conduct practical assessment in competencies.

FCL.905.SFI SFI — Privileges and conditions

(a) The privileges of an SFI are to carry out synthetic flight instruction, within the relevant aircraft category, for:

~~(a)~~ (1) the issue, revalidation and renewal of an IR, provided that he/she holds or has held an IR in the relevant aircraft category and has completed an IRI training course; and

~~(b)~~ (2) in the case of SFI for single-pilot aeroplanes:

~~(1)~~ (i) the issue, revalidation and renewal of type ratings for single-pilot high performance complex aeroplanes, when the applicant seeks privileges to operate in single-pilot operations.

[…]

~~(d)~~ (4) in the case of SFI for helicopters:

~~(1)~~ (i) the issue, revalidation and renewal of helicopter type ratings;

~~(2)~~ (ii) MCC training, when the SFI has privileges to instruct for multi-pilot helicopters.

(b) After successful completion of the operator's EBT instructor standardisation in accordance with Part ORO, the SFI has additionally the privilege to conduct practical assessment in competencies.

Appendix 10 to Annex I (Part-FCL) to Regulation (EU) No 1178/2011

Appendix 10 — Proficiency check type ratings, and proficiency check for IRs when combined with type rating — Practical assessment in competencies

A — General

1. The practical assessment in competencies within an approved EBT programme is equivalent to a proficiency check.

2. Appendix 10 only applies to:

(a) an operator with an approved EBT programme that has:

(1) an experience of at least 2 years conducting an EBT programme which may include mixed EBT; and

(2) a nominated person for crew training (or the deputy(ies)) who is a current examiner in each of the type ratings for which Appendix 10 is applicable; or

(b) an ATO on behalf of the operator that complies with paragraph (2)(a) above, under ORO.GEN.205 'Contracted activities'.

3. The nominated person for crew training must verify that the applicant complies with all the qualification, training and experience requirements in this Part for the revalidation of the rating for which the proficiency check is taken.

4. Applicants using Appendix 10 shall:

(a) be enrolled flight crew members in the operator's approved EBT programme; and

(b) within the period of validity, complete the operator's approved EBT programme.

5. The revalidation or renewal in accordance with Appendix 10 shall comprise:

(a) continuous practical assessment in competencies within an approved EBT programme;

(b) demonstration of an acceptable level of performance in all competencies; and

(c) the administrative action of licence revalidation.

(1) The nominated person for crew training (or the deputy(ies)) shall endorse the applicant's licence or certificate with the new expiry date of the rating, if specifically authorised for that purpose by the competent authority responsible for the applicant's licence. Delegation of the nominated person's for crew training (or the deputy(ies)) signature in order for the applicant's licence to be signed, may be possible only if the operator has an approved procedure for such case.

(2) The nominated person for crew training (or the deputy(ies)) shall ensure that the requirements in FCL.1030 'Conduct of skill tests, proficiency checks and assessments of competence' are met.

B — CONDUCT OF PRACTICAL ASSESSMENT IN COMPETENCIES

6. The practical assessment in competencies must be conducted in accordance with the operator's approved EBT programme.

7. Applicants who fail to demonstrate an acceptable level of competence and are de-enrolled from the operator's approved EBT programme shall not exercise the privileges of that type rating.

Annex VI (Part-ARA) to Regulation (EU) No 1178/2011

ARA.FCL.200 Procedure for issue, revalidation or renewal of a licence, rating or certificate

(a) Issue of licences and ratings. The competent authority shall issue a pilot licence and associated ratings, using the form as established in Appendix I to this Part.

(b) Issue of instructor and examiner certificates. The competent authority shall issue an instructor or examiner certificate as:

(1) an endorsement of the relevant privileges in the pilot licence as established in Appendix I to this Part; or

(2) a separate document, in a form and manner specified by the competent authority.

(c) Endorsement of licence by examiners.

(1) ~~b~~Before specifically authorising certain examiners to revalidate or renew ratings or certificates, the competent authority shall develop appropriate procedures.

(2) These appropriate procedures may include endorsement of licence under an approved EBT programme in accordance with Appendix 10. In such case, signature delegation to endorsement of licence may be allowed.

(d) Endorsement of licence by instructors. Before specifically authorising certain instructors to revalidate a single-engine piston or TMG class rating, the competent authority shall develop appropriate procedures.

2.2. Draft regulation, AMC & GM (draft EASA opinion and draft EASA decision) and rationale in detail

Annex I (Definitions) to Regulation (EU) No 965/2012

Definitions for terms used in Annexes II to VIII

For the purpose of this Regulation, the following definitions shall apply:

[…]

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(42a) 'EBT module' means a combination of sessions in a qualified flight simulation training device as part of the 3-year period of recurrent assessment and training.

(47a) 'enrolment' means the administrative act of being approved to participate in the EBT recurrent training programmes by the operator.

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(47e) 'evaluation phase (EVAL)' means one of the phases of an EBT module. The evaluation phase is a line-orientated flight scenario, representative of the operator's environment during which there are one or more occurrences to evaluate key elements of the defined competency framework. The root cause rather than the symptoms in any deficiency should be identified, in order to determine training needs.

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(a) provide confidentially simple instructions to one pilot; or

(b) perform predetermined exercises acting, in a pilot seat, as pilot flying (PF) or pilot monitoring (PM) for the purposes of demonstration and of intervention by the other pilot.

(76a) 'manoeuvres training phase (MT)' means one of the phases of an EBT module. During this phase, according to aircraft generation, crews have time to practise and improve performance in largely psychomotor skill-based exercises by achieving a prescribed flight path or performing a prescribed event to a prescribed outcome. These exercises or events should place a significant demand on a proficient flight crew. Flight path control may be accomplished by a variety of means including manual aircraft control and the use of auto flight systems.

(98a) 'proficient' means demonstration of the necessary skills, knowledge and attitudes required to perform any defined tasks to the prescribed standard.

(104a) 'scenario-based training phase (SBT)' means one of the phases of an EBT module. This phase is designed to focus on the development of competencies, whilst training to mitigate the most critical risks identified for the aircraft generation. It should include the management of specific operator's threats and errors in a real-time line-orientated environment.

competency-based training

The definition proposed is transposed from Doc 9995:

'**Competency-based training.** Training and assessment that are characterized by a performance orientation, emphasis on standards of performance and their measurement and the development of training to the specified performance standards.'

Competency-based training and EBT — use of the wording 'assessment and training'

The proposed provision uses the wording 'assessment and training' instead of 'training and assessment' because it reflects better the model used in EBT. Currently, EBT is used for airline pilots, which are current on type. Therefore, the phases of EBT focus first on assessment, to then develop the competencies in the subsequent phases (training).

The traditional use of the sentence 'training and assessment' is appropriate for initial type ratings and initial issues of licences where the pilots are not yet proficient, and they need to learn a new type rating. In these cases, the sequence of 'training' and then 'assessment' is appropriate.

competency framework

The term 'identified competencies' is used to refer to the competencies the operator must choose to develop a competency framework (e.g. the 9 competencies of EASA that include the 8 competencies of Doc 9995[18] plus 'Application of Knowledge'). These competencies are also called 'core competencies'.

However, the use of the word 'competencies' in the sentence 'train and assess competencies' is referring to the scenarios themselves and the intent is to develop the complete set of competencies (core and non-core).

'unforeseen threats and errors' is used to link it to resilience. As described several times in this document, resilience is very important to aviation safety.

The definition is based on the Doc 9995 definition of 'core competencies':

18 ICAO Doc 9995 AN/497 'Manual of Evidence-based Training' first edition 2013.

'Core competencies. A group of related behaviours, based on job requirements, which describe how to effectively perform a job and what proficient performance looks like. They include the name of the competency, a description, and a list of behavioural indicators'.

competency

A competency is manifested and observed through behaviours that mobilise the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions. Trainees successfully demonstrate competency by meeting the associated competency standard.

The definition proposed in the NPA is created based on:

— Amendment 175 to ICAO Annex 1 'Personal licensing'; and

— Doc 9995.

The Doc 9995 references used were:

- '7.8.5.1 To be competent in any job, a person requires a certain amount of knowledge, an adequate level of skills, and a particular set of attitudes'.
- '7.8.5.4 To be competent, a pilot requires capabilities across a range of knowledge, skills and attitudes (KSA)'.

evidence-based training

The definition is transposed from Doc 9995

evaluation phase

The evaluation phase is a first assessment of competencies to identify individual training needs. On completion of the evaluation phase, any areas that do not meet the minimum competency standard will become the focus of the subsequent training.

equivalency of malfunctions

The definition has been created to clarify the rules of equivalency of malfunctions. It is a new definition, which is not included in Doc 9995 AN/497 'Manual of Evidence-based training' first edition 2013.

manoeuvres training phase

This is not a real-time training but allows crews the time to practise and improve performance in largely psychomotor skill-based exercises. Repositioning of the flight simulation in order to focus training on the intended manoeuvres will be a commonly used FSTD feature for this phase.

Scenario-based training phase

The definition for SBT was based on the following ideas:

— Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrences, so that the pilots do not become overly familiar with repetition of the same scenarios.

— Variations should be the focus of EBT programme design, but not left to the discretion of individual instructors in order to preserve programme integrity and fairness.

The definition was transposed from Doc 9995 Chapter 3.8:

'c) Scenario-based training phase. This phase forms the largest phase in the EBT programme, and is designed to focus on the development of competencies, whilst training to mitigate the most critical risks identified for the aircraft generation. The phase will include the management of specific threats and errors in a real-time line orientated environment. The scenarios will include critical external and environmental threats, in addition to building effective crew interaction to identify and correct manage errors. A portion of the phase will also be directed towards the management of critical system malfunctions. For this programme to be fully effective, it is important to recognise that these predetermined scenarios are simply a means to develop competency, and not an end or 'tick box' exercise in themselves'.

GM2 Annex I Definitions

ABBREVIATIONS AND ACRONYMS

APP	approach
APK	application of procedures (EBT competency)
CLB	climb
COM	communication (EBT competency)
CRZ	cruise
DES	descent
EBT	evidence-based training
EVAL	evaluation phase
FPA	flight path management — automation (EBT competency)
FPM	flight path management — manual (EBT competency)
GND	ground
ISI	in-seat instruction
KNO	application of knowledge (EBT competency)
LDG	landing
LOC-I	loss of control in-flight
LTW	leadership and teamwork (EBT competency)
OB	observable behaviour
PSD	problem-solving & decision-making (EBT competency)
SAW	situation awareness (EBT competency)
TO	take-off
UPRT	upset prevention and recovery training
WLM	workload management (EBT competency)

GM1X Annex I Definitions

EVIDENCE-BASED TRAINING

'Behaviour' is the way a person responds, either overtly or covertly, to a specific set of conditions, and which is capable of being measured.

'Concordance (inter-rater reliability)' is the consistency or stability of scores between different EBT instructors. It gives a score (s) of how much homogeneity, or consensus, there is in the ratings given by instructors (raters).

'Cycle' is the combination of two modules where Cycle 1 comprises Modules 1 and 2, Cycle 2 comprises Modules 3 and 4, and Cycle 3 comprises Modules 5 and 6 of the 3-year EBT programme.

'Evaluation phase (EVAL)' is the phase where a first assessment of competencies is performed in order to identify individual training needs. On completion of the evaluation phase, any areas that do not meet the minimum competency standard will become the focus of the subsequent training. The evaluation phase comprises a complete mission as a crew.

'Facilitation technique' is an active training method, which uses effective questioning, listening and a non-judgmental approach, and is particularly effective in developing skills and attitudes, assisting trainees to develop insight and their own solutions and resulting in better understanding, retention and commitment.

'Line-orientated flight scenario' is the assessment and training involving a realistic, 'real-time', complete mission simulation of scenarios that are representative of line operations.

'Monitoring' is a cognitive process to compare an actual to an expected state. It requires knowledge, skills and attitudes to create a mental model and to take appropriate action when deviations are recognised.

'Observable behaviour (OB)' is a single role-related behaviour that can be observed and may or may not be measurable.

'Performance criteria' are statements used to assess whether the required levels of performance have been achieved for a competency. A performance criterion consists of an OB, a condition (s) and a competency standard.

'Practical assessment (or practical assessment in competencies)' is the primary method for assessing performance and should serve to verify the integrated performance of competencies. It takes place in either a simulated or an operational environment. A practical assessment in competencies is equivalent to a proficiency check and is performed under the instructor privilege in the context of proficiency check in accordance with Appendix 10 to Part-FCL. More information can be found in ICAO Doc 9868 'PANS-TRG'.

'Line-orientated flight scenario(s)' are comprised of scenario elements derived from the table of assessment and training topics.

Scenario-based training phase (SBT)' is the largest phase in the EBT programme. It is designed to maximise crew's exposure to a variety of situations that develop and sustain a high level of competency and resilience. The scenario for this phase should include critical external and environmental threats, to build effective crew interaction to identify and manage errors. A portion of the phase will also be directed towards the management of critical system malfunctions.

Scenario elements address the training topic and detail the threat and/or error that the crew are exposed to.

'Train-to-proficiency' means approved training designed to achieve end-state performance objectives, providing sufficient assurances that the trained individual is capable to consistently carry out specific tasks safely and effectively.

Note: In the context of this definition, 'train-to-proficiency' can be replaced by 'training-to-proficiency'.

Behaviour

The definition is introduced to explain the definition of performance criteria. The definition is transposed from Doc 9995.

Concordance

The definition is transposed from the Doc 9995 definition of inter-rater reliability.

Inter-rater reliability is a term not easily translated into all the languages of the European Union; therefore, a synonym for inter-rater reliability was used: 'concordance'.

In statistics, inter-rater reliability, inter-rater agreement, or concordance, is the degree of agreement among raters.

Evaluation phase

Further guidance is provided in this GM to complement the definition provided in the IR.

Facilitation technique

Primary technique that should be used for EBT and competency-based training.

Monitoring

Monitoring is the based fundament of threat and error management. Monitoring is embedded in the competency framework provided in ORO.FC.231, and its behaviour indicators are spread out in different competencies.

Observable behaviour

The definition is transposed from the ICAO Doc 9841 definition.

'Performance criteria'

The definition is transposed from ICAO working papers for PANS-TRAINING and the new version of Doc 9995.

Train-to-proficiency

This text is based on GM15 Annex 1 definitions on UPRT and is referred to within the context of EBT.

Practical assessment

Although ICAO Doc 9995 follows an approach where summative assessment is performed at the end of the evaluation as follows:

'3.6.2 The evaluation phase of each module will periodically be the focus of licence renewal or revalidation and may ultimately be the means by which Licensing Authorities continue to ensure that competence is maintained to hold a professional licence and type rating as applicable.'

The RMG decided to embrace the new philosophy of the draft ICAO Doc 9868 'PANS-TRG' to be soon published. The new paragraph 4.4.1.2.2 is moving the summative assessment that otherwise would be made in the evaluation phase to the end of the module as provided in ORO.FC.231(a) 'will not continue line

operations if during a module the performance observed was below the minimum acceptable level. The flight crew member continues line operations when a module is completed.'

Below an extract of ICAO Doc 9868 'PANS-TRG'

'4.4.1.2 Assessment methods

4.4.1.2.1 The primary method for assessing performance is the conduct of practical assessments, which should serve to verify the integrated performance of competencies. It may be necessary to supplement practical assessments with other forms of evaluation. The supplemental evaluations may be included as a result of regulatory requirements and/or a decision that these methods are necessary to confirm that competence has been achieved.

4.4.1.2.2 Practical assessments take place in either a simulated or operational environment. There are two types of practical assessment: formative assessments and summative assessments. Formative and summative assessments are conducted based on 4.6.6 and 4.6.7.

4.4.1.2.2.1 Formative assessments

4.4.1.2.2.1.1 Formative assessments are a part of the learning process. Instructors provide feedback to the trainee on how they are progressing toward the interim or final competency standard. This type of assessment enables the trainee to progressively build on competencies already acquired and should aid learning by identifying gaps as learning opportunities. If trainees receive feedback or are assessed only at the end of the training, they will have no opportunity to use that information to improve their performance. The frequency and number of formative assessments may vary depending on the duration of the training and the syllabus structure and its assessment plan (see 4.6).

4.4.1.2.2.1.2 Formative assessments should serve to:

a) motivate trainees;

b) identify strengths and weaknesses; and

c) promote learning.

4.4.1.2.2.2 Summative assessments

4.4.1.2.2.2.1 Summative assessments provide a method that enables the instructor/assessor to work with a trainee to collect evidence of the competencies and performance criteria to be demonstrated with respect to the interim or final competency standard(s). Summative assessments are carried out at defined points during the training and/or at the end of training. During summative assessments, the decision is either 'competent' or 'not competent' with respect to the interim or final competency standard(s). However, this can be further developed into a more refined grading system with a scale of judgements to improve feedback for the trainee and training personnel.

4.4.4.1.2.2.2 Summative assessments that are conducted during the course to evaluate the progress of the trainee are typically carried out by the instructing team. It may be advantageous if the instructors conducting these assessments were different from the instructors who routinely work with the trainee. Summative assessments conducted at the end of training and that lead to the issue of a licence and/or rating have both legal and safety implications. Therefore, the personnel carrying out these assessments should have the necessary competencies to assess objectively and meet the authority's requirements. Such personnel should be provided with the tools necessary to collect evidence in a systematic and reliable manner in order to ensure

inter-rater reliability.

4.4.1.2.3 The list of methods below that supplement practical assessments is not intended to be restrictive. Any suitable supplemental method for assessing competence may be used. Other methods may include projects and group assignments.'

Annex II (Part-ARO) to Regulation (EU) No 965/2012

ARO.OPS.226 Approval and oversight of evidence-based training programmes

(a) Where a competent authority grants an approval for EBT programmes, inspectors must receive qualification and training in EBT principles, application, approval processes and continuing oversight.

(b) The competent authority shall assess and oversee the EBT programme, together with the processes that support the implementation of the EBT programme.

(c) Before approving an EBT programme, the competent authority shall:

(1) ensure the resolution of significant findings in the areas that will support the application of the EBT programme;

(2) assess the capability of the operator to support the implementation of the EBT programme. The following elements shall be considered as a minimum:

(i) the maturity and capability of the operator's management system, and this programme's suitability;

(ii) the operator's ability to maintain reliable and accurate flight crew training records;

(iii) the suitability of the operator's grading and assessment scheme;

(iv) the experience of the relevant personnel, fundamentally of the flight crew instructors, in the use of the processes and procedures that support the implementation of the EBT programme; and

(v) the operator's implementation plan and a safety risk assessment supporting the EBT programme in order to demonstrate how an equivalent level of safety to that of the current training programme can be achieved;

(d) The competent authority shall amend or revoke the approved EBT programme if continuing compliance is not ensured.

ARO.OPS.226

This provision contains the approval and the oversight provisions to ensure a safe EBT programme. The provisions follow the concept already described in:

— Point (a)(2) of ARO.GEN.200 regarding the training and qualification of the inspectors (point (a) of ARO.OPS.226) and in the associated AMC2 ARO.GEN.200(a)(2) point (a)as regards the initial training programme for the instructors, and AMC4 ARO.GEN.200(a)(2) (applicable from 30 March 2019) with regard to inspector qualification for cat operations for CAT operations.

The requirements of training in ARO.OPS.226 are further explained in AMC1 ARO.OPS.226(a).

— The new proposed rule ARO.OPS.225 published in NPA 2016-06 (A) on fuel schemes for the general structure of the rule.

ARO.OPS.226 point (c)(1)

This provision may need further development through the development of AMC or GM by the review group or through the internal policy of the competent authority.

Comments on whether this rule should be developed are welcome by the stakeholders.

ARO.OPS.226 point (c)(2)(ii)

EBT programmes require extensive use of data and suitable records systems.

This is already required in the operator's requirements ORO.GEN.220 and ORO.MLR.115; therefore, it has probably been overseen in the past.

However, the competent authority should verify that the operator is compliant as EBT will increase the workload and usability of the record system; therefore, it may be a first indication of an operator's maturity to implement EBT.

ARO.OPS.226 point (c)(2)(iii)

This provision allows the competent authority to access pilots grading results. This already applies today and EBT will not change the current situation. The competent authority is allowed to access the pilot records (ORO.GEN.140 access) to verify 'the suitability of the operator's grading and assessment scheme'.

Furthermore, the access to records and grading data for the verification of the grading system is also recognised at ICAO level (see Doc 9379 'Manual of Procedures for Establishment and Management of a State's Personnel Licensing System' (Part I: General principles and organization Chapter 2 - The Licensing Authority, paragraph 2.8 Record-keeping)).

ARO.OPS.226 point (d)

The periodic oversight plan follows the following principles:

— A performance-based safety objective is provided in the IR.

— A more detailed criterion is then provided in the associated AMC1 ARO.OPS.226(d) 'Approval and oversight of EBT programmes OVERSIGHT PLAN — PERIODIC ASSESSMENT TO VERIFY COMPLIANCE OF THE APPROVED EBT PROGRAMME'

— Then, GM addressing an important criterion that competent authority should oversee is developed — GM1 to AMC1 ARO.OPS.226(d) 'EFFECTIVENESS OF THE OPERATOR'S APPROVED EBT PROGRAMME'.

The provision is linked to another IR (ARO.GEN.350) that provides a reference when continuing compliance is not ensured.

'ARO.GEN.350

(1) In the case of level 1 findings the competent authority shall take immediate and appropriate action to prohibit or limit activities, and if appropriate, it shall take action to revoke the certificate, specialised operations authorisation or specific approval or to limit or suspend it in whole or in part, depending upon the extent of the level 1 finding, until successful corrective action has been taken by the organisation.'

The intent of this rule also includes the need for the competent authority to have periodic observations of the training session; however, this requirement was not included as AMC2 ARO.GEN.305(b) already provides for such requirement:

'AMC2 ARO.GEN.305(b) Oversight programme

PROCEDURES FOR OVERSIGHT OF OPERATIONS

(…)

(b) Audits and inspections, on a scale and frequency appropriate to the operation, should cover at least:

(1) infrastructure,

(2) manuals,

(3) training,

(…)

(c) The following types of inspections should be envisaged, as part of the oversight programme:

(1) flight inspection,

(2) ground inspection (e.g. documents and records),

(3) training inspection (e.g. ground, aircraft/FSTD,

(…)'

Point (b) normally means a documentation exercised, and point (c) normally means visit/inspection; therefore, observation of the training session.

***ARO.OPS.226 point(d)* wording 'approved EBT programme'**

The term 'approved EBT programme' is used instead of simply 'EBT programme'. EBT programme is referred to in the AMC contained in ORO.FC.231 point (a) 'EBT programme': this is a generic programme in an aircraft generation while the 'approved EBT programme' is specific to a particular operator and it encompasses all the requirements contained in ORO.FC.231 from point (a) to (i).

AMC1 ARO.OPS.226(a) Approval and oversight of evidence-based training programmes

QUALIFICATION AND TRAINING — INSPECTORS — EVIDENCED-BASED TRAINING

(a) For the initial approval and oversight of an operator's EBT programme, the inspector of the competent authority should undertake EBT as part of their required technical training (see AMC2 ARO.GEN.200(a)(2)). At the conclusion of the inspector training, the inspector should:

(1) know the principles of EBT, including the following underlying principles:

(i) competency-based training;

(ii) learning from positive performance;

(iii) building resilience; and;

(iv) data-driven training;

(2) know the structure of an EBT module;

(3) know the method of training delivery for each phase of an EBT module;

(4) know the principles of adult learning and how they relate to EBT;

(5) recognise effective observations based on a competency framework, and document evidence of observed performance;

(6) recognise and relate specific performance observations of competencies;

(7) recognise trainee performance to determine competency-based training needs and recognise strengths;

(8) understand methods for the evaluation of performance using a competency-based grading system;

(9) recognise appropriate teaching styles during simulator training to accommodate trainee learning needs;

(10) recognise and facilitate trainee learning, focusing on specific competency-based training needs; and

(11) understand how to conduct a debrief using facilitation techniques.

(b) The objective of such training is to:

(1) attain the adequate level of knowledge in the principles of approval and oversight of the EBT programmes; and

(2) acquire the ability to recognise the features of the EBT programme.

AMC1 ARO.OPS.226(a)

The intention of the RMG and EASA is not to substitute the existing requirements in AMC4 ARO.GEN.200(a)(2) regarding the qualification of the inspector for the EBT programmes. On the contrary, the EBT training requirements are additional to those contained in AMC4 ARO.GEN.200(a)(2). If stakeholders believe this is not clear in the proposed IR, EASA encourages them to place a relevant comment so that the review group addresses this issue through a new paragraph with the following approach:

'In addition to the requirements of AMC4 ARO.GEN.200(a)(2)'

Only the EBT training course is required for inspectors and not the EBT assessment of competence (demonstration). This approach follows the concept already introduced in the regulation for the Fatigue Risk Management System course.

Since the EBT paradigm is mainly under the supervision of the operator, including licencing issue, the inspector needs to have an acute understanding of the principles, philosophy and application of EBT concepts, in order to understand the performance of the operator

The demonstration of the acceptable level of knowledge of the inspector can be achieved through an on the job training.

AMC1 ARO.OPS.226(a) wording 'technical training'

The use of the term 'technical training' is referring to AMC2 ARO.GEN.200(a)(2) point (a)(11)

AMC2 ARO.GEN.200(a)(2) Management system
QUALIFICATION AND TRAINING — INSPECTORS

(a) Initial training programme:

The initial training programme for inspectors should include, as appropriate to their role, current knowledge, experience and skills in at least all of the following:

(…)

(11) technical training, including training on aircraft-specific subjects, appropriate to the role and tasks of the inspector, in particular for those areas requiring approvals.

GM1 to AMC1 ARO.OPS.226(a) Approval and oversight of evidence-based training programmes

INSPECTOR'S EBT PROGRAMME — FEATURES OF AN OPERATOR'S EBT PROGRAMME

In order to recognise and evaluate the features of an operator's EBT programme, the inspector's training programme may include those features as training objectives. AMC1 ORO.FC.231(a)(2) provides the list of minimum features that should be contained within an approved EBT programme.

GM1 to AMC1 ARO.OPS.226(a)

The GM provides further details on the learning objective number (b) (2) 'acquire the ability to recognised the features of the EBT programme ' contained in AMC1 ARO.OPS.226 (a) 'Approval and oversight of Evidence-based training programmes' TRAINING AND QUALIFICATION — EVIDENCED-BASED TRAINING

AMC1 ARO.OPS.226(c) Approval and oversight of programmes

INITIAL APPROVAL — VERIFICATION OF COMPLIANCE

When approving an EBT programme, the competent authority should ensure that the operator fulfils all the applicable criteria of ORO.FC.231 and its associated AMC. In particular, it should recognise the features of the operator's EBT programme (AMC1 ORO.FC.231(a)(2)).

AMC1 ORO.OPS.226(c)

This provision was introduced to guide the competent authority on the main characteristics of an EBT programme. This AMC may be used by the competent authority to develop checklists for audits.

AMC1 ARO.OPS.226(d) Approval and oversight of evidence-based training programmes

OVERSIGHT PLAN — PERIODIC ASSESSMENT TO VERIFY COMPLIANCE OF THE APPROVED EBT PROGRAMME

(a) After issuing the approval of the operator's EBT programme, the competent authority should have a process to verify the operator's continuing compliance.

(b) Each organisation to which an EBT approval has been issued should have an inspector assigned to it who is trained and qualified for EBT (see AMC1 ARO.OPS.226(a)).

(c) Audits and inspections, on a scale and frequency appropriate to the operation, should cover at least:

(1) management supervision of the EBT programme;

(2) ongoing identification of operational risk and inclusion into the operator's approved EBT programme;

(3) relevance of the operator's approved EBT programme to address its operational and training needs;

(4) effectiveness of the operator's approved EBT programme to improve pilot competencies. When there is an ineffective programme, the competent authority should examine the operator processes which identify the lack of effective results;

(5) compliance with all requirements of ORO.FC.231;

(6) delivery of instructor training in accordance with AMC1 ORO.FC.145(a)(3), including inspections of the training delivery;

(7) conduct of assessments of competence for EBT instructors, including periodic inspections of FSTD training;

(8) maintenance of crew records;

(9) administration of programme enrolment and compliance with the requirements of Annex I (Part-FCL) for licence revalidation and renewal;

(10) continuing standardisation of EBT instructors, including inspections of the training delivery; and

(11) verification that the operator fulfils the requirements detailed in AMC1 ORO.FC.231(a).

AMC1 ARO.OPS.226(d)

The list was derived by a read-through of ORO.FC.231 and all ARO.GEN, ARO.OPS requirements for approval and oversight.

This list may be supported by a checklist similar to that developed by EASA for mixed EBT implementation. Readers are invited to comment on the necessity of this material.

AMC1 ARO.OPS.226(d) points (b) and (c)

The intent of the RMG when drafting points (b) and (c) was to ensure that the competent authority has sufficiently qualified inspectors to oversee the EBT programme. The RMG also provided the considerations and items to review in the periodic oversight plan so appropriate resources are planned.

AMC1 ARO.OPS.226d(d) point (c)(1)

Management supervision of the EBT programme.

This means that the operator should demonstrate to the competent authority that it has a method to collect, analyse and act upon the data from the EBT programme. It is expected that this would normally be discussed in regular meetings (the training standards meetings or similar format). Minutes of the meeting should be kept. In the training standards meetings, the operator would review the data and revise the programme as necessary. This is also provided in ORO.GEN.200(a)(5) of the Air OPS Regulation.

AMC1 ARO.OPS.226(d) point (c)(3) wording 'relevance of the operator's approved EBT programme'

Relevance means that an EBT programme both includes the features contained in AMC1 ORO.FC.231(a)(2) and continuously identifies the operator's operational risks to feed the operator's approved EBT programme.

There was a discussion in EASA and the RMG whether clarifying 'EBT effectiveness' and 'EBT relevance' was necessary. These are important elements of the EBT programme (verifying performance output). Please provide comments on the necessity of GM to further explain relevance and effectiveness.

AMC1 ARO.OPS.226(d) point (c)(8)

The competent authority should verify compliance with the provision of record-keeping under ORO.GEN.220 and ORO.MLR.115. Data collection and record-keeping are a key part of the EBT system.

AMC1 ORO.OPS.226(d) point (c)(10) wording 'Continuing standardisation of EBT instructors'

This provision includes training and concordance assurance of the instructor.

Verifying concordance should be preferably a data-driven process. EASA may develop GM to expand on this to show how verification of concordance may occur, and how decay prevention should be addressed. Readers are invited to comment on the necessity of this GM.

GM1 to AMC1 ARO.OPS.226(d) Approval and oversight of evidence-based training programmes

EFFECTIVENESS OF THE OPERATOR'S APPROVED EBT PROGRAMME

(a) This can be determined by periodic review of pilot competencies across several domains, such as role fleet (e.g. CPT/FO, A320, B737) and airline, so that the continuing improvement of the approved EBT programme is linked to an improvement of the pilot core competencies.

(b) The analysis of the pilot competencies across the domains should also take into account the operator's experience in the approved EBT programme and the level of difficulty contained within the scenario elements of the programme, which may result in variations of the grading results.

GM1 to AMC1 ARO.OPS.226(d) point (b)

This point is introduced to guide the competent authority to verify the results of the competencies. These grading results may have variations and those variations are acceptable. These variations occur for several reasons, for example, due to variations in the difficulty of the EBT programme. Therefore, the effectiveness of the EBT programme should be considered from a holistic view. For instance, a temporary decrease of pilot grading in core competencies does not necessarily mean a lack of effectiveness. Operators designing modules with numerous difficult events could end up in a decrease of the grading results of some competencies and vice versa.

Annex III (Part-ORO) to Regulation (EU) No 965/2012

ORO.FC.145 Provision of training

(a) All the training required in this Subpart shall be conducted:

(1) in accordance with the training programmes and syllabi established by the operator in the operations manual;

(2) by appropriately qualified personnel. In the case of flight and flight simulation training and checking, the personnel providing the training and conducting the checks shall be qualified in accordance with Annex I (Part-FCL) to Regulation (EU) No 1178/2011;

(3) in addition to the above, for an approved EBT programme:

(i) personnel providing assessment and training shall hold an Annex I (Part-FCL) instructor or examiner certificate; and

(ii) have completed the operator's EBT instructor standardisation.

Successful completion of the operator's EBT standardisation will qualify the instructor to perform practical assessment in competencies.

ORO.FC.145(a)(3)

EBT is a paradigm shift and instructors play a key role in the delivery of the programme. The RMG found necessary to add an EBT course on top of the qualification required in the Aircrew Regulation.

Doc 9995 requires this training as well:

'6.3.2 Instructors should undergo suitable training in order to adapt to the needs of training within an EBT programme. Training should provide the framework for existing instructors to develop their competence to undertake EBT assessment and training'.

ORO.FC.145(a)(3) wording 'for an approved EBT programme'

This wording 'for an approved EBT programme' is used instead of 'operator holding an approval for EBT' or other wordings that could be possibly used in order to allow:

— contracted activities under ORO.GEN.205; and

— that other aspects of the training programme which are not linked to the EBT programme itself could be delivered by other personnel which are not EBT instructors.

ORO.FC.145(a)(3) wording 'hold an Annex I (Part-FCL) instructor or examiner certificate'

The proposed rule is restricting the possibility instructors holding a certificate issued by a third country to become EBT instructors. By using the wording 'hold an Annex I (Part-FCL) instructor or examiner certificate', only instructors or examiners holding a certificate issued in accordance with the EU regulatory framework can deliver EBT. The reasons for such a provision according to the RMG is the following:

— The EBT programme based on competencies does not have the same prescriptive components as a task-based checking under Appendix 9 to Part-FCL. Therefore, the RMG, in an effort to ensure standardisation and integrity of the licence revalidation under EBT, wanted to put into place some level of control of instructor qualification.

— To ensure alignment between Part-ORO of the Air OPS Regulation and Part-FCL of the Aircrew Regulation, the requirement of FCL.900 point (c) must be reproduced in Part-ORO. Therefore, only holders of European instructors' certificates (with a European pilot licence or with a pilot licence issued by a third country but subject to FCL.900 (c)) are allowed to provide training to European licence holders.

— The EBT concept is so new that a less restricted option could create issues in terms of standardisation as most of the non-European countries are not applying Doc 9995.

— Furthermore, the situation where an instructor holding a pilot licence issued by a third country provides training, only occurs when the operator has subcontracted its training to an approved training organisation (ATO) under ORO.GEN.205. In this situation, the efforts of standardisation are already big. Considering that a small number of non-standardised data introduced in the EBT system can have big implication in the result of the programme, then only Part-FCL certificate holders should be allowed to provide EBT as they are standardised in EBT by the ATO.

— The RMG was also concerned with the delivery of the EBT programme, as they believe that the quality of the delivery of the operator's EBT programme could be compromised; since Europe is the first region

delivering full EBT, Part-FCL certified instructors may better guarantee the consistency and philosophy of EBT. This is particularly important as at a later stage, in the context of the activities of RMT.0599, initial type rating courses may be subject to EBT.

Note: Individual European certified trainers with a European pilot licence are allowed to provide EBT even if they are not operator or ATO staff members. This is allowed under ORO.FC.205 contracted activities.

ORO.FC.145 (a)(3) wording 'the operator's EBT instructor standardisation'

The wording used in the AMC1 ORO.FC.145(a)(2) for the instructor's standardisation is using 'EBT' for each of the 2 parts 'EBT instructor training' and 'EBT assessment of competence' to ensure they are both specific for EBT. The use of 'EBT assessment of competence' is to ensure that the EBT instructor is allowed to revalidate the instructor certificate when the EBT assessment of competence and the assessment of competence for the revalidation of the instructor are combined. The RMG was reluctant to allow the EBT instructor to revalidate the EBT instructor certificate under an ATO not belonging to an airline, and therefore the requirements for the assessment are contained in the operators' requirements. Hence, the revalidation of the EBT instructor certificate requires an operator.

Following the concept already described in Subparts J and K of Part-FCL, the instructors should complete a course to become EBT instructors. This standardisation is composed of a training course and the assessment of competence, which follows the logic of Part-FCL. For example, FCL.930 'Training course', FCL.935 'Assessment of competence' and FCL.940.TRI TRI illustrate the situation for instructor courses and assessment:

'FCL.940.TRI TRI — Revalidation and renewal

(a) *Revalidation*

(1) Aeroplanes. For revalidation of a TRI(A) certificate, the applicant shall, within the last 12 months preceding the expiry date of the certificate, fulfil one of the following 3 requirements:

(i) conduct one of the following parts of a complete type rating training course: simulator session of at least 3hours or one air exercise of at least 1 hour comprising a minimum of 2 take-offs and landings;

(ii) receive instructor refresher training as a TRI at an ATO;

(iii) pass the assessment of competence in accordance with FCL.935.

[…]'

The RMG believes that it must be an operator EBT instructor training. Therefore, the instructor course is operator-specific. However, credits are foreseen in point (d) of the AMC1 ORO.FC.145(a)(3) when an instructor has experience in EBT, allowing for a shorter training course.

ORO.FC.145 (a)(3)(ii)

The sentence 'Successful completion of the operator's EBT standardisation will qualify the instructor to perform practical assessment in competencies' was introduced because in the Aircrew Regulation the instructors do not have the privilege to perform practical assessment in competencies. For example, the current FCL.905.TRI.TRI only provides a privilege to *'instruct for'*:

'FCL.905.TRI TRI — Privileges and conditions

The privileges of a TRI are to instruct for […]'

This provision introduces the link to Part-FCL for the EBT proficiency check in accordance with Appendix 10 (practical assessment of competencies), the wording 'practical assessment in competencies' provides the link to Appendix 10 point 6 'The practical assessment in competencies must be conducted in accordance with the operator's approved EBT programme'.

ORO.FC.145(a)(3)(ii) wording 'practical assessment in competencies'

This wording is a transposition of the ICAO wording 'practical assessment' contained in PANS-TRAINING paragraph 4.4.1.2.2.

Furthermore, practical assessment is defined in the new GM to definitions in Subpart ORO.FC.

AMC1 ORO.FC.145(a)(3) Provision of training

EBT INSTRUCTOR — INITIAL STANDARDISATION

(a) Before delivering the operator's approved EBT programme, the instructor should successfully complete an EBT instructor initial standardisation composed of:

(1) EBT instructor training; and

(2) EBT assessment of competence.

EBT INSTRUCTOR TRAINING

(b) The EBT instructor training course should be delivered by a pilot who has already demonstrated proficiency to train the elements specified in point (b) below.

(c) The EBT instructor training course should comprise theoretical and practical training. At the completion of EBT instructor training, the instructor should:

(1) have knowledge of EBT, including the following underlying principles:

(i) competency-based training;

(ii) learning from positive performance;

(iii) building resilience; and

(iv) data-driven training;

(2) demonstrate knowledge of the structure of an EBT module;

(3) demonstrate knowledge of the method of training delivery for each phase of an EBT module;

(4) demonstrate knowledge of the principles of adult learning and how they relate to EBT;

(5) conduct objective observations based on a competency framework, and document evidence of observed performance;

(6) relate specific performance observations of competencies;

(7) analyse trainee performance to determine competency-based training needs and recognise strengths;

(8) evaluate performance using a competency-based grading system;

(9) apply appropriate teaching styles during simulator training to accommodate trainee learning needs;

(10) facilitate trainee learning, focusing on specific competency-based training needs; and

(11) conduct a debrief using facilitation techniques.

(d) An instructor may be given credits on the topics of point (c) if the instructor has previously demonstrated competencies in those topics.

EBT ASSESSMENT OF COMPETENCE

(e) Prior to conducting assessment and training within an EBT programme, the EBT instructor should complete an EBT assessment of competence where the EBT instructor delivers:

(1) an evaluation phase and a manoeuvres training phase; or

(2) a scenario-based training phase.

(f) The assessment of competence has a validity period of 3 years. When the assessment of competence is conducted within the 12 months preceding the expiry date, the next assessment of competence should be completed within 36 calendar months of the original expiry date of the previous assessment.

(g) The EBT assessment of competence should be conducted by a person nominated by the operator, who:

(1) is qualified in accordance with Annex I (Part-FCL) to Regulation (EU) No 1178/2011 to conduct an assessment of competence; and

(2) has completed the EBT instructor initial standardisation.

(h) The EBT assessment of competence may be combined with the assessment of competence required in Annex I (Part-FCL) to Regulation (EU) No 1178/2011.

AMC2 ORO.FC.145(a)(3) Provision of training

EBT INSTRUCTOR — RECURRENT STANDARDISATION

(a) The EBT instructor should receive an annual recurrent standardisation. The recurrent standardisation should include:

(1) refresher EBT training; and

(2) concordance training.

(b) The EBT instructor should conduct a complete EBT module within the last 12 months preceding the expiry date.

(c) If the requirement of point (b) has not been fulfilled, before conducting training within an EBT programme, the EBT instructor should undergo an EBT assessment of competence.

(d) The EBT instructor should undergo an EBT assessment of competence every 3 years.

AMC1.ORO.FC.145(a)(3) points (b) and (c) wording 'EBT instructor training'

The syllabus for the EBT instructor training has been taken from Doc 9995 and the IATA/ICAO/IFALPA EBT Implementation Guide.

The volume of the EBT instructor initial standardisation course is addressed in the new GM1 ORO.FC.145(a)(3) point (e).

AMC1 ORO.FC.145(a)(3) point (b)

Point (b) provides the prerequisite for the pilot who delivers the EBT instructor training (ground course). The only prerequisite is that this pilot has completed the EBT instructor training. This pilot does not need to be a qualified instructor under Part-FCL of the Aircrew Regulation.

This requirement is less stringent than the one for the person who delivers the assessment of competence (see requirement AMC1 ORO.FC.145(a)(3) point (g)) who needs to receive an EBT instructor training and be a qualified examiner in accordance with Part-FCL of the Aircrew Regulation.

AMC1.ORO.FC.145(a)(3) wording 'EBT assessment of competence'

The wording 'assessment of competence' is used for consistency purposes between Part-ORO of the Air OPS Regulation and Part-FCL of the Aircrew Regulation and to allow a combined assessment of the revalidation of the EBT instructor in Part-ORO and the revalidation of instructor's certificate in accordance with Part-FCL.

AMC1 ORO.FC.231 (a)(3) point (f) validity period of 3 years

This provision is transposed from the Aircrew Regulation: instructors and examiners validity period.

Furthermore, this provision is also included Doc 9995 paragraph 6.3.5:

'All instructors should receive annual refresher training, and be re-assessed in the competencies specified in 6.3.3 every three years.'

The 12 month-transition period to complete the assessment of competence is transposed from FCL.940.TRI TRI — 'Revalidation and renewal' of Regulation (EU) No 1178/2011.

AMC1.ORO.FC.145(a)(3) Point (g) wording 'nominated person for this purpose by the operator'

The intention is that the person in charge of this matter would be a person specialised in EBT and a current examiner.

However, there was a discussion in the RMG whether this person should be a current examiner or not. If not, then the word 'held' could be used in the provision.

The proposal to allow NON-current examiners would allow more flexibility. This is important when the EBT is introduced for the first time in the airline. This option is deviating from the concept of instructor course in Part-FCL of the Aircrew Regulation.

EASA expects that most of the courses for EBT will be combined with Part-FCL instructor courses. Therefore, at the end the assessment of competence is expected to be performed by a current qualified examiner anyway. Thus, the option of NON-current examiner was discarded and EASA to be consistent between Part-FCL and Part-ORO, decided that only current examiners will conduct the EBT assessment of competence.

AMC1 ORO.FC.145(a)(3) point (g)(1)

The requirement proposed was originally transposed from the existing Doc 9995 and the explanatory note of the ED Decision 2015/027/R for mixed EBT.

'A person nominated (refer to ICAO Doc 9995 AN/497 'Manual of Evidence-based training' first edition 2013 paragraph 6.3.4) by the operator for the conduct of competency assessments of EBT examiners and instructors should be a person who holds a certificate equivalent to that being assessed, provided that he or she has completed the training and assessment indicated in ICAO Doc 9995 paragraph 6.3'.

That's why point (g) of this AMC uses 'conducted by a person nominated by the operator.''

However, to be consistent with Part-FCL of the Aircrew Regulation and ORO.FC.145 (a)(3), a further clarification was introduced as the ICAO provision does not provide details. Therefore, the NPA will require an assessment of competence performed in the FSTD before receiving the EBT instructor qualification. To maintain legal consistency between the assessment of competence referred to in Part-FCL and the EBT assessment of competence proposed in this provision (OPS), EASA decided that only personnel holding a certificate with privileges to perform assessment of competence are allowed to perform such 'test'. When revalidating an instructor or examiner licence in accordance with the Aircrew Regulation, the provision is already there. Therefore this requirement does not add an extra burden to the airlines. The only exception to such statement (no extra burden to the airlines) would be during the transition period from legacy training to EBT, where the instructor/examiner revalidation may not match with the assessment of competence of EBT required during the initial EBT course. After the transition phase, the airline will roster the instructor/examiner revalidation in combination with an EBT assessment of competence when required.

AMC1 ORO.FC.145(a)(3) Point (g)(1) wording 'is qualified in accordance with Annex I (Part-FCL) to Regulation (EU) No 1178/2011 to conduct an assessment of competence'

This provision is introduced to ensure an examiner will perform the EBT assessment of competence.

This provision is already required in the assessment of competence for the instructor in Subpart J of Part-FCL of the Aircrew Regulation.

The intention of the RMG is that the assessment of competence for EBT and the assessment of competence to revalidate instructor certificate will be combined (see AMC1.ORO.FC.145(a)(3) Provision of training, this provision does not add any further requirement or cost.

AMC2 ORO.FC.145(a)(3)

The wording used is based on the revalidation for instructors and examiners in accordance with Subparts J and K of Part-FCL of the Aircrew Regulation. The example is provided below:

'FCL.940.TRI TRI — Revalidation and renewal
(a) *Revalidation*
(1) Aeroplanes. For revalidation of a TRI(A) certificate, the applicant shall, within the last 12

months preceding the expiry date of the certificate, fulfil one of the following 3 requirements:

(i) conduct one of the following parts of a complete type rating training course: simulator session of at least 3 hours or one air exercise of at least 1 hour comprising a minimum of 2 take-offs and landings;

(ii) receive instructor refresher training as a TRI at an ATO;

(iii) pass the assessment of competence in accordance with FCL.935.'

Following the concept above, the revalidation for EBT instructor will be based on the completion of one full simulator of EBT every 12 months; that means the combination of evaluation plus manoeuvres training/validation (mixed EBT) and a scenario-based training, plus an assessment of competence every 3 years.

Point (a) of AMC2 ORO.FC.145(a)(3) provides the requirement for EBT refresher training. This training may satisfy the requirement of FCL.940.TRI(a)(1)(ii) concerning instructor refresher training, if accepted by the competent authority.

This requirement is proposed to ensure standardisation of the instructors.

Furthermore, the need for concordance assurance was introduced considering Doc 9995 Attachment to Chapter 1 step 9.

9**	Instructor training and standardization.	4.1.1 and 6.3 of Part I	Instructor EBT programme standardisation, which should be a formalized approach to ensure a consistent and standardised approach to the EBT programme prior to implementation, including practical training reinforcing application of the assessment and grading system and maximising inter-rater reliability.

GM1 ORO.FC.145(a)(3) Provision of training

EBT INSTRUCTOR — INITIAL STANDARDISATION

(a) The intent of the practical training is to ensure that EBT instructors have exposure to assessment of performance and route cause identification within an EBT programme.

(b) EBT instructors receive practical assistance and guidance during standardisation in order to apply the learning from EBT instructor training. In particular, the focus should be on assessment of performance and the determination of root cause for remediation, plus facilitated debriefing based on root cause as a learning objective.

(c) The personnel providing the EBT training is selected by the operator to assess the instructor capability in delivering EBT and provide effective feedback in order that instructor practice meets the expectations of the operator.

(d) Practical EBT training includes the learning objective 'Evaluate performance using a competency-based grading system'. This may be done with videos and other multimedia. It means that EBT instructors are exposed:

(1) to different levels of pilot performance. This enables EBT instructors to distinguish between pilots performing less than the minimum acceptable level of performance (e.g. grade 1) and those whose performance is at an acceptable level in all competencies (e.g. grade 2). This EBT training may also include other performance examples (e.g. 3, 4 and 5).

(2) also to different scenarios (e.g. complex to less complex) so that the instructor has exposure to assessments of competency in varying EBT scenarios.

(e) The EBT instructor training course may be a minimum of 14 hours (EBT instructor training) and the recommended length is between 21 to 24 hours (EBT instructor training plus assessment of competence).

GM1 ORO.FC.145(a)(3) EBT programme

The transition to EBT involves a paradigm shift in the focus of training. To maximise the safety benefits of the programme, EBT instructors should be mentored to ensure practice develops according to the expectations of the operator. EBT instructors delivering standardisation course should be carefully selected and trained so that the standardisation activity provides the maximum benefit.

The syllabus described in the AMC1 ORO.FC.145(a)(3) provides enough granularity for a performance-based rule. Therefore, the RMG decided not to include a prescriptive requirement regarding the number of hours

needed to deliver the EBT instructor course and instead the information is provided in point (e) in this GM. If necessary, EASA may transfer this information to AMC depending on the feedback received.

However, the RMG acknowledged the novelty of the EBT programme where instructor training course is a fundamental piece. Therefore, it was decided to provide GM that would include some references regarding the length of the EBT instructor course in order to promote a successful discussion between the operator and the competent authority where the focus is on the outcome of the course (provided at the level of the AMC) rather than on the prescription of 14/21/24 hours (provided at the level of GM).

GM1 ORO.FC.145(a)(3) point (e)

Given the paradigm shift in the philosophy of assessment and training of competencies, a nominal value of course duration was included as a standardisation element.

In order to agree in a figure, the RMG reviewed the rules relating to qualification of instructors (e.g. FCL.930 TRI.TRI were consulted). The 14 hours were commensurate with those required for initial qualification of instructors.

Furthermore, the IATA EBT implementation guide recommends at least a 3-day course in Appendix B. However, this appendix provides a range of duration for the course between 3 days and 5 days.

If necessary EASA may transfer this information to AMC depending on the feedback received.

GM2 ORO.FC.145(a)(3) Provision of training

EBT INSTRUCTOR — RECURRENT STANDARDISATION

(a) Refresher EBT training

The intent of this training is to provide the framework for existing instructors to develop their competence to conduct EBT. This may be conducted using media (distance learning); however, operators should be aware that this is subject to the acceptance of the competent authority.

(b) Concordance training

This training is one of the elements to assure concordance within the EBT instructor community. The operator will verify concordance for each individual EBT instructor at least once a year. Those EBT instructors who do not demonstrate concordance may require further training.

EBT INSTRUCTOR CONCORDANCE TRAINING

(c) During training the assessment of the instructor concordance may be verified by controlling the content to be assessed (e.g. a video or paper case), in order to compare variance between instructors. Concordance may not be inferred only from training data, as this implicitly assumes homogeneity of all EBT modules assessed, which may not be the case, as EBT allows for module variation (e.g. providing different modules depending of strength and weakness of a group of pilots (e.g. Senior first officer, first officers and cadet)).

(d) Individual Instructor concordance will be assessed for a wide envelope of assessment. This includes:

(1) assessing all competencies (9 if following the EASA competency framework);

(2) assessing all levels of performance (1 to 5); and

(3) different flight scenarios.

(e) Concordance training also includes the alignment of root-cause analyses between instructors.

GM2 ORO.FC.145(a)(3) Provision of training

This GM for the annual EBT instructor standardisation was developed to clarify the intent of the provision provided in the AMC. The text proposed provides certain criteria on how to perform the annual instructor standardisation; however, the criteria that may be provided by the competent authority is fundamental, as training is subject to approval under OM part D and revalidations and renewal of licences are performed within an approved EBT programme.

The authority should exercise its oversight powers to ensure operators provide the right amount of training and concordance assurance to their instructors.

GM2 ORO.FC.145(a)(3) point (a) Wording 'media (distance learning)'

The wording used is consistent with Part-FCL of the Aircrew Regulation, used in AMC1 FCL.115; FCL.120, AMC1 FCL210;FCL215, AMC1 to Appendix 3

GM2 ORO.FC.145(a)(3) points (b), (c), (d), (e), (f)

This provision was introduced following the IATA 'Evidence-Based Training Implementation Guide'[19] chapter 4.1 'The EBT instructor'.

'The development of strong inter-rater reliability and consistency in the approach to EBT is of great importance and should not be underestimated either initially or as a focus for the continuous improvement of an EBT system. Establishing robust guidelines and thorough experience strengthens inter-rater reliability, provided that suitable mechanisms are put in place. Clear and concise instructions, accurate performance indicator descriptions and peer review all increase inter-rater reliability.'

GM2 ORO.FC.145(a)(3) points (c), (d) and (e)

The GM provides guidance to the following concepts:

(1) comparability of instructors requires controlled assessment material (video)

(2) concordance should cover wide envelope of assessment

(3) concordance should be safeguarded against standards drift

(4) concordance should look at observation, but also at root-cause analyses.

ORO.FC.230 Recurrent training and checking

GM1 ORO.FC.230(a);(b);(f) Recurrent training and checking

MIXED EVIDENCE-BASED RECURRENT TRAINING AND CHECKING OF FLIGHT CREW CONDUCTED IN FLIGHT SIMULATION TRAINING DEVICES (FSTDs)

[19] IATA Evidence-Based Training Implementation Guide July 2013 1st Edition.

ICAO developed Doc 9995 'Manual of Evidence-based Training', followed by EASA EBT MANUAL, which is intended to provide guidance to civil aviation authorities, operators and approved training organisations in the recurrent assessment and training of pilots by establishing a new methodology for the development and conduct of a recurrent assessment and training ~~and assessment~~ programme, titled evidence-based training(EBT).

~~'Evidence-based Training(EBT)' means training and assessment based on operational data that is characterised by developing and assessing the overall capability of a trainee across a range of core competencies rather than by measuring the performance during individual events or manoeuvres.~~

ICAO Doc 9995 and the EASA EBT manual are ~~is~~ the reference documents for operators seeking to implement EBT. The purpose of this guidance material (GM) is to enable the implementation of a mixed EBT according to the principles established in ICAO Doc 9995 taking into account the European regulatory framework.

In the current regulatory framework, it is possible to achieve a mixed EBT implementation ~~of EBT~~. Implementation of a mixed EBT programme means that some portion of the recurrent assessment and training is dedicated to the application of EBT. This includes the Licence Proficiency Check (LPC) and the Operator Proficiency Check (OPC).

As it is possible to combine LPC and OPC in ORO.FC, this GM is applicable to both checks. Therefore, the EBT ~~training~~ programme described in this GM refers to the recurrent training and checking of flight crew, including LPCs and OPCs.

The EBT ~~training~~ programme takes into account the differences between aircraft of different generations and the effect of these differences on training. The operator should acquire a thorough knowledge of ICAO Doc 9995 or the EASA EBT manual before implementing this GM. For applicability, see ICAO Doc 9995 ~~Chapter 3~~ or EASA tables of applicable aeroplane/helicopter types by generation.

Mixed EBT programme

~~Within the current regulatory framework~~ ~~t~~The operator may undertake an ~~mixed~~ implementation of the mixed EBT programme according to this GM. The ICAO baseline EBT programme is defined in ICAO Doc 9995 Chapter 4.3.1 and in Appendices 2 to 7; the EASA EBT programme is defined in AMC2 to AMC7 ORO.FC.231(a).

The ~~baseline~~ EBT programme provides the flexibility to adapt programmes according to specific operator risks. ~~Elements of the enhanced EBT programme may be implemented according to the definition and process described in ICAO Doc 9995 Chapter 5.~~

The operator should contact the competent authority in order for them to assess the application of the process described in ICAO Doc 9995 ~~including, where applicable, the results from data analyses to support the enhanced EBT programme.~~

Personnel providing training and checking in EBT (Refers to AMC1 ORO.FC.230(d))

ICAO Doc 9995 Chapter 6, or EASA AMC1 and AMC2 ORO.FC.145(a)(3), ~~which is additional to EU regulations~~, contains the guidance for the assessment and training ~~and assessment~~ of personnel involved in the conduct of EBT.

Equivalency of malfunctions~~/Malfunction clustering~~ (Refers to ICAO Doc 9995 Paragraph 3.8.3)

According to the concept of EASA and ICAO Doc 9995 Chapter 3.8.3, major failures reduce the capability of the aircraft or the ability of the crew to cope with operating conditions to the extent that there would be a

significant reduction in functional capabilities, significant increase in crew workload or in conditions impairing crew efficiency.

Clusters of major failures of aircraft systems are determined by reference to malfunction characteristics and the underlying elements of crew performance required to manage them. ~~Malfunction clustering~~ Equivalency of malfunction may be used to guide the operator towards the implementation of ~~an~~ a mixed EBT programme according to AMC1 ORO.FC.230(a)(4)(i)(A) and ORO.FC.145(d).

Conduct of Licence and Operator Proficiency Checks

The EASA EBT programme or ICAO EBT programme described in ~~ICAO~~ Doc 9995 contains modules with three phases: the evaluation phase, the manoeuvres training phase, and the scenario-based training phase. In order to comply with the ~~existing~~ regulatory framework, LPC and OPC requirements are fulfilled by a combination of the evaluation phase and the manoeuvres validation phase, which replaces the manoeuvres training phase described in EASA EBT programme or ICAO Doc 9995. The manoeuvres validation phase is defined in Section 3 below. This is a form of mixed EBT implementation, which is described as follows:

1. **Evaluation phase:** This includes check scenarios referred to in Part-FCL Appendix 9 within an accepted EBT programme.

In order to facilitate the provision of simple and realistic scenarios in accordance with ICAO Doc 9995 Chapters 3.8 and 7.4, the evaluation phase is not intended to be a comprehensive assessment of all Part-FCL Appendix 9 items; nevertheless, the list below includes the items that should be included in the evaluation phase only.

		Part-FCL or Part-ORO reference	Description
AEROPLANES	HELICOPTERS	Part-FCL Appendix 9 Paragraph 6	*The examiner may choose between different skill test or proficiency check scenarios containing simulated relevant operations developed and approved by the competent authority. Full-flight simulators and other training devices, when available, shall be used, as established in this Part.*

AEROPLANES	Part-FCL Appendix 9 Paragraph 16 of section B	*The test/check should be accomplished under instrument flight rules (IFRs), if instrument rating (IR) is included, and as far as possible be accomplished in a simulated commercial air transport environment. An essential element to be checked is the ability to plan and conduct the flight from routine briefing material.*
	Part-FCL Appendix 9 Item 1.4	*Use of checklist prior to starting engines, starting procedures, radio and navigation equipment check, selection and setting of navigation and communication frequencies.*
	Part-FCL Appendix 9 Item1.6	*Before take-off checks.*
	Part-FCL Appendix 9 Item 3.9.1*	*Adherence to departure and arrival routes and ATC instructions.* *The starred item (*) shall be flown solely by reference to instruments. If this condition is not met during the skill test or proficiency check, the type rating will be restricted to VFR only.*
HELICOPTERS	Part-FCL Appendix 9 Paragraph 2 of section C	2. In case of proficiency check for an IR the applicant shall pass section 5 of the proficiency check. Failure in more than three items will require the applicant to take the entire section 5 again. An applicant failing not more than three items shall take the failed items again. Failure in any item of the re-check or failure in any other items of section 5 already passed will require the applicant to take the entire check again.
	Part-FCL Appendix 9 Item 1.3.	*Starting procedures, radio and navigation equipment check, selection and setting of navigation and communication frequencies*
	Part-FCL Appendix 9 Item 1.4	Taxiing/air taxiing in compliance with air traffic control instructions or with instructions of an instructor
	Part-FCL Appendix 9 Item 1.5	Pre-take-off procedures and checks
	Part-FCL Appendix 9 Item 5.2*	Adherence to departure and arrival routes and ATC instructions
		The starred item (*) shall be flown solely by reference to instruments. If this condition is not met during the skill test or proficiency check, the type rating will be restricted to VFR only.

2. **Manoeuvres validation phase:** The purpose of the manoeuvres validation phase is to check the handling skills necessary to fly critical flight manoeuvres so that they are maintained to a defined level of proficiency. This replaces the manoeuvres training phase described in ICAO Doc 9995 Chapter 7.5 and ORO.FC.231(a)(2)(iii)(B). Manoeuvres in this context are not part of line-orientated flight scenario; they

are a sequence of deliberate actions to achieve a prescribed flight path or to perform a prescribed event to a prescribed outcome. All remaining items listed in Part-FCL Appendix 9, and not included in the evaluation phase, should be included here. The manoeuvres listed in Doc 9995 or EASA table of assessment and training topics for the manoeuvres training phase that do not form part of the Part-FCL Appendix 9 mandatory items may be trained after the manoeuvres validation phase.

3. **Scenario-based training phase:** The purpose of the scenario-based training phase is to further develop pilot core competencies in a learning environment. This does not form part of any LPC or OPC requirement.

It should be noted that if the operator is following an alternative means of compliance to ORO.FC.230 (b) Operator Proficiency Check, the equivalence of using EBT evaluation and manoeuvres validation phases may no longer exist.

Additional guidance on mixed EBT implementation is available in the EASA checklist 'Oversight guidance for transition to EBT'.

ORO.FC.231 Evidence-based training

(a) EBT PROGRAMME

(1) The operator may substitute the requirements of ORO.FC.230 by implementing an EBT programme approved by the competent authority. The operator shall demonstrate its capability to support the implementation and perform a safety risk assessment demonstrating how an equivalent level of safety is achieved.

(2) Features of the operator's approved EBT programme

The operator's approved EBT programme shall:

(i) assess and develop the competencies required by flight crew members for safe, effective and efficient operations of aircraft;

(ii) ensure flight crew members are exposed to assessment and training topics derived from a large-scale analysis of operational data, distributed across a 3-year period at a defined frequency relevant to the type or variant of aircraft on which they operate;

(iii) consist of modules conducted in the following sequence:

(A) evaluation phase, comprising a line-orientated flight scenario (or scenarios) to assess competencies and identify individual training needs;

(B) manoeuvres training phase, comprising training to proficiency in certain defined manoeuvres; and

(C) scenario-based training phase, a comprising line-orientated flight scenario (s) and in-seat instruction to develop competencies and address individual training needs; and

(iv) be delivered by instructors trained and qualified to ensure the effectiveness of learning.

(3) The operator shall ensure that each flight crew member:

(i) is enrolled in the EBT programme;

(ii) completes a minimum of 2 modules within the validity period of 12 months, separated by a period of not less than 3 months. The module is completed when:

(A) the content of the approved EBT programme is completed for that module; and

(B) an acceptable level of performance in all observed competencies has been demonstrated; and

(C) will not continue line operations if during a module the performance observed was below the minimum acceptable level. The flight crew member continues line operations when a module is completed.

(4) The operator shall establish an instructor concordance assurance programme.

(i) Relevant metrics must be used to support this programme.

(ii) All instructors must be subject to this programme.

(iii) Sufficient instructor concordance must be demonstrated.

(5) The operator shall include contingency procedures for unforeseen circumstances that may affect the delivery of the modules. It may include a different separation period between modules.

ORO.FC.231

The EBT programme and philosophy are intended to be applied as the means of assessing and training key areas of flight crew performance in a recurrent training system. This is referred to in ICAO Annex 6, Operation of Aircraft, Part I, International commercial Air Transport — Aeroplanes, SARP 9.3, Flight crew member training programmes, and 9.4.4, Pilot proficiency checks. In addition, it is also referred to in ICAO Annex 1, Personnel Licensing, 1.2.5, Validity of licenses.

The EBT programme considers the differences between aeroplane generations by tailoring the recurrent training programme to the aeroplane generation. The paradigm shift proposed under the EBT programme is not simply to replace a set of critical events with a new set, but to use the events as a vehicle for assessing and developing crew performance across a range of competencies. In addition, EBT refocuses the instructor population onto analysis of the root causes to correct inappropriate actions, rather than simply asking a flight crew member to repeat a manoeuvre with no real understanding as to why it was not successfully flown in the first instance. Finally, it is acknowledged that in today's high-fidelity simulator environment, very sophisticated training tools exist that are often not used effectively, as regulation focus much more towards checking. EBT seeks to redress the imbalance between training and checking. It recognises that an assessment of competence is necessary, but once completed, pilots learn more effectively when being trained by competent instructors to perform tasks and manage events measured according to a given set of OBs, while not under test conditions.

The data analyses undertaken to support the EBT programme illustrate inadequacies in the perpetuation of historical airline flight training regimes and identify areas in which major change is necessary. They strongly support the implementation of such change in both the regulation and development of recurrent airline pilot assessment and training. Finally, they identify the areas for improvement, providing the prioritisation of relevant training topics to guide in the construction of suitable EBT programmes.

ORO.FC.231 point (a)(2) wording 'the features of the approved EBT programme'

AMC1 ORO.FC.231(a)(2) provides a more detailed presentation of the features of an operator's EBT approved programme.

The term 'features' is used in the Air OPS Regulation (for example, in GM4 ORO.FC.220&230 on UPRT).

The term 'approved EBT programme' is used instead of simply 'EBT programme'. 'EBT programme' is referred in point (a) to ORO.FC.231 and related AMC. 'EBT programme' is generic to an aircraft generation while the 'approved EBT programme' is specific to the operator and fulfils all the requirements from point (a) to (i) in ORO.FC.231.

ORO.FC.231 point (a)(2) wording 'to assessment and training topics derived from a large-scale analysis of operational data'

The assessment and training topics are included in the 'table of assessment and training topics' (e.g. Appendix 2 to ICAO Doc 9995). The table defines also the frequency of training those topics. The programme is described at AMC level. This means that Alternative Means of compliance (AltMoC) can be also used to demonstrate compliance with the IR (in accordance with ORO.GEN.120 of the Air OPS Regulation). However, in order to seek for an approval, the operator should demonstrate that this change of the programme is subject to a proper study of the operational risks. Such a large study was conducted by a collaborative group (industry and the regulator) in the IATA data report for EBT. If operators would like to modify the 'table of assessment and training topics', a similar work must be carried out.

ORO.FC.231point (a)(2)(ii) wording "3 year period"

'3-year *period*' instead of '3-year *cycle*' as provided in Doc 9995 is used because:

1- The European rules generally use *'period'* instead of cycle (see Part-ORO)

2- This NPA proposes the definition of 'cycle' that expresses the notion of one-year period. Therefore, if '3-year cycle' is used, it may be confusing.

ORO.FC.231 point (a)(2)(iii)(A) 'evaluation'

The evaluation phase should consist of a line-orientated flight scenario during which there are one or more occurrences for evaluating one or more key elements of the required competencies. The root cause/contributing factor should be identified rather than the symptoms of any deficiency.

This is not intended to be a comprehensive assessment of all areas of competency, nor a demonstration of all critical flight manoeuvres.

During the evaluation phase, for any competency observed below minimum:

- specific training needs should be determined; and
- the subsequent SBT phase includes remediation and the flight crew member is not released to line flying until an acceptable level of performance is reached.

ORO.FC.231 point (a)(2)(iii)(C) 'in-seat instruction'

Effective monitoring and error detection are increasingly important when operating highly-reliable, automated aircraft. Multiple data sources illustrate substantial rates of undetected error. Error management is reported as a very significant countermeasure in current operations with one accident study espousing that it is the most significant tool available to pilots for the prevention of accidents. Furthermore, multiple data sources

show that there is a high level of intentional non-compliance and so any error management strategy must include greatly reducing its incidence. Error management skills are subject to decay. Error management currently does not form part of any strategy developed through the regulation of flight crew training so consequently it is lacking in most training programmes. It is a key topic and needs to be incorporated into training strategies in order to raise flight crew situation awareness and further develop the professional capabilities of pilots.

When in training, flight crews are usually highly vigilant, and therefore the performance observed may not be representative of performance in normal routine operations. After extensive discussion, the worldwide international subject matter experts (SMEs) group that developed material for Doc 9995 concluded that an effective means to provide reliable exposure in FSTD training is to use a method called in-seat instruction (ISI). This is also an effective means to provide the recovery element of UPRT; data from LOC-I events regularly indicate a cognitive impairment of the pilot flying (PF) with the pilot monitoring (PM) often demonstrating a higher level of situational awareness (SA). When the PF does not immediately respond and act on monitoring calls, the PM takes control and recovers the aircraft. This approach is supported by both Airbus and Boeing in their guidance in recovery FSTD training, and has been integrated within the EBT programme.

ORO.FC.231 point (a)(3)(ii) wording 'by a period of not less than 3 months'

The RMG discussed the ICAO Annex 6 Part I Chapter 9 SARP 9.4.4 'Pilot proficiency checks' where 2 checks a year are required, performed at least 4 months apart:

'9.4.4 Pilot proficiency checks

9.4.4.1 The operator shall ensure that piloting technique and the ability to execute emergency procedures is checked in such a way as to demonstrate the pilot's competence on each type or variant of a type of aeroplane. Where the operation may be conducted under instrument flight rules, the operator shall ensure that the pilot's competence to comply with such rules is demonstrated to either a check pilot of the operator or to a representative of the State of the Operator. Such checks shall be performed twice within any period of one year. Any two such checks which are similar and which occur within a period of four consecutive months shall not alone satisfy this requirement.'

The RMG considers that these checks are not similar, as they are not repetitive training tasks or events, but evaluations in different scenarios. Therefore, a 3-month period is consistent with the European regulatory framework where the OPC in ATQP (ORO.FC.A.245) has a validity period of 6 months with the possibility to do it 3 months in advance.

Furthermore, according to Doc 9995, this document is a means of compliance with the Annex 6 SARP under SARP 9.4.4.

'This manual is intended to provide guidance to Civil Aviation Authorities, operators and approved training organizations in the recurrent assessment and training of pilots referred to in Annex 6 to the Convention on International Civil Aviation, Operation of Aircraft, Part I, International Commercial Air Transport — Aeroplanes, paragraphs 9.3, Flight crew member training programmes, and 9.4.4, Pilot proficiency checks.'

ORO.FC.231 point (a)(3)(iii) wording 'line operations'

The use of the term 'line operations' allows for training flights. At the same time, it restricts line flying when a minimum performance is not achieved. EBT is an FSTD programme, therefore the recommendation is to provide such remedial training in the FSTD. However, the operator is allowed to conduct training flights and

the pilot should be permitted to be trained in flight. This is especially relevant in small aircraft models, and although most of those models are not yet permitted in EBT, EASA has plans to incorporate them in the future.

The term 'line operations' is used in the Air OPS Regulation and although no definition is provided, its meaning is obvious. However, readers are invited to comment if a definition may be necessary.

ORO.FC.231 point (a)(3)(iii)

If a low performance is observed and there is no immediate opportunity for remedial training (e.g. unforeseen circumstances, sessions separated by several days apart with flight duty in the middle, etc.), the pilot should be removed from line operations until an acceptable level of performance can be achieved.

ORO.FC.231 point (a)(4) 'instructor concordance'

It is imperative that instructor concordance is regulated as a core aspect of an EBT programme, and should be held to high standards as it is one of the most critical drivers of data quality in an EBT programme. Concordance should be required to prevent a drift in instructor quality and concordance over time, especially in the non-technical competencies.

AMC1 ORO.FC.231(a) Evidence-based training

ASSESSMENT AND TRAINING TOPICS

(a) The EBT programme is available to operators of the aeroplanes listed below. There is a table of assessment and training topics to support each generation listed, except Generation 1 (Jet).

(b) Using the table, operators should develop a recurrent EBT programme.

(c) Each table is specific to the aeroplane generation specified in the title. The component elements in the column headings of the matrix are as follows:

(1) Assessment and training topic. A topic or grouping of topics derived from threats, errors or findings from data analysis, to be considered for assessment and mitigation by training.

(2) Frequency. The priority of the topic to be considered in an EBT programme, according to evidence is linked to a recommended frequency. There are three levels of frequency:

(i) A — assessment and training topic to be included with defined scenario elements during every EBT module;

(ii) B — assessment and training topic to be included with defined scenario elements during every cycle;

(iii) C — assessment and training topic to be included with defined scenario elements at least once in the three-year period of the EBT programme.

(3) Flight phase for activation. The flight phase for the realisation of the critical threat or error in the assessment and training scenario.

(4) Description (includes type of topic, being threat, error or focus). A description of the training topic.

(5) Desired outcome (includes performance criteria or training outcome). Simple evaluative statements on the desired outcome.

(6) Example scenario elements. The example scenario elements address the training topic and detail the threat and/or error that the crew are exposed to. Operators are encouraged to develop scenarios elements relevant to operations.

(7) Competency map. Competencies marked are those considered critical in managing the scenario.

(d) The table of applicable aeroplane types by generation is provided in Appendix II.

AMC1 ORO.FC.231 point (c)(2) 'Frequency'

The explanation provided for frequency was not transposed from Doc 9995, because the document provides two different definitions in paragraphs 1.2.3 and 1.4.2 of Part II.

The NPA provides a new definition for frequency using the new term 'cycle'. This term is defined in Annex I (Definitions) to the Air OPS Regulation. The proposal reflects the intent of the provision of ICAO in regard to frequency.

AMC2 ORO.FC.231(a) Evidence-based training

GENERATION 4 (JET) — EBT PROGRAMME — TABLE OF ASSESSMENT AND TRAINING TOPICS

The table of assessment and training topics applicable to Generation 4 (Jet) is provided in AMC2 to Appendix II — EBT programme.

AMC3 ORO.FC.231(a) Evidence-based training

GENERATION 3 (JET) — EBT PROGRAMME — TABLE OF ASSESSMENT AND TRAINING TOPICS

The table of assessment and training topics applicable to Generation 3 (Jet) is provided in AMC3 to Appendix II — EBT programme.

AMC4 ORO.FC.231(a) Evidence-based training

GENERATION 3 (TURBOPROP) — EBT PROGRAMME — TABLE OF ASSESSMENT AND TRAINING TOPICS

The table of assessment and training topics applicable to Generation 3 (turboprop) is provided in AMC4 to Appendix II — EBT programme

AMC5 ORO.FC.231(a) Evidence-based training

GENERATION 2 (JET) — EBT PROGRAMME — TABLE OF ASSESSMENT AND TRAINING TOPICS

The table of assessment and training topics applicable to Generation 2 (Jet) is provided in AMC5 to Appendix II — EBT programme.

AMC6 ORO.FC.231(a) Evidence-based training

GENERATION 2 (TURBOPROP) — EBT PROGRAMME — TABLE OF ASSESSMENT AND TRAINING TOPICS

The table of assessment and training topics applicable to Generation 2 (turboprop) is provided in AMC6 to Appendix II — EBT programme.

AMC7 ORO.FC.231(a) Evidence-based training

GENERATION 1 (JET) — EBT PROGRAMME — TABLE OF ASSESSMENT AND TRAINING TOPICS

This AMC addresses the case of turbo-jet aeroplanes of the first generation.

Given the very small number of turbo-jet aeroplanes of the first generation in current use in commercial air transport operations and the lack of appropriate FSTD for recurrent training, it has not been deemed possible to provide a table of assessment and training topics for those aeroplanes and therefore it is not possible to apply EBT.

AMC8 ORO.FC.231(a) Evidence-based training

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) FOR COMPLEX MOTOR-POWERED AEROPLANES WITH A MAXIMUM OPERATIONAL PASSENGER SEATING CONFIGURATION (MOPSC) OF MORE THAN 19

Operators approved for EBT should follow the provisions for upset prevention and recovery training (UPRT) contained in AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'.

AMC8 ORO.FC.231(a)

Although this NPA proposes to exempt operators implementing the EBT programme from ORO.FC.230 and its AMC, the UPRT provisions were reintroduced through this AMC8 ORO.FC.231(a) due to the importance of these provisions.

Doc 9995 has not transposed the latest UPRT requirements of Doc 10011 AN/506 'Manual on aeroplanes upset prevention and recovery training' first edition -2014.

The first phase of RMT.0599 only addresses recurrent training and checking (ORO.FC.230); therefore, the requirements for the Operator Conversion course (ORO.FC.220) are not amended. AMC1 ORO.FC.220&230 is linked to both IRs ORO.FC.220 and ORO.FC.230; therefore, AMC8 ORO.FC.231(a) is just acknowledging the need to fulfil the UPRT provisions.

SPT.012 — Safety promotion to ORO.FC.231(a) EBT programme (UPRT)

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) FOR COMPLEX MOTOR-POWERED AEROPLANES WITH A MAXIMUM OPERATIONAL PASSENGER SEATING CONFIGURATION (MOPSC) OF MORE THAN 19

The purpose of this table is to assist the operator in cross-mapping the requirements of UPRT in in ORO.FC.230 and how this objective is achieved in ORO.FC.231 EBT programmes. The example table is a compilation of the tables proposed by two different operators to their authorities.

AMC1 ORO.FC.220&230 Operator conversion training and checking & recurrent training and checking

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) FOR COMPLEX MOTOR-POWERED AEROPLANES WITH A MAXIMUM OPERATIONAL PASSENGER SEATING CONFIGURATION (MOPSC) OF MORE THAN 19 SEATS

Current provision in AMC1 ORO.FC.220&230	**Means of compliance in ORO.FC.231 – Appendix II**	**Rationale**
Upset prevention training should:		
(1) consist of ground training and flight training in an FSTD or an aeroplane;	Ground training requirements are unchanged. FSTD requirements are included in the EBT programme	Applicability for EBT is determined by aircraft types and variants listed in ORO.FC.231 and only for those for which a suitably qualified FSTD is available
(2) include upset prevention elements from Table 1 for the conversion training course; and	Does not apply to recurrent training and checking	
(3) include upset prevention elements in Table 1 for the recurrent training programme at least every 12 calendar months, such that all the elements are covered over a period not exceeding 3 years.	Equivalent to the 'B' level within the EBT Programme, all items to be completed within the 3-year programme and some elements of UPRT to be included every year.	
(4) All trainings could be done as PF and PM (the ones involved in MANUAL AIRCRAFT CONTROL must be done as PF)		
b. Upset recovery training should:		
(1) consist of ground training and flight training in an FFS qualified for the training task;	Included in the EBT programme as upset recovery. All exercises, but especially the ones in Table 2 **RECOVERY FROM**	

(2) be completed from each seat in which a pilot's duties require him or her to operate; and	**DEVELOPED UPSETS,** must be trained as PF and PM and strongly recommended in manoeuvres TRAINING.	
(3) include the recovery exercises in Table 2 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years.		
(4) All trainings must be done as PF and PM.		

AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'		**Ground training**	**FSTD training**		**ORO.FC.231 EBT phase**	**ORO.FC.231 – Appendix II - Example – suggested relevant EBT 'training topic and description'**
A.	**Aerodynamics**					
1.	General aerodynamic characteristics	•				
2.	Aeroplane certification and limitations	•				
3.	Aerodynamics (high and low altitudes)	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**
					In-seat instruction	**Upset recovery** (recoveries at low and high altitude)
4.	Aeroplane performance (high and low altitudes)	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**
					In-seat instruction	**Upset recovery** (handling at low and high altitude, including degraded control modes)
5.	Angle of attack (AOA) and stall awareness	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**
					In-seat instruction	**Upset recovery** (stall recoveries according to OEM recommendations at low and high altitudes)
6.	Stick shaker or other stall-warning device	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**

AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'		**Ground training**	**FSTD training**		**ORO.FC.231 EBT phase**	**ORO.FC.231 – Appendix II - Example – suggested relevant EBT 'training topic and description'**
	activation (as applicable)				In-seat instruction	**Upset recovery** (stall recoveries according to OEM recommendations at low and high altitudes)
7.	Stick pusher (as applicable)	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**
					In-seat instruction	**Upset recovery** (stall recoveries according to OEM recommendations at low and high altitudes)
8.	Mach effects (if applicable to the aeroplane type)	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**
					In-seat-instruction	**Upset recovery** (handling at low and high altitude, including degraded control modes)
9.	Aeroplane stability	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**
					In-seat instruction	**Upset recovery** (envelope and protections if applicable)
10.	Control surface fundamentals	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**
					In-seat instruction	**Upset recovery** (upset recoveries according to OEM recommendations at low and high altitudes)
11.	Use of trims	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**
					In-seat instruction	**Upset recovery** (upset recoveries according to OEM recommendations at low and high altitudes)
12.	Icing and contamination effects	•	•		Evaluation Scenario-based training	**Adverse weather**

AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'		**Ground training**	**FSTD training**		**ORO.FC.231 EBT phase**	**ORO.FC.231 – Appendix II - Example – suggested relevant EBT 'training topic and description'**
13.	Propeller slipstream (as applicable)	•	•	**or**	Scenario-based training	**Automation management** **Manual aircraft control**
					In-seat instruction	**Upset recovery** (upset recoveries according to OEM recommendations at low and high altitudes)
B.	**Causes of and contributing factors to upsets**					
1.	Environmental	•	•		Evaluation & scenario-based training	**Adverse weather** (Thunderstorm, heavy rain, turbulence, ice build-up to include de-icing issues, as well as high temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios)
2.	Pilot-induced	•	•		In-seat instruction	**Upset recovery** (upset recovery according to OEM recommendations at low and high altitudes) **Monitoring & error detection** (Develop scripted role-play scenarios encompassing the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. The scenarios should be realistic and relevant, and are for the purpose of demonstration and reinforcement of effective flight path monitoring. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training)
3.	Mechanical (aeroplane systems)	•	•	**or**	Evaluation & scenario-based training	**Aircraft malfunctions** (Equivalency of malfunctions-general) Characteristics: Loss of Instrumentation and Degraded Control, both incorporated in the evaluation and scenario-based training phases of an operator's approved

AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'		**Ground training**	**FSTD training**		**ORO.FC.231 EBT phase**	**ORO.FC.231 – Appendix II - Example – suggested relevant EBT 'training topic and description'**
						EBT programme)
C.	**Safety review of accidents and incidents relating to aeroplane upsets**					
1.	Safety review of accidents and incidents relating to aeroplane upsets	•	•	**or**	ALL	Contributing factors to upsets in general should be incorporated with appropriate competency links to relevant training topics within the EBT programme. This can relate to any training topic as appropriate. Examples may be adverse weather, workload distraction pressure, operations- or type-specific, monitoring and error detection.

AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'		**Ground training**	**FSTD training**		**ORO.FC.231 EBT phase**	**ORO.FC.231 –Appendix II - Example — suggested relevant EBT training topic and description**
D.	**G-load awareness and management**					
1.	Positive/negative/increasing/decreasing g-loads	•	•	**or**	Evaluation & scenario-based training	**Manual aircraft control**
					In-seat instruction	**Upset recovery** (upset recoveries according to OEM recommendations at low and high altitudes — where there are indications of g-load, they can be included)
2	Lateral g awareness (sideslip)	•	•	or	Evaluation & scenario-based training	**Upset prevention/recovery** (upset recoveries according to OEM recommendations at low and high altitudes — where there are indications of g-load, they can be included)
					In-seat instruction	

3	g-load management	•	•	or	Evaluation & scenario-based training In-seat instruction	**Upset prevention/recovery** (upset recoveries according to OEM recommendations at low and high altitudes — where there are indications of g-load, they can be included)
E.	**Energy management**					
1.	Kinetic energy vs potential energy vs chemical energy (power)	•	•		Evaluation & scenario-based training	**Manual aircraft control**
F.	**Flight path management**					
1.	Relationship between pitch, power and performance	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control**
2.	Performance and effects of differing power plants (if applicable)	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control**
3.	Manual and automation inputs for guidance and control	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control**
4.	Type-specific characteristics	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control**
5.	Management of go-arounds from various stages during the approach	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control** **Upset prevention**
6.	Automation management	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control**

7.	Proper use of rudder	•	•		Manoeuvres training	**Upset prevention/recovery** This training can be combined with the Table 2 exercises
G.	**Recognition**					
1.	Type-specific examples of physiological, visual and instrument clues during developing and developed upsets	•	•		Manoeuvres training	**Upset prevention/recovery** This training can be combined with the Table 2 exercises
2.	Pitch/power/roll/yaw	•	•		Manoeuvres training	**Upset prevention/recovery** This training can be combined with the Table 2 exercises
3.	Effective scanning (effective monitoring)	•	•		Manoeuvres training	**Upset prevention/recovery** This training can be combined with the Table 2 exercises
4.	Type-specific stall protection systems and cues	•	•		Manoeuvres training	**Upset prevention/recovery** This training can be combined with the Table 2 exercises
5.	Criteria for identifying stalls and upsets	•	•		Manoeuvres training	**Upset prevention/recovery** This training can be combined with the Table 2 exercises
H.	**System malfunction** **(including immediate handling and subsequent operational considerations, as applicable)**					
1.	Flight control defects	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control** **Knowledge**

2.	Engine failure (partial or full)	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control**
3.	Instrument failures	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control**
4.	Loss of reliable airspeed	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control**
5.	Automation failures	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control**
6.	Fly-by-wire protection degradations	•	•		Evaluation & scenario-based training	**Automation management** **Manual aircraft control** **Knowledge**
7.	Stall protection system failures including icing alerting systems	•	•	**or**	Evaluation & scenario-based Training	**Automation management** **Manual aircraft control**
					Manoeuvres training	
I.	**Manual handling skills** **(no autopilot, no autothrust/autothrottle and, where possible, without flight directors)**					
1.	Flight at different speeds, including slow flight, and altitudes within the full normal flight envelope	-	•		Evaluation & scenario-based Training	**Automation management** **Manual aircraft control**
2.	Procedural instrument flying and manoeuvring including instrument departure and arrival	-	•		Evaluation & scenario-based training	**Automation management**

3.	Visual approach	-	•		Evaluation & scenario-based training	**Manual aircraft control**
4.	Go-arounds from various stages during the approach	-	•	**or**	Evaluation & scenario-based training	**Automation management** **Manual aircraft control**
					Manoeuvres training	**Upset prevention**
5.	Steep turns	-	•		Manoeuvres training	

Table 2: Exercises for upset recovery training

A.	**Recovery from developed upsets**					
1.	Timely and appropriate intervention	•	•		Manoeuvres training	**Upset prevention/recovery** Flight crew must be trained as PF and PM and (strongly recommended in manoeuvres TRAINING.
2.	Recovery from stall events in the following configurations: take-off configuration, clean configuration low altitude, clean configuration near maximum operating altitude, and landing configuration during the approach phase.	•	•		Manoeuvres training	**Upset prevention/recovery** Flight crew must be trained as PF and PM and (strongly recommended) in manoeuvres TRAINING. Due to the protections in flight envelope in the 4th generation aircrafts, the take-off upsets can be trained as final APP stall/ Go around
3.	Recovery from nose high at various bank angles	•	•		Manoeuvres training	**Upset prevention/recovery** Flight crew must be trained as PF and PM and (strongly recommended) in manoeuvres TRAINING.
4.	Recovery from nose low at various bank angles	•	•		Manoeuvres training	**Upset prevention/recovery** Flight crew must be trained as PF and PM and strongly recommended in manoeuvres TRAINING.
5.	Consolidated summary of airplane recovery techniques	•	•		Manoeuvres training	**Upset prevention/recovery** Flight crew must be trained as PF and PM and (strongly recommended) in manoeuvres TRAINING.

GM1 ORO.FC.231(a) Evidence-based training

RECURRENT CREW RESOURCE MANAGEMENT (CRM)

Operators implementing EBT in accordance with ORO.FC.231 may demonstrate compliance with ORO.FC.115 by showing how the recurrent CRM requirements are integrated within the operator's EBT programme. An example of how this may be done is provided in the safety promotion material of EASA (e.g. 'Oversight guidance for transition to EBT Implementation').

AMC9 ORO.FC.231(a) Evidence-based training

EBT PROGRAMME — SCENARIO ELEMENTS AND COMPETENCY MAPPING

(a) The operator may develop scenario elements and a competency map that are more relevant to its operation.

(b) When developing scenario elements, the operator should ensure there can be no negative training by asking pilots to induce their own errors.

(c) Competencies mapped are those considered critical in managing the scenario. They are determined according to the following principles:

(1) those competencies considered most critical to the successful management of the defined threat or error; or

(2) those competencies most likely to be linked to the root cause of poor performance in the case of unsuccessful management of a defined threat or error.

(d) The competency map may indicate scenarios or combinations of scenarios for development of particular competencies.

(e) The competency map indicates the most critical competencies suggested by design, but the instructor should always assess all observed competencies.

GM2 ORO.FC.231(a) Evidence-based training

EBT PROGRAMME — COMPETENCY MAP PROCESS

Note 1. The competency map process may be done in teams of instructors. Each instructor should use a scale 1 to 5 for each competency for each scenario element. Then the results are compared and reconciled by a small group of subject matter experts (SMEs).

Note 2. It is always easy to map SAW or KNO as underlying competency, but there are almost invariably other competencies, especially when there is ineffective management, so the intent should be to balance the mapping of SAW or KNO and map the other predominant competencies within the scenario.

AMC9 ORO.FC.231(a) EBT programme and GM2 ORO.FC.231(a)

The purpose of AMC9 is to allow operators to develop their own scenario elements and competency map to better reflect their operational environment, while maintaining the integrity of the EBT programme. Therefore, the training topics and frequency as per the table of assessment and training topics should not be amended by the operator as they derive directly from the 'Data report for Evidence-Based Training'[20] (AMC2

[20] IATA Data Report for Evidence-Based Training August 2014 1st Edition.

to AMC7), while the example scenario elements and their associated competency map may be adapted without using the AltMoC procedure (ORO.GEN.120).

This provision is a transposition of the Doc 9995 Paragraph 1.2.8.

Purpose

To give an indication of the most likely critical competencies required for effective management of the scenario or manoeuvre (considering the management of a threat or combination of threats).

Process

The nominated person for crew training or EBT manager designs one or more example scenario elements, including a description and an outcome. The competency map process is as follows:

The competency map process should be undertaken by subject matter experts (SMEs), who hold or have held a type rating on the aeroplane type. Steps of the competency map process:

1. Using the description of the scenario element, SME instructors determine the competencies most likely to be required for effective management of the scenario element. Generally, about 3 competencies may be selected.

2. SME instructors determine which competencies are most likely to be the root cause(s) of poor performance.

Note 1. This was done in teams of instructors, and it is for mapping purposes only. If there is a desire to be more accurate, ask two groups of instructors to review and suggest the competencies following this methodology. Each instructor should use a scale (for example, 1 to 5) for each competency for each scenario element. The following instructors should perform the same analysis independently, and then the results are compared and reconciled by a small group of SME instructors training.

Note 2. It is always easy to code (SAW) or knowledge (KNO) as underlying, but there are almost invariably other competencies, especially when there is ineffective management, so the intent should be to balance the mapping of SAW or KNO and map the other predominant competencies within the scenario.

Note 3: A similar process is described in 'equivalency of malfunctions' (see Delphi).

AMC9 ORO.FC.231(a) point (e)

The intent of this provision is to highlight that the competency map should not drive the instructor's observations; instead, the instructor should observe the simulator session with a neutral observation, without focusing on the particular competencies mapped and make neutral assessment of all competencies.

For the instructors, the competency map is intended to guide them on what they should expect to observe; however, this does not mean that they should ignore useful learning points for other competencies not mapped within that example scenario.

AMC1 ORO.FC.231(a)(1) Evidence-based training

(a) MINIMUM EXPERIENCE TO SUBSTITUTE ORO.FC.230

The operator should have a minimum experience of 2 years of a mixed EBT programme (mixed EBT implementation). Note: More information on a mixed EBT programme is provided in GM1 ORO.FC.230(a);(b);(f) and in GM2 ORO.FC.A.245.

(b) SUBSTITUTION OF THE REQUIREMENTS OF ORO.FC.230

One complete EBT module substitutes a complete operator proficiency check (OPC).

AMC1 ORO.FC.231(a)(1) point (a)

EASA believes that the transition from legacy training to EBT requires experience in the use of data, competency framework, grading system and instructor concordance assurance. Furthermore, a clear baseline for the training system performance must be established before any alleviation or competency-based licence revalidation can be achieved.

Finally, the competent authority must be able to transition and be able to observe changes in the operator processes that support EBT. This requires time.

AMC1 ORO.FC.231(a)(1) point (b)

This provision is introduced because other parts of the Regulation refer back to 'proficiency check'. For example, in SPA.LVO.120 the low-visibility training provisions have a frequency of 'every operator proficiency check'. Therefore, this provision is needed to indicate that a complete OPC is substituted by a complete EBT module, while an LPC is completed by at least two EBT modules as described in Appendix 10 to Part-FCL.

Furthermore, this provision is introduced in order to provide clarity in FCL.740 point (a)(3)

'A pilot working for a commercial air transport operator approved in accordance with the applicable air operations requirements who has passed the operators proficiency check combined with the proficiency check for the revalidation of the class or type rating shall be exempted from complying with the requirement in (2)'.

The wording 'complete' is to ensure alignment with the current regulation — for example:

'**ORO.FC.230 Recurrent training and checking**

(a) Each flight crew member shall complete recurrent training and checking relevant to the type or variant of aircraft on which they operate.

(b) Operator proficiency check

(1) Each flight crew member shall complete operator proficiency checks as part of the normal crew complement to demonstrate competence in carrying out normal, abnormal and emergency procedures.

[…]'

AMC1 ORO.FC.231(a)(2) Evidence-based training

EBT PROGRAMME FEATURES

An operator's approved EBT programme is one in which:

(a) training is focused on development of competencies, rather than repetition of tasks;

(b) the development of the programme is based on data-driven EBT training topics with a link to the operator's competency framework;

(c) training needs are addressed through training based on underlying competencies;

(d) the programme includes:

(1) an evaluation phase to identify training needs based on competencies and collect population-based data; and

(2) a scenario-based training phase to focus on identified training needs based on competencies rather than repetition of tasks;

(e) the programme includes the conduct of objective observations based on a competency framework, and documents evidence of the behaviour observed;

(f) instructors grade competencies based on observable behaviour (OB);

(g) instructors have sufficient concordance and completed EBT instructor standardisation;

(h) analyses of trainee performance are used to determine competency-based training needs and recognise strengths;

(i) performance is evaluated using a competency-based grading system;

(j) there is a range of teaching styles during simulator training to accommodate trainee learning needs; and

(k) facilitation techniques in debriefing are incorporated.

AMC1 ORO.FC.231(a)(2) point (d)

The evaluation phase is a first look to assess competencies, determined training system effectiveness and indicate individual training needs. On completion of the evaluation phase, any areas that do not meet the minimum competency standard will become the focus of the subsequent training.

AMC1 ORO.FC.231(a)(2) point (g)

EBT instructor standardisation refers to AMC1 ORO.FC.145(a)(2).

AMC1 ORO.FC.231(a)(2) point (k)

Facilitation is a very important part of EBT and therefore the RMG introduced this requirement.

The authority requirements (Part-ARO) developed for the oversight of EBT provide a direct link to the features of the EBT programme. This is an approach similar to that applied for the oversight of CRM (AMC3 ARO.GEN.200(a)(2) provides a reference to CRM and the details such us *'facilitation'* are provided in Part-ORO).

Although CRM in Part-ORO already provides a reference to facilitation, it was introduced here to have all the information in one place.

AMC1 ORO.FC.231(a)(2)(iv) Evidence-based training

PERSONNEL PROVIDING ASSESSMENT AND TRAINING

(a) Ground and refresher training should be provided by suitably qualified personnel.

(b) Flight training should be provided by a flight instructor (FI), type rating instructor (TRI) or class rating instructor (CRI) or, in the case of the FSTD content, a synthetic flight instructor (SFI), providing that the FI, TRI, CRI or SFI satisfies the operator's standardisation, experience and knowledge requirements.

(c) Emergency and safety equipment training should be provided by suitably qualified personnel.

(d) CRM should be provided by EBT instructors or, for the classroom CRM training, one CRM trainer qualified as specified in AMC3 ORO.FC.115.

AMC1 ORO.FC.231(a)(2)(iv)

This provision is transposed from AMC1 ORO.FC.230 point (d) with the necessary amendments. It includes the provision to allow CRM training by EBT instructors as they have completed the EBT instructors standardisation.

This provision must be read in conjunction with ORO.FC.145; therefore, when EBT training is delivered, instructors must be provided with an EBT standardisation course. When other training is provided which is not part of EBT, then only point (b) applies (no combination with ORO.FC.145). A classic example would be 'aerodrome qualification' category C, where a regular instructor would provide such training unless the qualification is delivered in conjunction with the EBT programme.

AMC1 ORO.FC.230 point (d) reads as follows:

'(d) Personnel providing training and checking

Training and checking should be provided by the following personnel:

(1) ground and refresher training by suitably qualified personnel;

(2) flight training by a flight instructor (FI), type rating instructor (TRI) or class rating instructor (CRI) or, in the case of the FSTD content, a synthetic flight instructor (SFI), providing that the FI, TRI, CRI or SFI satisfies the operator's experience and knowledge requirements sufficient to instruct on the items specified in points (a)(1)(i)(A) and (B);

(3) emergency and safety equipment training by suitably qualified personnel;

(4) CRM:

(i) integration of CRM elements into all the phases of the recurrent training by all the personnel conducting recurrent training. The operator should ensure that all personnel conducting recurrent training are suitably qualified to integrate elements of CRM into this training;

(ii) classroom CRM training by at least one CRM trainer, qualified as specified in AMC3 ORO.FC.115 who may be assisted by experts in order to address specific areas'.

GM1 ORO.FC.231(a)(2)(iii)(C) Evidence-based training

EBT PROGRAMME — IN-SEAT INSTRUCTION (ISI)

(a) Effective monitoring and error detection are increasingly important when operating highly-reliable automated aircraft.

(b) In-seat instruction may be used as a valuable tool to maintain and develop training topics, including skills of monitoring, cross-checking, error management, and recognition of mismanaged aircraft state.

GM1 ORO.FC.231(a)(2)(iii)(C)

The explanatory note about ISI is provided for the IR.

This GM clarifies and complements the table of assessment and training topics in regard to ISI.

The RMG and EASA agreed that some elements in the ICAO baseline programme classified as frequency A in ISI and in regard to 'example scenarios' and 'competency map' are incorrect.

In addition, with regard to the training topic 'monitoring, cross checking, error management, and mismanaged aircraft state', Doc 9995 titles the topic as in-seat instruction (ISI). EASA believes there is an inconsistency because ISI is a means to deliver a training topic and not a training topic (see definition of ISI). Therefore, ISI is removed from the training topics. Furthermore, the IATA Data report for EBT does not identify that the means and the only means to deliver such topic (monitoring, cross-checking, error management, mismanaged aircraft state) should be ISI.

It also has to be noted that effective monitoring and error detection as well as error management, mismanaged aircraft state, compliance and cross-checking topics are also embedded in the observance of the behavioural indicators. This way, they are present in all of the EBT FTSD sessions, and any observance of deficiencies should be taken as a learning opportunity, identifying the root cause/contributing factor, and discussed during the subsequent 'facilitated debriefing'.

AMC1 ORO.FC.231(a)(3)(i) Evidence-based training

EBT PROGRAMME — ENROLMENT

(a) Enrolment is when a flight crew member commences the first EBT module.

(b) A flight crew member is considered to be de-enrolled when the operator is no longer responsible for the administrative action for the flight crew's licence revalidation under an approved EBT programme.

(c) Applicants who fail to demonstrate an acceptable level of competence and are de-enrolled from the operator's approved EBT programme should not exercise the privileges of that type rating.

AMC1 ORO.FC.231(a)(3)(i)

This requirement is to maintain the integrity of the EBT programme.

The EBT programme will be the means to revalidate pilots' licence: the revalidation will not be based on a single simulator event, but instead on multiple simulator events. This requires clarity as to when the pilot joined the EBT programme. Normally, this will occur in the operator conversion course where an EBT module (equivalent to an OPC) is planned. This provision also has relevance in the cases of long-term sickness or long leave of absence where the pilot discontinued the training programme.

AMC1 ORO.FC.231(a)(4) Evidence-based training

INSTRUCTOR CONCORDANCE ASSURANCE PROGRAMME

(a) The concordance assurance programme must be able to identify areas of weak concordance in order to drive improvement in the quality and validity of the grading data.

(b) The programme should identify good concordance and address those instructors who do not meet the standards required.

AMC1 ORO.FC.231(a)(4)

Point (a) provides a requirement from a systemic view (e.g. the programme must identify that instructors in a certain fleet have problems to grade non-technical competencies or that one competency is always graded too low. This may occur with 'application of knowledge' where instructors identify all the time 'knowledge' as the root cause for all pilot being deficient when they should not, leading thus to a low grading in 'knowledge').

Point (b) ensures that each individual instructor has the necessary concordance (e.g. my instructor Pepito Perez has problems to rate flight path management manual and therefore this has to be addressed).

GM1 ORO.FC.231(a)(4) Evidence-based training

INSTRUCTOR CONCORDANCE ASSURANCE PROGRAMME

(a) The operator should have instructor concordance as a tool for continuous improvement of the EBT programme.

(b) As the instructor plays a key role in the EBT programme, the quality and validity of the grading data must be guaranteed. Strong concordance ensures integrity of the EBT programme.

(c) Minimum concordance standards are normally set by the operator; however, the competent authority may recommend certain criteria, especially when the revalidation of licences is performed under EBT.

GM1 ORO.FC.231(a)(4)

The use of the wording 'integrity of the EBT programme' in point (b) means that:

1. the programme addresses the shortcomings of pilot performance in competencies; and

2. the training system performance ensures the improvement of the pilot is real.

Safety promotion material — relevant metrics to support the programme

EASA has planned a safety promotion task (SPT.012) to support the implementation of EBT. The following material has been developed to explain the intent of the wording used in the implementing rule 'relevant metrics must be used to support this programme', and other concepts used in this regulatory proposal:

SPT.012 ORO.FC.231(a)(4) — safety promotion task 012 — safety material for EBT — CONCORDANCE

RELEVANT METRICS MUST BE USED TO SUPPORT THIS PROGRAMME;

Concordance must be analysed independently per competency, and, if possible, segregated between different levels of competency assessment. This serves to identify whether concordance varies between competencies or between levels of assessment, providing guidance that is more accurate in order to improve concordance. Assessing concordance between instructors should make use of statistical methods, gauging both individual instructor metrics as well as group instructor metrics.

Different statistics may be appropriate for different types of measurement. Some options are: joint-probability of agreement, Cohen's kappa, Scott's pi and the related Fleiss' kappa, inter-rater correlation, concordance correlation coefficient, and intra-class correlation.

Individual assessments should assess to what extent an individual aligns with predefined standards for the reference material (e.g. correlation analysis) and to what extent the individual's ability to assess is improving or deteriorating over time (e.g. compared to previous concordance assessments). Group statistics may make use of group agreement (e.g. variance assessment) and group alignment (e.g. group averages compared to standards for the reference material). A high variance implies that a large number of instructors is not rating according to the standards set, and warrants investigation. Individual instructors that exhibit a large deviation from standards, consistent positive/negative bias or poor improvement/deterioration of their concordance with standards, must be considered for focused instructor training before re-engaged in EBT assessments. However, the investigation may determine that although an individual instructor exhibits a large deviation, the reason is not that this instructor is not standardised. The reason could be that the instructor is delivering a

different programme (e.g. always delivering a harder-than-usual EBT programme in preparation of command upgrades) or that the instructor is fundamentally conduct training to a specific group of pilots (e.g. those that require remedial training).

Finally, when subcontracted instructors are used, the standardisation provided to them should be particularly considered. This group of instructors may not acquire the required concordance initially. In order to maintain the data integrity for instructor concordance, the operator should maintain data traceability for each group of instructors (airline and subcontracted) as the root cause for the good or bad performance of each group may be different as the background and environment of each group is different. Same principles may be necessary to be applied in other groups (e.g. mature instructors vs young instructors).

CONTINUOUS IMPROVEMENT OF CONCORDANCE

Metrics of instructor concordance must drive specific interventions in instructor training, the assessment framework used and/or the reference material developed. Instructor concordance must be submitted to a process of continuous improvement in order to safeguard against standards drift and concordance degradation. For this reason, these requirements do not specify statistical thresholds of minimum variance of concordance; however, improvement in concordance metrics should indicate whether the operator's concordance programme is effective. Over time, as concordance improves, so will the reliability of EBT data.

CONCORDANCE ASSURANCE AND EBT INSTRUCTOR RECURRENT STANDARDISATION (SEE GM2 ORO.FC.145(a)(3) point (c))

Instructor concordance may be verified by controlling the content to be assessed (reference material) such as flight recordings, scripted videos and/or case studies.

Within each 3-year period, reference material should address every competency at a minimum of two levels per competency, such that concordance is assessed across the wide range of competency assessment that instructor must be proficient in. Reference materials may not be presented to the same instructor within 3 years in order to maintain true assessment of an instructor's ability to assess accurately. Operators should strive to include a broad diversity of flight phases, situations and behaviours when developing reference material, and preferably integrate their own operations and SOPs.

Reference material should be assessed using the same assessment framework used for actual EBT training delivery, and preferably assess not only the competency observation, but also the ability to assess root causes and identify subsequent training needs. Reference material should be supplemented with 'correct' ratings (i.e. answer sheet), such that instructor assessment can be compared against agreed-upon standards. The answer sheet should be composed by a core group of EBT instructors; preferably, rotating members to prevent standards drift and/or lasting bias.

Instructor concordance may not be inferred from actual assessment data collected from EBT sessions when these sessions are not equivalent in terms of difficulty, competency distributions, etc. because this may not guarantee equal reference material between instructors.

INSTRUCTOR CONCORDANCE

The development of strong instructor concordance (inter-rater reliability) is critical for the validity of the EBT data collection. In a norm-referenced system, the operator must safeguard concordance between instructors. Minimum concordance standards are normally set by the operator; however, the competent authority may recommend certain criteria, especially when the revalidation of licences is performed under EBT.

Distribution of grades across the instructor community for the modules conducted should be recorded. This recording may be accessible to the instructors, normally a posteriori. Some airlines underweight the grading performed by an instructor with poor concordance to have accurate competency data. Underweight may only be needed in rare cases during mixed EBT; however, it should not happen during EBT baseline.

However, this standard needs to be easy for the instructors allowing them to focus on the observation of the students and to provide training to them rather than crosschecking complicated criteria.

AMC1 ORO.FC.231(a)(5) Evidence-based training

CONTINGENCY PROCEDURES FOR UNFORESEEN FACTORS WHICH MAY AFFECT THE DELIVERY OF THE EBT PROGRAMME

(a) The operator should detail in the EBT programme the contingency procedures in the event unforeseen factors occur which may affect the delivery of the operator's approved EBT programme.

(b) In case of unforeseen interruption of a module at any point, the missing parts of the module should be rescheduled.

(1) The applicant may continue line flying until the expiry of the validity period unless the performance observed was below the minimum acceptable level.

(2) If the interruption results in an instructor change, the operator must ensure that the instructor completing the module is provided with the details of the performance of the pilots.

(c) In case the pilot misses modules and the pilot does not meet the requirements of recent experience (FCL.060):

(1) when the pilot misses one module and has not completed 2 modules in the last 12 months, the evaluation phase of the missing module should be rescheduled before the pilot can resume line operations, and the manoeuvres and scenario-based training phases should be completed 30 days after the evaluation phase or before the expiry date whichever occurs first.

(2) When the pilot misses one module in the preceding 12 months but the pilot's rating is expired by less than 3 months, the missing module should be rescheduled before the pilot can resume line operations.

(3) When the pilot misses one module in the preceding 12 months but the pilot's rating is expired by longer than 3 months but shorter than 1 year, the missing module should be rescheduled using EBT instructor (s) with examiner privileges before the pilot can resume line operations.

(4) When the pilot misses two modules and the pilot rating is valid:

(i) one module should be rescheduled before line operations using EBT instructor(s) with examiner privileges; and

(ii) the training topics B and C of the second module should be rescheduled before the expiry date.

In such case, the 3-month separation requirement between modules may not apply.

(5) When the pilot misses two modules and the pilot's rating is expired by less than 1 year:

(i) one module should be rescheduled using EBT instructor(s) with examiner privileges; and

(ii) the training topics B and C of the second module before he/she can resume line operations.

In such case, the period of 3-month separation between modules may not apply.

(6) If the amount of time lapsed since the expiry of the rating is more than 1 year the pilot is de-enrolled AMC1 FCL.625(a) 'IR — Validity, revalidation and renewal' and AMC1 FCL.740(b)(1) 'Validity and renewal of class and type ratings' applies.

(d) In the case of other situations not covered by points (b) or (c), point (a) applies.

AMC1 ORO.FC.231(a)(5) point (b)(1) wording 'unless the performance observed was below the minimum acceptable level'

The intent of the RMG is to allow line operations as long as the observed performance of the pilot was acceptable, provided the pilot was still in the validity period of the licence. However, if an unsafe performance was observed prior to an interruption, the candidate should not continue line operations until remedial training has been performed.

There is a similar provision in Part-FCL where pilots shall not exercise the privileges of their licence if the LPC was failed even if their licence is still within the validity period.

Description of 'performance observed below the minimum acceptable level' is provided in GM1 ORO.FC.231(d)(1) on GRADING SYSTEM – VENN.

GM1 ORO.FC.231(a)(5) Evidence-based training

EBT PROGRAMME — CONTINGENCY PROCEDURES — LICENCE REVALIDATION

(a) The renewal of licences in EBT follows the Annex I (Part-FCL) to the Aircrew Regulation provisions 'Renewal of class and type ratings' (IRs and AMC) and it is complemented with the provisions covered in AMC1 ORO.FC.231(a)(5) for 'contingency procedures for unforeseen factors'. The ATO or AOC will determine the amount of training following Part-FCL; however, as EBT combines assessment and training, the following guidance is applicable:

(1) Expiry shorter than 3 months may not require additional training in Part-FCL. In EBT the missing module is rescheduled with an EBT instructor. Following that, the nominated person for crew training (or the deputy(ies)) for the type rating may renew the licence without extra training, as the EBT programme is now completed (at least 2 modules in the last 12 months).

(2) In Part-FCL, when the expiry is longer than 3 months but shorter than 1 year, there need to be two training sessions. In EBT, there are be two cases:

(i) One module is missing: the applicant must complete the missing module (2 simulator sessions) before line operations. Following that, the nominated person for crew training (or the deputy(ies)) for the type rating may renew the licence in accordance with Appendix 10 as the EBT programme is now completed (2 modules in the last 12 months).

(ii) Two modules are missing: the applicant must complete one module (2 simulator sessions) and the training topics B and C (extra simulator session) with a total of 3 simulator sessions. Training data is gathered in a short time period; therefore, an EBT instructor with examiner privilege is introduced to ensure the proficiency of the pilot.

(b) In case of an expiry longer than 1 year, the requirements of (Annex I) Part-FCL will be followed and the proficiency checks will be performed in accordance with Appendix 9 as the EBT system may not have sufficient training data for the pilot:

(1) Expiry longer than 1 year but shorter than 3 years: a minimum of three training sessions in which the most important malfunctions in the available system are covered plus a proficiency check in accordance with Appendix 9 to renew the licence.

(2) Expiry longer than 3 years: the applicant should again undergo the training for the initial issue of the rating.

GM1 ORO.FC.231(a)(5)

The GM was drafted following AMC1 ORO.FC.231(a)(5) as proposed in this NPA and the existing AMC1 FCL.740(b)(1) 'Validity and renewal of class and type ratings'. AMC1 FCL.625(c) IR — 'Validity, revalidation and renewal' was also considered.

(b) COMPETENCY FRAMEWORKS

The operator shall use a competency framework for all aspects of assessment and training within an approved EBT programme. The competency framework shall:

(3) include observable behaviours required for safe, effective and efficient operations; and

(4) be comprehensive, accurate, and usable.

ORO.FC.231(b)

Why is there a need to require a competency framework?

Mastering a finite number of competencies should allow a pilot to manage situations in flight. The main benefit of a competency-based approach to training is its potential to encourage and enable individual aviation professionals to reach their highest level of operational capability while ensuring a basic level of competence as a minimum standard.

PRINCIPLES OF A COMPETENCY FRAMEWORK

— The purpose of competency-based assessment and training is to assess and train the capacity of an individual to perform at the standard expected in an organisational workplace.

— There is an explicit link between competencies and training, required performance on the job, and assessment.

— Competencies are formulated in a way that ensures they can be developed, observed and assessed consistently in a wide variety of work contexts for a given aviation profession or role.

— Each stakeholder in the process including the trainee, instructor, training organisation, operator and regulator has a common understanding of the competency requirements.

— Clear performance criteria are established for assessing competence.

— Evidence of competent performance is valid and reliable.

— Instructors' and assessors' judgments are calibrated to achieve a high degree of inter-rater reliability.

— Assessment of competencies is based on multiple observations across multiple contexts.

— Relevant competency framework is clearly defined for a particular role.

— To be considered competent, an individual demonstrates an integrated performance of all the required competencies to a specified standard.

ASSUMPTIONS

— All tasks performed by aviation professionals require the application of a relevant set of competencies.

— Aviation professionals apply the same set of competencies in a given role throughout their career but with different degrees of performance

AMC1 ORO.FC.231(b) Evidence-based training

COMPETENCY FRAMEWORK — GENERAL

(a) The competency framework should include at least the following elements:

(1) competencies; and

(2) associated observable behaviours.

RECOMMENDED COMPETENCY FRAMEWORK

(b) The operator should include in their approved EBT programme a competency framework that, as a minimum, exhibits the following competencies:

Application of procedures (APK)

Competency description
Identifies and applies procedures in accordance with published operating instructions and applicable regulations, using the appropriate knowledge.

Observable behaviour
Identifies the source of operating instructions.
Follows SOPs unless a higher degree of safety dictates an appropriate deviation.
Identifies and follows all operating instructions in a timely manner.
Correctly operates aircraft systems and associated equipment.
Complies with applicable regulations.
Applies relevant procedural knowledge.

Communication (COM)

Competency description
Demonstrates effective oral, non-verbal and written communications, in normal and non-normal situations.

Observable behaviour
Ensures the recipient is ready and able to receive the information.
Selects appropriately what, when, how and with whom to communicate.
Conveys messages clearly, accurately and concisely.

Confirms that the recipient correctly understands important information.
Listens actively and demonstrates understanding when receiving information.
Asks relevant and effective questions.
Adheres to standard radiotelephone phraseology and procedures.
Accurately reads and interprets required company and flight documentation.
Accurately reads, interprets, constructs and responds to datalink messages.
Completes accurate reports as required by operating procedures.
Correctly interprets non-verbal communication.
Uses eye contact, body movement and gestures that are consistent with and support verbal messages.

Flight path management — automation (FPA)

Competency description
Controls the aircraft flight path through automation, including appropriate use of a flight management system (s) and guidance.

Observable behaviour
Controls the aircraft using automation with accuracy and smoothness as appropriate to the situation.
Detects deviations from the desired aircraft trajectory and takes appropriate action.
Contains the aircraft within the normal flight envelope.
Manages the flight path to achieve optimum operational performance.
Maintains the desired flight path during flight using automation whilst managing other tasks and distractions.
Selects appropriate level and mode of automation in a timely manner considering phase of flight and workload.
Effectively monitors automation, including engagement and automatic mode transitions.

Flight path management — manual control (FPM)

Competency description
Controls the aircraft flight path through manual flight, including appropriate use of a flight management system (s) and flight guidance systems.

Observable behaviour
Controls the aircraft manually with accuracy and smoothness as appropriate to the situation.
Detects deviations from the desired aircraft trajectory and takes appropriate action.
Contains the aircraft within the normal flight envelope.
Controls the aircraft safely using only the relationship between aircraft attitude, speed and thrust.
Manages the flight path to achieve optimum operational performance.
Maintains the desired flight path during manual flight whilst managing other tasks and distractions.
Selects appropriate level and mode of flight guidance systems in a timely manner considering phase of flight and workload.

Effectively monitors flight guidance systems including engagement and automatic mode transitions.

Application of knowledge (KNO)

Competency description
Demonstrates knowledge and understanding of relevant information, operating instructions, aircraft systems and the operating environment.

Demonstrates practical and applicable knowledge of limitations and systems and their interaction.
Demonstrates required knowledge of published operating instructions.
Demonstrates knowledge of the physical environment, the air traffic environment including routings, weather, airports and the operational infrastructure.
Demonstrates appropriate knowledge of applicable legislation.
Knows where to source required information.
Demonstrates a positive interest in acquiring knowledge.
Is able to apply knowledge effectively.

Leadership and teamwork (LTW)

Competency description
Demonstrates effective leadership and team working.

Observable behaviour
Understands and agrees with the crew's roles and objectives.
Creates an atmosphere of open communication and encourages team participation.
Uses initiative and gives directions when required.
Admits mistakes and takes responsibility.
Anticipates and responds appropriately to other crew members' needs.
Carries out instructions when directed.
Communicates relevant concerns and intentions.
Gives and receives feedback constructively.
Confidently intervenes when important for safety.
Demonstrates empathy and shows respect and tolerance for other people.
Engages others in planning and allocates activities fairly and appropriately according to abilities.
Addresses and resolves conflicts and disagreements in a constructive manner.
Projects self-control in all situations.

Problem-solving and decision-making (PSD)

Competency description
Accurately identifies risks and resolves problems. Uses the appropriate decision-making processes.

Observable behaviour
Seeks accurate and adequate information from appropriate sources.
Identifies and verifies what and why things have gone wrong.

Employ(s) proper problem-solving strategies.
Perseveres in working through problems without reducing safety.
Uses appropriate and timely decision-making processes.
Sets priorities appropriately.
Identifies and considers options effectively.
Monitors, reviews, and adapts decisions as required.
Identifies and manages risks effectively.
Improvises when faced with unforeseeable circumstances to achieve the safest outcome.

Situation awareness (SAW)

Competency description
Perceives and comprehends all of the relevant information available and anticipates what could happen that may affect the operation.

Observable behaviour
Identifies and assesses accurately the state of the aircraft and its systems.
Identifies and assesses accurately the aircraft's vertical and lateral position, and its anticipated flight path.
Identifies and assesses accurately the general environment as it may affect the operation.
Keeps track of time and fuel.
Maintains awareness of the people involved in or affected by the operation and their capacity to perform as expected.
Anticipates accurately what could happen, plans and stays ahead of the situation.
Develops effective contingency plans based upon potential threats.
Identifies and manages threats to the safety of the aircraft and people.
Recognises and effectively responds to indications of reduced situation awareness.

Workload management (WLM)

Competency description
Manages available resources efficiently to prioritise and perform tasks in a timely manner under all circumstances.

Observable behaviour
Maintains self-control in all situations.
Plans, prioritises and schedules tasks effectively.
Manages time efficiently when carrying out tasks.
Offers and accepts assistance, delegates when necessary and asks for help early.
Reviews, monitors and cross-checks actions conscientiously.
Verifies that tasks are completed to the expected outcome.
Manages and recovers from interruptions, distractions, variations and failures effectively.

AMC1 ORO.FC.231(b)

This is an example of a competency framework that was developed for EBT by a large expert industry working group based upon systems tested and validated in operational use today. The availability of a worldwide-harmonised framework of competencies is of great value. An identical competency framework can be applied to both baseline and enhanced EBT programmes.

Pilot core competencies were developed to support the EBT concept adopted by ICAO in 2013. An international industry working group was established in 2007. The EBT and Instructor Qualification group began work in early 2008. The Group was mostly comprised of expert practitioners in pilot training from almost 50 organisations worldwide. The group met every 2 months over a period from early 2008 until end of 2011.

The group decided that the first and critical step in the development of EBT was to identify a complete framework of performance indicators, in the form of observable actions or behaviours, usable and relevant across the complete spectrum of pilot training for CAT operations. These competencies and performance indicators combine the technical and non-technical (CRM) knowledge, skills and attitudes that have been considered essential for pilots to operate aircraft safely, efficiently and effectively. The development of pilot core competencies was considered as the first important step towards the creation of the 'total systems approach to training'.

After extensive consultation and discussion, the framework of behaviours was developed, divided into 8 core competencies, each with observable performance indicators. The competencies were published in Doc 9995. The core competencies are primarily an assessment tool, offering a different approach from the evaluation of outcomes and manoeuvres, the purpose being to understand and remediate root causes of performance difficulties, rather than addressing only the symptoms.

The purpose of these performance indicators is to underpin the creation of performance expectations at all stages of training in a pilot's career. To complete the picture, a fair and usable system of grading performance is also required, and instructors using it should be trained and assessed themselves as competent in its use.

The publication of Doc 9995 limits the applicability of EBT to recurrent training conducted in a qualified FSTD, but it has been always anticipated that the example framework of core competencies agreed should be applied to all aspects of initial and recurrent pilot training for CAT operations, including pilot selection and instructor pre-selection.

A number of 'behavioural marker' systems were considered, and the group chose the most relevant and appropriate, and developed them further to include technical competencies and associated performance indicators.

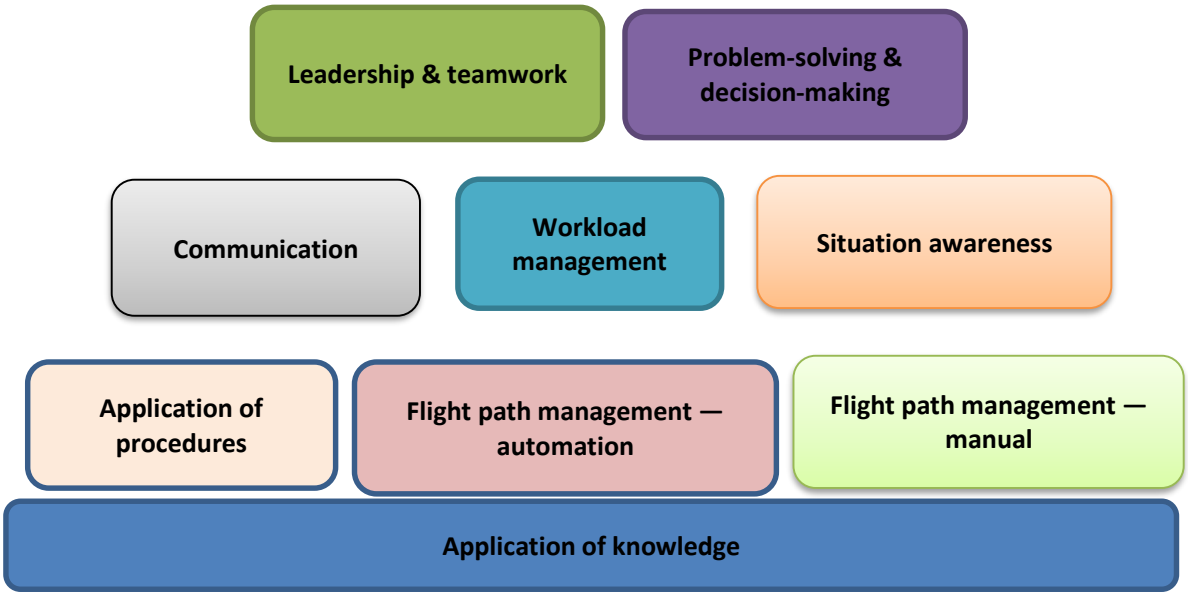
The behavioural marker system was the one published by the UK CAA in CAP 737 in 2005, in service across a wide range of cultures since 2002. The system has been validated through operational use.

By far the most significant challenge for operators using these competency frameworks is the creation of an effective performance assessment and grading system, and subsequently the need for instructor training and the assurance of instructor concordance.

Finally, the competency framework of EBT provides a good process for the training needs analysis. The competencies in EBT provide a hierarchy and they are linked between them. There are some competencies that the pilot cannot reach without having first other ones. For example, in order for the pilot to have a strong competency in 'leadership and teamwork', it is necessary to be good at 'communications', and probably good at 'workload management'. At the same time, in order to be good at 'workload management', being good at 'flight

path management — automation' or 'flight path management — manual', depending on the scenario, is as well necessary.

An example of a possible route cause analysis is shown below.



AMC1 ORO.FC.231(b)

ICAO will amend the EBT competency framework provided in Doc 9995. The new model is based on the ICAO competency framework for aeroplane pilots contained in Part II, Section 1, Chapter 1 of PANS-TRG (it may be approved in 2019 and it may be applicable in November 2020). The proposed model may be discussed by the review group and EASA may decide to include it in the final version of the EBT regulation. In the meantime, this model is included in the explanatory note for stakeholders' awareness. See below the new competency map:

ICAO competency	*Description*	*Observable behaviour*
Application of procedures and compliance with regulations	Identifies and applies appropriate procedures in accordance with published operating instructions and applicable regulations.	— Identifies where to find procedures and regulations — Applies relevant operating instructions, procedures and techniques in a timely manner — Follows SOPs unless a higher degree of safety dictates an appropriate deviation — Operates aeroplane systems and associated equipment correctly — Monitors aircraft systems status — Complies with applicable regulations. — Applies relevant procedural knowledge

ICAO competency	*Description*	*Observable behaviour*
Communication	Communicates through appropriate means in the operational environment, in both normal and non-normal situations	— Determines that the recipient is ready and able to receive information — Selects appropriately what, when, how and with whom to communicate — Conveys messages clearly, accurately and concisely — Confirms that the recipient demonstrates understanding of important information — Listens actively and demonstrates understanding when receiving information — Asks relevant and effective questions — Uses appropriate escalation in communication to resolve identified deviations — Uses and interprets non-verbal communication in a manner appropriate to the organisational and social culture — Adheres to standard radiotelephone phraseology and procedures — Accurately reads, interprets, constructs and responds to datalink messages

ICAO competency	*Description*	*Observable behaviour*
Flight Path Management, Automation	Controls the flight path through automation.	— Uses appropriate flight management, guidance systems and automation, as installed and applicable to the conditions (see Part I, Chapter 1, definitions) — Monitors and detects deviations from the intended flight path and takes appropriate action — Manages the flight path to achieve optimum operational performance — Maintains the intended flight path during flight using automation whilst managing other tasks and distractions — Selects appropriate level and mode of automation in a timely manner considering phase of flight and workload — Effectively monitors automation, including engagement and automatic mode transitions
Leadership and Teamwork	Influences others to contribute to a shared purpose. Collaborates to accomplish the goals of the team.	— Encourages team participation and open communication — Demonstrates initiative and provides direction when required — Engages others in planning — Considers inputs from others — Gives and receives feedback constructively — Addresses and resolves conflicts and disagreements in a constructive manner — Exercises decisive leadership when required — Accepts responsibility for decisions and actions — Carries out instructions when directed — Applies effective intervention strategies to resolve identified deviations — Manages cultural and language challenges, as applicable

ICAO competency	*Description*	*Observable behaviour*
Problem Solving and Decision Making	Identifies precursors, mitigates problems; and makes decisions	— Identifies, assesses and manages threats and errors in a timely manner — Seeks accurate and adequate information from appropriate sources — Identifies and verifies what and why things have gone wrong, if appropriate — Perseveres in working through problems whilst prioritizing safety — Identifies and considers appropriate options — Applies appropriate and timely decision-making techniques — Monitors, reviews and adapts decisions as required — Adapts when faced with situations where no guidance or procedure exists — Demonstrates resilience when encountering an unexpected event
Situation awareness and management of information	Perceives, comprehends and manages information and anticipates its effect on the operation.	— Monitors and assesses the state of the aeroplane and its systems — Monitors and assesses the aeroplane's energy state, and its anticipated flight path. — Monitors and assesses the general environment as it may affect the operation — Validates the accuracy of information and checks for gross errors — Maintains awareness of the people involved in or affected by the operation and their capacity to perform as expected — Develops effective contingency plans based upon potential risks associated with threats and errors — Responds to indications of reduced situation awareness

ICAO competency	*Description*	*Observable behaviour*
Workload Management	Maintain available workload capacity by prioritizing and distributing tasks using appropriate resources	— Exercises self-control in all situations — Plans, prioritizes and schedules appropriate tasks effectively — Manages time efficiently when carrying out tasks — Offers and gives assistance — Delegates tasks — Seeks and accepts assistance, when appropriate — Monitors, reviews and cross-checks actions conscientiously — Verifies that tasks are completed to the expected outcome — Manages and recovers from interruptions, distractions, variations and failures effectively while performing tasks
Application of Knowledge	Demonstrates knowledge and understanding of relevant information, operating instructions, aircraft systems and the operating environment.	— Demonstrates practical and applicable knowledge of limitations and systems and their interaction. — Demonstrates required knowledge of published operating instructions. — Demonstrates knowledge of the physical environment, the air traffic environment including routings, weather, airports and the operational infrastructure. — Demonstrates appropriate knowledge of applicable legislation. — Knows where to source required information. — Demonstrates a positive interest in acquiring knowledge. — Is able to apply knowledge effectively.

AMC2 ORO.FC.231(b) Evidence-based training

ALTERNATIVE COMPETENCY FRAMEWORKS

(a) An operator seeking to develop an alternative competency framework under ORO.GEN.120 should:

(1) identify positive behaviours and use language that avoids ambiguity; and

(2) demonstrate equivalence to the competency framework in AMC1 ORO.FC.231(g).

(b) In order to demonstrate equivalence, the operator should map the competencies and observable behaviours to the recommended competency framework.

(c) When the operator is translating AMC1 ORO.FC.231(g) into its common language, the application of ORO.GEN.120 may not be necessary. The translation may not be literal.

AMC2 ORO.FC.231(b) Alternative competency frameworks

EBT and competency-based training are based on the concept that competencies are transferable. In the design of a competency-based assessment and training programme, a limited number of competencies are defined.

If an airline decides to add or remove a competency, there should be a clear and justifiable reason to do so.

Operators may develop suitable equivalent frameworks to meet their needs.

— A limited number of competencies involving knowledge, skills and attitudes should be defined.

— These defined competencies should cover more than a single situation and be consistently observable across a wide variety of contexts.

Short summary on how to develop an operator 'COMPETENCY FRAMEWORK' structure

A rapid analysis of the training need and the local environment should answer the following questions:

— What is to be trained?

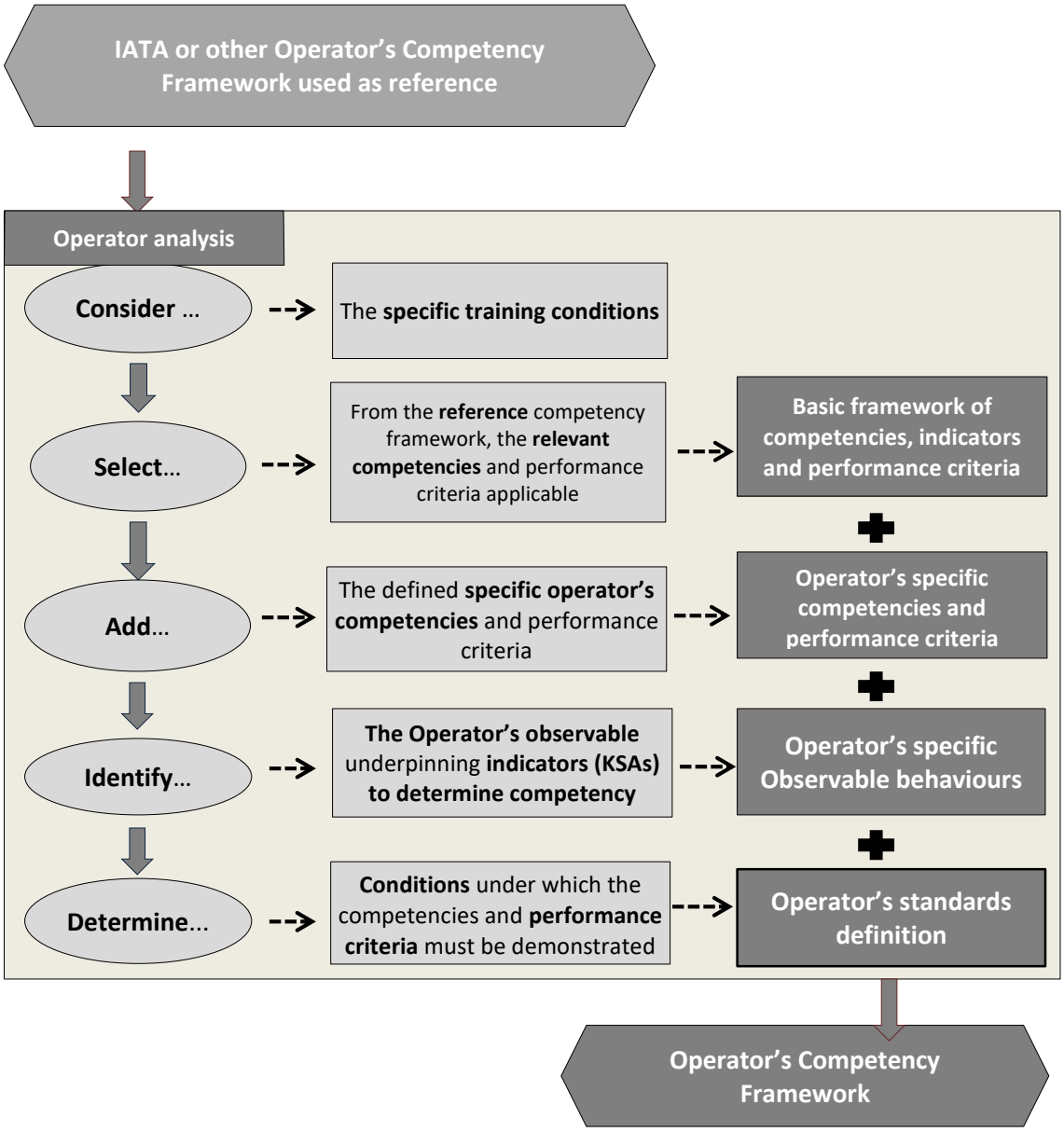
— What tasks does the trainee need to be able to perform by the end of the training?

— What regulatory, technical and operational knowledge is required?

— What skills are required?

— What attitudes are required?

— What are the specific conditions required for performance (i.e. level of complexity, specific requirements)?



AMC2 ORO.FC.231(b) point (c)

The use of the term 'common language' refers to the common language used by the operator. An IR for such requirement is provided in the Air OPS Regulation Annex IV.

'CAT.GEN.MPA.120 Common language

The operator shall ensure that all crew members can communicate with each other in a common language'.

GM1 to AMC2 ORO.FC.231(b) Evidence-based training

ALTERNATIVE COMPETENCY FRAMEWORKS/POSITIVE OBSERVABLE BEHAVIOUR

(a) OBs should describe behaviours that contribute to positive pilot performance.

(b) The indicators should clearly describe how a competency is expected to be demonstrated by a crew member in the context of the operational environment.

(c) TRAINING SYSTEM PERFORMANCE

(1) The EBT system performance shall be measured and evaluated through a feedback system in order to:

(iii) validate and refine the operator's approved EBT programme; and

(iv) ascertain that the operator's approved EBT programme develops pilot competencies.

(2) The feedback system shall be included in the operator's management system.

ORO.FC.231(c)

This requirement is transposed from Doc 9995 paragraphs 3.6.6 and 3.6.7 with the necessary amendments into the European regulatory system.

'3.6.6 Quality management. The training system performance should be measured and evaluated in respect of the organizational objectives. Monitoring should include a feedback system to identify trends and ensure corrective action where necessary. The quality system of the operator or training organization, as defined in Doc 9841, the Manual on the Approval of Training Organizations, should monitor alignment with the EBT assessment and training guidelines recommended in this manual.

3.6.7 Feedback system. For the purpose of collecting data from an EBT programme, and making adjustments and continuous improvement to the training system, an operator should implement a performance feedback system utilising defined metrics (see paragraph 5.3)'.

AMC1 ORO.FC.231(c) Evidence-based training

TRAINING SYSTEM PERFORMANCE — FEEDBACK SYSTEM

(a) The feedback system should use defined metrics to collect data in order to:

(1) identify trends and ensure corrective action where necessary;

(2) identify collective training needs;

(3) review, adjust and continuously improve the training programme;

(4) further develop the training system; and

(5) standardise the instructors.

(b) Alternatively, where a system for the measurement of training system performance already exists, the operator may use it and, if necessary, adapt it to meet the demands of EBT, for example in measuring performance throughout the range of competencies.

AMC1 ORO.FC.231(c) point (a)

This requirement is transposed from Doc 9995 paragraph 4.1.2 (d) and (e) with the necessary amendments to incorporate the ICAO proposal into the European regulatory framework.

'4.1.2 There are various mechanisms for the implementation of EBT, which should be conducted in close consultation with the CAA and which include:

a) the definition of an implementation and operations plan;

b) the adaptation of the programmes defined in Appendices 2 to 7 to Part II according to the generation of aircraft (fleet) and type of operation for the operator;

c) the EBT programme implementation (an initial limited trial phase should be considered by the CAA);

d) the review of training effectiveness upon receipt of sufficient training system data; and

e) the adjustment and continuous improvement of the training programme according to the training system feedback.'

AMC2 ORO.FC.231(c) Evidence-based training

DATA PROTECTION — FEEDBACK SYSTEM — GRADING SYSTEM

(a) The data access and security policy should restrict information access to authorised persons.

(b) The procedure to prevent disclosure of crew identity should be written in a document, which should be signed by all parties involved (airline management and flight crew member representatives nominated either by the union or the flight crew themselves).

AMC2 ORO.FC.231(c)

EBT will collect an increased training data, however some provision must be made to protect individual data (data protection).

ORO.AOC.130 'Flight data monitoring – aeroplanes' already requires a system that provides such kind of protection (individual data protection) and at the same time it provides good information to operators and authorities. The details of such protection and scope is provided in AMC1 ORO.AOC.130 points (g) and (k).

Point (a) of this AMC is transposed from AMC1 ORO.AOC.130 point (g).

Point (b) of this AMC is transposed from AMC1 ORO.FC.130 point (k); however, some of the details were transferred to GM2 ORO.FC.231(b).

This provision must be read in conjunction with ORO.GEN.140 the Air OPS Regulation where the competent authority has access to all records:

'ORO.GEN.140 Access

(a) For the purpose of determining compliance with the relevant requirements of Regulation (EC) No 216/2008 and its Implementing Rules, the operator shall grant access at any time to any facility, aircraft, document, records, data, procedures or any other material relevant to its activity subject to certification, SPO authorisation or declaration, whether it is contracted or not, to any person authorised by one of the following authorities: (…)'

GM1 ORO.FC.231(c) Evidence-based training

TRAINING SYSTEM PERFORMANCE - FEEDBACK SYSTEM — METRICS

(a) Training metrics within the feedback system are a valuable source of data. Typical metrics may include but are not limited to:

(1) differences in success rates between aircraft types and training topics;

(2) distribution of errors for various training scenarios and aircraft types;

(3) distribution of level of performance within the range of competencies;

(4) the trainee's feedback, which provides a different perspective as to the quality and effectiveness of the training product; and

(5) instructor concordance assurance: this system is important to measure the effectiveness of the instructor calibration process. However, it is essential to stress that the purpose of this system is not to spy on instructors or to pressure individuals to change their grading.

(b) Training metrics are an invaluable component in supporting an EBT programme but they must be placed in the context of operational data, because only the latter can justify the importance of a specific skill within the real operation.

GM1 ORO.FC.231(c)

This requirement is transposed from Doc 9995 paragraph 5.3.1 with the necessary amendments to incorporate the ICAO proposal into the European regulatory framework:

'5.3.1 Training metrics. The 'inner loop' within the training function is a valuable source of data. Taking full advantage of such data requires robust and well-calibrated training metrics. Typical metrics include:

a) differences in success rates between aircraft types and training topics;

b) distribution of errors for various training scenarios and aircraft types;

c) skill retention capability versus skill type;

d) the trainee's feedback, which provides a different perspective as to the quality and effectiveness of the training product; and

e) instructor tracking system: this system is important to measure the effectiveness of the instructor calibration process. However, it is essential to impress that the purpose of this system is not to spy on instructors or to pressure individuals to change their grading'.

GM1 ORO.FC.231(c) point (b)

This provision is a transposition from the Doc 9995 paragraph 5.3.2:

'5.3.2 Training metrics are an invaluable component in supporting an EBT programme but they must be placed in the context of operational data, because only the latter can justify the importance of a specific skill within the real operation'.

Furthermore, operational data is already required in ORO.AOC.130 and ORO.GEN.200 of the Air OPS Regulation.

GM2 ORO.FC.231(c) Evidence-based training

DATA PROTECTION — FEEDBACK SYSTEM — GRADING SYSTEM

The procedure to prevent disclosure of crew identity may, as a minimum, define:

(a) a data access and security policy that may restrict access to information to specifically authorised persons identified by their position. The required authorised person(s) does (do) not necessarily need to be the nominated person for crew training (or their deputy(ies)), but could be the EBT programme manager or a third party mutually acceptable to unions or staff and management. (Note: access to the last 12 months training data is required for the examiner that will revalidate the pilot licence);

(b) the identified data retention policy and accountability, including the measures taken to ensure the security of the data;

(c) the method to obtain de-identified crew feedback on those occasions that require specific follow-up;

(d) the conditions under which advisory briefing or remedial training should take place. This should always be carried out in a constructive and non-punitive manner;

(e) the conditions under which the confidentiality may be withdrawn for reasons of gross negligence or significant continuing safety concern;

(f) the policy for publishing the findings resulting from the EBT programme.

GM2 ORO.FC.231(c)

This GM is transposed from AMC1 ORO.AOC.130 'Flight data monitoring – aeroplanes' point (k):

(…) 'This procedure should, as a minimum, define:

(1) the aim of the FDM programme;

(2) a data access and security policy that should restrict access to information to specifically authorised persons identified by their position;

(3) the method to obtain de-identified crew feedback on those occasions that require specific flight follow-up for contextual information; where such crew contact is required the authorised person(s) need not necessarily be the programme manager or safety manager, but could be a third party (broker) mutually acceptable to unions or staff and management;

(4) the data retention policy and accountability, including the measures taken to ensure the security of the data;

(5) the conditions under which advisory briefing or remedial training should take place; this should always be carried out in a constructive and non-punitive manner;

(6) the conditions under which the confidentiality may be withdrawn for reasons of gross negligence or significant continuing safety concern;

(7) the participation of flight crew member representative(s) in the assessment of the data, the action and review process and the consideration of recommendations; and

(8) the policy for publishing the findings resulting from FDM.'

The use of the word 'examiner' in the note to the first point 'Note: access to the last 12 months training data is required for the examiner that will revalidate the pilot licence' is used to provide a generic term.

(d) GRADING SYSTEM

(3) The operator shall use a grading system to assess flight crew, which ensures:

(i) sufficient level of detail to enable accurate and useful measurements of individual performance;

(ii) a performance scale for each competency, with a point on the scale which determines the minimum acceptable level to be achieved for the conduct of line operations; and

(iii) data integrity.

(4) The operator shall verify in regular intervals the accuracy of the grading system against a criterion-referenced system.

ORO.FC.231(d)

The paradigm shift from legacy training and checking programmes is a move away from assessment against the execution of predefined manoeuvres and tasks, based on the quality of execution. Remediation in these cases often leads to simple task repetition without an understanding of the underlying causes of ineffective performance.

To be consistent with the central philosophy of EBT, assessment should be completed at key points during the module, and performance evaluated against each of the defined competencies, using the most relevant OBs to the performance observed. The instructor should take an overview of everything observed during the phase, and using a methodology similar to that published, award grades in each competency only.

The grading system should be used for crew assessment, in addition to providing quantifiable data for the measurement of the training system performance. It can range from a simple 'acceptable/unacceptable' grading performance system to a gradual relative measurement system.

ORO.FC.231(d) wording 'a grading system to assess flight crew'

The intent of the grading system 'to assess flight crew' is provided in the IR following the performance-based regulation model, where the objective is allocated in the rule.

The provision is transposed from Doc 9995 paragraph 3.6.3:

'3.6.3 Assessment and grading system. A full description of the competencies is provided in Appendix 1 to Part II. It is essential to note that an operator intending to use this framework should in addition develop a clear assessment and grading system for expected crew performance. Competencies are a fundamental component of the grading system. It is not the intention of this document to fully describe a grading system, but a grading system should be used for crew assessment, in addition to providing quantifiable data for the measurement of the training system performance. It can range from a simple 'acceptable/unacceptable' grading performance system to a graduated relative measurement system.'

ORO.FC.231(d) point (1)(iii)

Data integrity is the maintenance of, and the assurance of the accuracy and consistency of, data over its entire life-cycle and is a critical aspect to the design, implementation and usage of any system which stores, processes, or retrieves data.

Any unintended changes to data as the result of a storage, retrieval or processing operation, including malicious intent, unexpected hardware failure, and human error, is failure of data integrity.

ORO.FC.231(d) point (2)

Why do we need a verification of the grading system?

The EBT grading system provides a norm-referenced system, although it contains some characteristics of a criterion-referenced system.

Glasser (1963) formalised the concept of criterion-referenced testing (CRT). The development of a CRT entails, firstly, a statement of behavioural objectives and then a systematic generation of test items designed to unambiguously ascertain to what degree these objectives have been met. Standards of performance are set using minimal levels of competence before the test is applied.

These characteristics are difficult to achieve in the EBT system for certain OBs and grading, especially as regards non-technical skills, associated OBs and their grading. For example, a grade 3 ('The pilot

communicated adequately, by regularly demonstrating most of the OBs when required, which resulted in a safe operation') in communication will require that all OBs are clearly and unambiguously defined. As an example, the OB 'Uses eye contact, body movement and gestures that are consistent with and support verbal messages' would require further criteria in the context of a particular scenario to reach the 'unambiguously ascertain to what degree the objective have been met' explained by Glasser (1963). These criteria could be: at least 20 seconds of eye contact along with a body movement of 3 gestures (e.g. indicating with the arm the side of the aircraft affected) that support the verbal message of the explanation of an engine problem to the cabin crew.

Today the revalidation of licenses is based on a criterion-referenced system for the conduct of the training, tests and checks of Appendix 9 with regard to technical competencies (see FLIGHT TEST TOLERANCE, Appendix 9 to the Aircrew Regulation. For the non-technical competencies, a norm-referenced system may be provided (see ORO.FC.115 &215 of the Air OPS Regulation).

Today, the European aviation system uses a criterion-referenced system for revalidation of pilot licences to ensure a level playing field (that is the aim in accordance with Article 2 of Basic Regulation). EBT proposes a norm-referenced system. In order to combine both methods, a feedback loop is proposed. This process is recommended in different scientific works. From all the scientific works, the RMG provided a reference to the book 'Criterion-referenced and norm-referenced assessments: compatibility and complementarity' author: Beatrice Lok, Carmel McNaught & Kenneth Young.

An extract is provided to support the need of a verification of the grading system in EBT. The book proposed a yearly verification of the grading system; however, the RMG opposed to this proposal and instead EASA proposed a onetime feedback every three years.

'Feedback loop:

There is no need to choose between norm referencing and criterion referencing. They are both present.

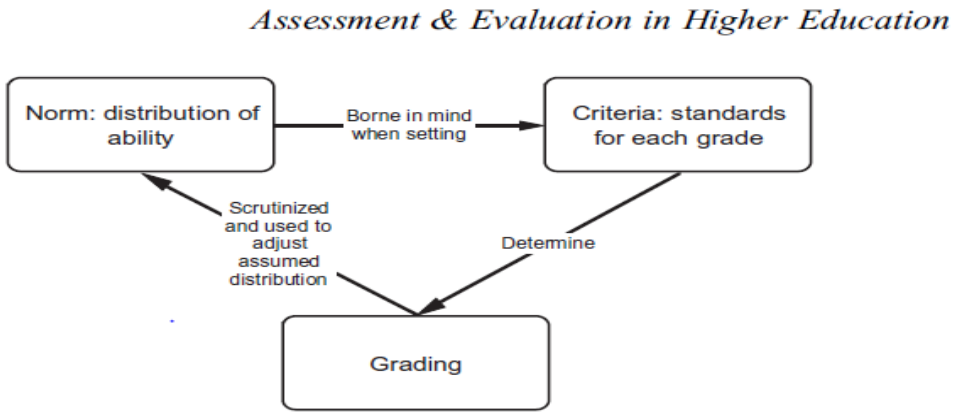
— Not only are they both present, but with the caveat about minor adjustments from year to year, they are consistent. Thus, it is possible both to define rubrics (criterion referencing) and to prescribe grade-distribution guidelines (norm referencing), provided the latter contains a degree of flexibility.

— The presence of norm referencing and criterion referencing in a loop enables the generation of both useful feedback to learners and useful summative information to external stakeholders.

— The use of criteria allows meaningful reference to higher-order learning outcomes. While these are inevitably ambiguous and even unknown to external stakeholders, the simultaneous use of norm referencing *allows the* interpretation of these criteria to be supported by norm comparisons, and to guard against grade inflation.

— Since these steps are all in a loop, there is no need to argue which one comes first.

— The entire approach is coherent with modern quality-assurance and fitness-for purpose concepts.'



Feedback loop.

AMC1 ORO.FC.231(d)(1) Evidence-based training

GRADING SYSTEM

(a) The grading system should provide quantifiable data for the measurement of the training system performance.

(b) The grading scale should be 1 to 5, where:

(1) Level 1 determines that a minimum acceptable level of performance was NOT achieved for the conduct of line operations. An outcome of ADDITIONAL TRAINING REQUIRED should be recorded.

(2) Levels 2 to 5 determine an outcome of COMPETENT for the competent authority.

(3) Level 2 (below the norm) determines that the minimum acceptable level was achieved for the conduct of line operations.

(4) Consistent Level 2 grading indicates a need for additional training to elevate performance to the norm.

(5) Level 3 on a 5-point scale is the norm.

(6) Level 4 determines that the pilot is above the norm.

(7) Level 5 (exemplary) determines that the pilot is above the norm (enhanced safety, effectiveness and efficiency).

AMC2 ORO.FC.231(d)(1) Evidence-based training

GRADING SYSTEM — ALTERNATIVE SYSTEM

(a) The grading system should provide quantifiable data for the measurement of the training system performance.

(b) The grading scale for each competency should:

(1) determine the grade at which the performance is considered:

(i) NOT COMPETENT for the conduct of line operations. An outcome of ADDITIONAL TRAINING REQUIRED should be recorded; and

(ii) COMPETENT for the conduct of line operations; and

(2) determine for the pilot whose performance is considered competent for the conduct of line operations:

(i) if the pilot needs additional training to elevate their performance to the operator specified norm.

(ii) if the pilot is at the operator specified norm.

(iii) if the pilot is above the norm (it can be one or more levels e.g. above the norm and exemplary).

AMC1 ORO.FC.231(d)(1)

This provision did not obtain a full consensus in the EBT subgroup RMT.0599. Whereas the need for guidance for the grading system was fully supported, there was disagreement regarding the regulatory level it should have —IR, AMC or GM (e.g. GM2 ORO.FC.231(d)).

Airline associations represented in the EBT subgroup RMT.0599 believed the operators should have the choice to use their own grading system without any involvement of the competent authority. Other stakeholders believed there should be a prescriptive approach in order to ensure all pilots are assessed in the same way. Some of the arguments for such prescriptive approach are:

— As this NPA allows the revalidation of licences based on the EBT system and therefore based on the rate obtained within the grading system, all pilots in Europe should be rated in the same way given that pilots with a valid type rating can join any airline in the European market. Therefore, level playing field should be considered. This argument is relevant for points 1 and 2 in the scale proposed in the NPA.

— A standardised grading system of airlines will allow a standardised approach to grading and therefore to forms and paperwork. This may simplify bureaucracy in the competent authorities across Europe. In addition, the potential benefits this standardised approach to the grading system would bring to the oversight functions of the competent authorities were discussed.

— Data exchange: EASA consulted some data experts whether a standardised approach to the grading system could bring benefits to all stakeholders[21]. The conclusion is that in order to facilitate the data exchange (which is of paramount importance nowadays), it is quite important to have a common grading system. Data preparation, normalisation and standardisation can take up to 90 % of the resources, while the actual data analysis may take only 10 %. A standardised approach to grading system, competency framework and OB could reduce the data preparation and normalisation close to 100 %. It could additionally increase data exchange between stakeholders (anonymity is ensured in accordance with the data protection regulations). Furthermore, platforms like the European Data4safety or the FAA Aviation safety information analysis and sharing (ASIAS) will largely benefit from a standardised approach.

Taking into account the above, EASA decided to locate this provision at an intermediate regulatory level: AMC. This regulatory level allows an increased flexibility compared to IRs, whereby national authorities could approve deviations in accordance with AltMoC (ORO.GEN.120 of the Air OPS Regulation). Furthermore, an alternative grading system in AMC2 ORO.FC.231(d)(1) provides further flexibility to the operators.

[21] The whole spectrum of stakeholders: airlines, competent authorities, accident and incident investigation authorities, safety analysts, etc. (there are plans to extend EBT to helicopters and business jets).

Note: As mentioned, data exchange will be done in accordance with the data protection regulations (European and national). Comments are welcome in this NPA if more guidance is necessary in regard to data management, exchange of data, etc. Flight data monitoring regulations may provide the basis of this new guidance.

On the other hand, some operators believe that in order to fulfil the 1 to 5 grading requirement, they will need to change their IT tools. This may be expensive. According to the RIA, the price of this system is around EUR 100 000 (one-off expense) and the same amount is valid in recurrent basis (every year). For that reason, to avoid this one-off expense, the possibility for an alternative grading system was provided to allow those operators that already invest in a system to continue to do so.

The grading provided in the AMC follows the principle described in the IATA Implementation guide, chapter 6.4:

'1. Fairness and accuracy

The grading system should allow the evaluation to be objective, fair, and relevant. It should be reliable, accurate, consistent and resistant to abuse, halo effects, instructor-evaluator laziness, 'box ticking" and bias, both positive and negative. Finally, it should ensure that pilots who are unable to fulfil competency performance expectations are not released to line service.

2. Clarity

The grading system should allow assessments to be transparent, clear, complete, unambiguous, and not subject to interpretation or confusion. It must also address the occasions where pilots do not have the opportunity to demonstrate a particular competency.

3. Usability

The grading system should be simple, easy to use, understandable, practical, manageable, accessible, uncomplicated, and resistant to unintentional errors. It should not dominate any debrief and should be compatible with facilitation. Finally, it should be compatible with any media to be used, electronic or otherwise.

4. Ease of compliance

The grading system should comply with both operator and CAA requirements. It should meet high-level regulations, allow auditing, and be traceable, explainable and long lasting. It should also ensure that any assessment is less liable to legal action.

5. Continuous improvement

The grading system should provide evidence to enable improvements in both the training system and trainee performance, for the purpose of enhancing safety. It should be meaningful, deliver useful data, identify trends, aid analysis and address existing, future or potential problems in order to improve the training system. It should enable trainees to provide feedback on their assessment in order to help improve grading consistency and the grading system. It should also enable the continuous development of the trainee's performance.

6. Motivating

The grading system should be motivating, trustworthy, respectful, and easy to „sell", so that both trainers and trainees enjoy the experience without creating fear. It should also recognize exemplary performance and promote commitment by both trainers and trainees to the assessment process.

7. Technical data management

The grading system should provide a manageable quantity of good data, be media compatible, easy to record and produce electronic data, compatible with analysis and presentation tools. It should also maintain data protection and assure controlled access.

8. Adaptability

The grading system should be adaptable, flexible and able to tailor to all facets of the operation, aircraft types and training objectives.

9. Implementation risk

The grading system should provide robust defences against the risks of ineffective implementation. The system should be comprehensible for trainers, enable efficient trainer standardisation, strong inter-rater reliability, and facilitate the identification of trainer divergence. It should be familiar to all users, cost efficient and resistant to drift and mutation.'

However, the RMG provided further guidance to expand some of the characteristics as follows:

— Fairness and accuracy: Identify evaluator divergence, facilitate instructor concordance, not repressive, is not open to abuse, avoids positive/negative bias

— Usability: acceptable to evaluators, avoids unintentional mistakes, it is familiar and is not complicated

— Safety improvement: compatible with facilitation, works towards excellence, is useful, identifies trends, is acceptable to operator, not costly, does not allow incompetent pass, improves system, continuous development

— Adaptability: customisable, cross-cultural

GM1 ORO.FC.231(d)(1) Evidence-based training

GRADING SYSTEM — VENN

(a) The VENN system is a methodology to ensure the maximum level of consistency and objectivity to assessments performed in an operator's approved EBT programme.

(b) Grading the performance of flight crew members during an EBT module may use the following methodology:

(1) Observe performance.

(2) Record details of effective and ineffective performance observed.

(3) Classify observations against the OBs within the competency framework.

(4) Assess performance by determining the root cause or causes according to the competencies measured. As a guide, this would also normally indicate the area of performance to be remediated in subsequent phases or modules.

(5) Evaluate performance by determining a grade in each competency using the VENN system and the following dimensions according to the observed behaviours related to the OB. At the conclusion of the evaluation phase and also at the end of the EBT module, the instructor may grade each flight crew member's performance in each of the competencies by the following the steps below, and determining:

(i) how well the flight crew member demonstrated the OB(s) when required;

(ii) how often the flight crew member demonstrated the OB(s) when they were required;

(iii) how many OBs the flight crew member demonstrated over the phase when they were required;

(iv) what was the outcome of threat, error and undesired aircraft state management relating specifically to the competency being assessed.

(6) The grades should reflect an overall assessment of the flight crew member's performance during the phase.

(c) Grades may be determined during each EBT module as follows:

(1) Evaluation phase (EVAL) — grading at the end of the phase

Note: Manoeuvres training — training to proficiency, no need to grade.

(2) Scenario-based training phase (SBT) — grading at the end of the phase

Note: In-seat instruction (ISI) should not be included in any assessment.

(3) For each assigned grade:

(i) the observed performance should be identified with one or more OBs; and

(ii) the OB should simply link the observed performance to the competency; they are not to be used as a checklist.

(4) At the completion of the module, grades should be assigned for each competency, based on the overall assessment of training during the SBT.

(5) Where any competency is rated below the minimum acceptable level of performance (level 1 on a 5-point scale), an outcome of ADDITIONAL TRAINING REQUIRED should be recorded.

(6) Where all competencies are determined at or above the minimum acceptable level of performance, (for example, level 2 on a 5-point scale) the outcome should be COMPETENT. Grades consistently below the norm (level 3 on a 5-point scale) may indicate a need for additional training to elevate performance to the norm (level 3 on a 5-point scale).

(d) Where any competency is determined below the minimum acceptable level of performance (for example, level 1 on a 5-point scale), the flight crew member may not be released to unsupervised line operations until each competency is demonstrated at or above the minimum acceptable level of performance, during a subsequent line evaluation of competence.

(e) The word pictures below support a VENN system. The example system is based on a 5-point scale with 3 being the norm, 1 determining unacceptable performance and 2 being the minimum acceptable level of performance. A means of utilising this system may be to determine that at the EBT module:

(1) Any competency rated 1 at the end of the module requires additional training prior to release to line flying.

(2) Any competency rated 2 in two consecutive simulator sessions in different recurrent modules requires individual customised training within 3 months of the completion date of the EBT module. (1st Module SBT rated 2, 2nd Module EVAL rated 2, thus SBT should trigger an individual customised training).

(3) Any competency rated 2 in three consecutive modules requires additional training at the end of the third module within three months (following the example in (2): 3rd Module EVAL is rated 2 again, the pilot should receive additional training).

(4) Any evaluation simulator session with three or more competencies rated 2 requires individual customised training in the SBT phase. If at the end of the module the three competencies continue being rated 2, the pilot requires additional training.

(5) Individual customised training: it means a simulator session tailored to the pilot's individual training needs which may require a different programme. Normally, there is not an increase of FSTD volume (no extra simulator session).

(6) Additional training: it means the simulator session is tailored to the pilot's individual training needs and an extra simulator session. It normally happens after an individual customised training.

(7) The word pictures are standardised according to the VENN system but may be simplified once instructors become familiar with the system.

Word picture VENN system	
Application of procedures (APK)	
5	The pilot applied procedures in an exemplary manner, by always demonstrating all of the observable behaviours to a high standard when required, which enhanced safety, effectiveness and efficiency
4	The pilot applied procedures effectively, by regularly demonstrating all of the observable behaviours when required, which resulted in a safe operation
3	The pilot applied procedures adequately, by regularly demonstrating most of the observable behaviours when required, which resulted in a safe operation
2	The pilot applied procedures at the minimum acceptable level, by only occasionally demonstrating some of the observable behaviours when required, but which did not result in an unsafe situation
1	The pilot applied procedures incorrectly, by rarely demonstrating any of the observable behaviours when required, which resulted in an unsafe situation

Communication (COM)	
5	The pilot communicated in an exemplary manner, by always demonstrating all of the observable behaviours to a high standard when required, which enhanced safety, effectiveness and efficiency
4	The pilot communicated effectively, by regularly demonstrating all of the observable behaviours when required, which resulted in a safe operation
3	The pilot communicated adequately, by regularly demonstrating most of the observable behaviours when required, which resulted in a safe operation
2	The pilot communicated at the minimum acceptable level, by only occasionally demonstrating some of the observable behaviours when required, but which overall did not result in an unsafe situation
1	The pilot communicated ineffectively, by rarely demonstrating any of the observable behaviours when required, which resulted in an unsafe situation
Flight path management — automation (FPA)	
5	The pilot managed the automation in an exemplary manner, by always demonstrating all of the observable behaviours to a high standard when required, which enhanced safety, effectiveness and efficiency
4	The pilot managed the automation effectively, by regularly demonstrating all of the observable behaviours when required, which resulted in a safe operation
3	The pilot managed the automation adequately, by regularly demonstrating most of the observable behaviours when required, which resulted in a safe operation
2	The pilot managed the automation at the minimum acceptable level, by only occasionally demonstrating some of the observable behaviours when required, but which did not result in an unsafe situation
1	The pilot managed the automation ineffectively, by rarely demonstrating any of the observable behaviours when required, which resulted in an unsafe situation
Flight path management — manual (FPM)	
5	The pilot controlled the aircraft in an exemplary manner, by always demonstrating all of the observable behaviours to a high standard when required, which enhanced safety, effectiveness and efficiency
4	The pilot controlled the aircraft effectively, by regularly demonstrating all of the observable behaviours when required, which resulted in a safe operation
3	The pilot controlled the aircraft adequately, by regularly demonstrating most of the observable behaviours when required, which resulted in a safe operation
2	The pilot controlled the aircraft at the minimum acceptable level, by only occasionally demonstrating some of the observable behaviours when required, but which did not result in an unsafe situation
1	The pilot controlled the aircraft ineffectively, by rarely demonstrating any of the observable behaviours when required, which resulted in an unsafe situation
Application of knowledge (KNO)	
5	The pilot showed exemplary knowledge, by always demonstrating all of the observable behaviours when required, which significantly safety, effectiveness and efficiency
4	The pilot showed adequate knowledge, by always demonstrating all of the observable behaviours when required, which resulted in a safe operation

3	The pilot showed adequate knowledge, by regularly demonstrating most of the observable behaviours when required, which resulted in a safe operation
2	The pilot showed knowledge to a minimum acceptable level, by only occasionally demonstrating some of the observable behaviours when required, but which did not result in an unsafe situation
1	The pilot showed inadequate knowledge, by rarely demonstrating any of the observable behaviours when required, which resulted in an unsafe situation
Leadership & teamwork (LTW)	
5	The pilot led and worked as a team member in an exemplary manner, by always demonstrating all of the observable behaviours to a high standard when required, which significantly enhanced safety, effectiveness and efficiency
4	The pilot led and worked as a team member effectively, by regularly demonstrating all of the observable behaviours when required, which enhanced safety
3	The pilot led and worked as a team member adequately, by regularly demonstrating most of the observable behaviours when required, which resulted in a safe operation
2	The pilot led and worked as a team member at the minimum acceptable level, by only occasionally demonstrating some of the observable behaviours when required, but which did not result in an unsafe situation
1	The pilot led or worked as a team member ineffectively, by rarely demonstrating any of the observable behaviours when required, which resulted in an unsafe situation
Problem-solving & decision-making (PSD)	
5	The pilot solved problems and made decisions in an exemplary manner, by always demonstrating all of the observable behaviours to a high standard when required, which enhanced safety, effectiveness and efficiency
4	The pilot solved problems and made decisions effectively, by regularly demonstrating all of the observable behaviours when required, which resulted in a safe operation
3	The pilot solved problems and made decisions adequately, by regularly demonstrating most of the observable behaviours when required, which resulted in a safe operation
2	The pilot solved problems and made decisions at the minimum acceptable level, by only occasionally demonstrating some of the observable behaviours when required, but which did not result in an unsafe situation
1	The pilot solved problems or made decisions ineffectively, by rarely demonstrating any of the observable behaviours when required, which resulted in an unsafe situation
Situation awareness (SAW)	
5	The pilot's situation awareness was exemplary, by always demonstrating all of the observable behaviours to a high standard when required, which enhanced safety, effectiveness and efficiency
4	The pilot's situation awareness was good, by regularly demonstrating all of the observable behaviours when required, which resulted in a safe operation
3	The pilot's situation awareness was adequate, by regularly demonstrating most of the observable behaviours when required, which resulted in a safe operation
2	The pilot's situation awareness was at the minimum acceptable level, by only occasionally demonstrating some of the observable behaviours when required, but which did not result in an unsafe situation

1	The pilot's situation awareness was inadequate, by rarely demonstrating any of the observable behaviours when required, which resulted in an unsafe situation
Workload management (WLM)	
5	The pilot managed the workload in an exemplary manner, by always demonstrating all of the observable behaviours to a high standard when required, which significantly safety, effectiveness and efficiency
4	The pilot managed the workload effectively, by regularly demonstrating all of the observable behaviours when required, which resulted in a safe operation
3	The pilot managed the workload adequately, by regularly demonstrating most of the observable behaviours when required, which resulted in a safe operation
2	The pilot managed the workload at the minimum acceptable level, by only occasionally demonstrating some of the observable behaviours when required, but which did not result in an unsafe situation
1	The pilot managed the workload ineffectively, by rarely demonstrating any of the observable behaviours when required, which resulted in an unsafe situation

Grading	OUTCOME (1)	HOW MANY (2)	HOW OFTEN (3)	HOW WELL(4)
1	unsafe situation	hardly any	rarely	ineffectively
2	not an unsafe situation	some	occasionally	minimally acceptable
3	safe situation	most	regularly	adequately
4	safe situation	all	regularly	effectively
5	enhanced safety, effectiveness and efficiency	all	always	in an exemplary manner

Safety promotion material — Grading system

EASA has planned a safety promotion task (SPT.012) to support the implementation of EBT. The following material was developed:

SPT.012 — Safety promotion to ORO.FC.231(d) Grading system

Although the regulation proposed in this NPA may provide enough material to develop a grading system, the operator may provide the instructors with further guidance in order to improve grading and instructor concordance.

Grading should look at the entire simulator session (the whole scenario), and not only at a particular scenario element (e.g. one manoeuvre or a small scenario within the simulator). Sometimes raters tend to decide the grading of the simulator session based on one manoeuvre when the grading in EBT should look for the global assessment instead.

An example of the kind of material the operator should develop is provided below. The example is based on the threat and error management (TEM) model:

— Grading of a non-intentional non-compliance (an undetected error or mistake but corrected in a timely manner with a safe outcome). There are two types:

  • Non-intentional non-compliance without consequences — trap error

For instance, there is a mistake on the altitude selection, crew are busy with other tasks and do not recognise the mistake when it occurs and therefore they do not call ATC to confirm the altitude clearance. However, later and before the level bust, they initiate a dialogue and realise their possible mistake, or one of the pilots due to their awareness of the route altitudes realises a possible mistake which triggers a call to ATC to confirm the altitude and fix the error. For the competency identified as root cause, the grade will not be 1. The example provides a reference to grade 3; it may be graded 2 or 4 depending on the rest of the simulator session. The competency probably may not be grade 5. It should be noted that this does not prevent that other competencies could be graded 5 based on the evidence of this particular scenario element. APK may not be graded 5 because the pilot did not confirm with ATC when in doubt of an altitude clearance as required by the SOPs; however, they may be graded 5 in SWA because they realised that the altitude selected did not make sense with the safe altitude for the route.

- Non-intentional non-compliance with consequences and provided the consequences were mitigated in a timely manner (e.g. mistake in the altitude selection followed by a level bust resolved by a call of ATC or a TCAS flown to a good standard, GPWS warning followed by an escape manoeuvre performed to a good standard, etc.).

  For the competency identified as root cause, the grade should not be 1 or 5. Reference grading is 2 as the situation may not be unsafe because the problem was resolved, however it may not be considered safe; depending on the rest of the simulator session, 3 may be possible and 4 is highly unlikely.

— Intentional non-compliance but recognised and corrected in a timely manner with a safe outcome (e.g. unestablished approach followed by a go-around well below the stabilised gate)

  For the competency identified as root cause, the probable grading (reference grading) will be 2 and the maximum grading for the simulator may be 3. 2 is the probable grading because the situation was not unsafe as the pilot executed a go-around, but the pilot did it well below the stabilised gate (e.g. 100 feet). However, the situation cannot be consider safe because he should go-around close to the stabilised gate (about 500 feet). It should never be 4 or 5. It may trigger a 1 depending on the other exercises. Note: this guidance to grading is not to be used when there is a non-compliance because a higher degree of safety dictates otherwise.

— Intentional non-compliance not corrected and continued to the end state (e.g. unestablished approach and maintained until landing)

  For the competency identified as root cause, the grade is 1 (failed) and the probable route cause is APK. No other competency of the pilot can be graded 5. Note: this guidance is not to be used when there is a non-compliance because a higher degree of safety dictates otherwise (e.g. unestablished approach maintained until landing due to uncontained fire or all engines flame out, etc.).

The grading should as much as possible assess what has happened (be objective) and not what would have happened if.

GM1 ORO.FC.231(d)(1)

Assessment and grading are an integral part of the learning process. As part of the creation of EBT as a new approach to competency-based training, a pilot performance assessment and grading system is required to address the fundamental shift from previous systems which are ‘event-based’ and require the assessment of

the quality of the outcome of a manoeuvre or of the management of the event or threat. In certain previous systems, behavioural markers or competencies were used as assessment tools or reason codes for the outcome of the manoeuvre or of the management of the event or threat. The paradigm shift in EBT is to focus attention on the underlying area of flight crew member performance in order to determine training need or focus. EBT is a system designed to determine areas of focus for all flight crew members, and not just those whose performance is observed below a minimum acceptable level. The system is intended to fulfil the needs of operators and was created according to a structured design process.

Rationale

The assessment and grading system should meet the needs of the following stakeholders.

— Civil aviation authority (CAA) — performance of assessments for the revalidation and renewal of flight crew licences and/or ratings

— Operator — measurement of individual, crew, fleet and operator pilot performance and identification of development needs for both individuals and the system

— Flight crew member — provision of information about performance measured during training, for the purpose of continuous development and improvement.

The system was created considering the importance of a number of design criteria. After wide consultation, criteria were considered as follows:

Fairness and accuracy, usability, continuous improvement, clarity, implementation risk, data management, adaptability, ease of compliance, motivation

Following the criteria definition, the development process was segregated in the following steps, with agreed criteria being applied at each step to determine the optimum solution:

System definition (what to grade: the whole event, parts of the event, individual actions or a combination with different granularity): to be consistent with the aims of EBT, this should be the competencies at predetermined points during the module.

Grading scales (considering sensitivity and the need to identify unacceptable, minimum acceptable, norm and performance above the norm): a 5-point scale is commonly used with 1 point determined as below acceptable performance, the norm being 3; 2 being a minimum acceptable determination, and 4 and 5 above norm. There are many arguments for and against the number of points on a scale and this should be finally determined by the operator and approved by the competent authority under the operations manual part D.

Word pictures: to assure the fulfilment of the criteria, in particular fairness, accuracy and clarity, grades are described by standardised word pictures. They describe the VENN dimensions in a standardised way, and this facilitates inter-rater reliability. The VENN system described in this GM is based on the following measurements at predetermined points during an EBT module:

A = HOW WELL (e.g. The pilot communicate ineffectively…)
B = HOW OFTEN (e.g. …by rarely demonstrating…)
C = HOW MANY (e.g. … any of the performance indicators when required…)
D = OUTCOME (e.g. … which resulted in an unsafe situation).

In order to ensure consistency a grading system should also be employed for the line evaluation of competence, with information provided for remediation where performance is determined below the minimum acceptable level, which in the example system is 1 on a 5-point scale.

GM1 ORO.FC.231(d)(1) point (c)

The provisions of EBT regarding grading are more detailed that those ones provided for legacy training in ORO.FC.230 where there is no definition of what training may be required post LPC failure or OPC failure. Remediation may include FSTD training, LIFUS, or something else depending on the circumstances (e.g. virtual-reality training).

GM1 ORO.FC.231(d)

'Application of knowledge' is a new competency not covered in Doc 9995. EASA is considering under SPT.012 to provide further safety material on this competency transposing some of the material provided by manufacturers. As an example of this, Airbus OTT 999.0012/17 provides the following reference:

'In order to ensure that the required competencies are acquired and to perform the training on undesired aircraft state, the flight crew should be aware of the following items:

- Causes and contributing factors of undesired aircraft state

- Examples of incidents related to undesired aircraft state.

In addition, the flight crew should review all of the following items:

- The control and display systems (EFIS & ECAM):

The flight crew should know the indications provided by the display units, but also their evolution over time in order to anticipate the flying conditions.

- The flight controls systems, that include flight control laws and protections:

The flight crew should know how to handle the aircraft. In addition, the flight crew should know how the protections work, their availability, and their limits.

- The automation (Autopilot (AP), Flight Directors (FD) and Auto thrust (A/THR)):

The flight crew should know how to use the automation, their availability and their limits. The flight crew should review the practices to engage the automatisms, as well as the takeover techniques and recommendations (Airbus golden rule n°4).

- The energy management of the aircraft, that includes thrust settings:

The flight crew should understand the acceleration and deceleration capabilities of the aircraft.

- The flight envelope limitations:

The flight crew should know the flight envelope of the aircraft, in order to keep the aircraft within the environmental and aerodynamic limits, and to know when the aircraft is out of these limits.

- Aircraft capability related to flight control laws:

The flight crew should know the capability of the aircraft in response to the related active flight control laws (normal, alternate and direct law).

- Procedures and techniques related to undesired aircraft state:

The flight crew should know the procedure and techniques for nose high and nose low recovery, stall recovery and unreliable airspeed.'

AMC1 ORO.FC.231(d)(2) Evidence-based training

VERIFICATION OF THE ACCURACY OF THE GRADING SYSTEM

(a) Part-FCL Appendix 9 provides a valid criterion-referenced system to determine the accuracy of the grading system.

(b) The operator should identify the mandatory exercises for the proficiency check for type rating and instrument rating in accordance with Part-FCL Appendix 9. Those exercises marked with the letter 'M' in the proficiency check column indicate a mandatory exercise or a choice where more than one exercise appears.

(c) The operator should then design a single module where all the mandatory exercises are performed to assess the accuracy of the grading system.

(d) Instructors should record for the purpose of data analysis if the pilots would have passed the proficiency check should they have taken the check in accordance with Appendix 9. Note: individual pilots are still graded and assessed according to the EBT grading system and Appendix 10; the result of the verification may not be used against the individual pilot.

(e) This verification should be performed once every 3 years.

(f) The verification will provide data for the training system performance and for the instructor standardisation concordance assurance.

GM1 ORO.FC.231(d)(2) Evidence-based training

VERIFICATION OF THE ACCURACY OF THE GRADING SYSTEM — FEEDBACK LOOP

The verification of the accuracy of the grading system provides valuable data for the training system performance and the concordance assurance. Therefore, the verification is intended from a systemic point of view and not to measure individual pilot against Appendix 9.

Concordance between instructors may be high (e.g. same grading in the videos displayed in the annual standardisation course, etc.); however, the whole community of instructors may be grading too low or too high.

The statistical result of the verification against Appendix 9 in one single module can provide the operator with a criterion-referenced system in order to adjust the accuracy of the grading system. The verification does not require an examiner, and EBT instructors may provide the necessary data for the grading verification.

Example 1: For the last 36 months the operator, has a rate of 3 % of pilots scoring 1 (assuming data is statistically relevant). In this example, the concordance of instructors is high in all competencies and the rate of 3 % of the pilots scoring 1 is maintained across all the technical competencies. When the operator performs a verification of the grading system against Appendix 9 criteria, the rate of failure would have been only 0,5 %. This may indicate that instructors are rating too low and therefore some of the pilots scoring 1 should have been rated at a higher score than 1. From a safety point of view, this situation is fine, although it may be economically negative for the operator. Operators may decide to implement higher standards for their operations.

Example 2: The operator has an EBT programme with a negligible rate of pilots scoring 1, and has a statistically higher rate (1 %) of pilots scoring 2 in two consecutive recurrent modules. The verification of the technical competencies against Appendix 9 provides a rate of 5 % failure. Provided the data is statistically significant, the

nominated person for crew training should further investigate the reason of this mismatch between EBT and Appendix 9 in the technical competencies. There may be factors influencing this mismatch (e.g. the events in the EBT modules are too benign compared to the Appendix 9 requirements), which may lead to a corrective action (e.g. redesign of the EBT modules). If the difficulty of the EBT scenarios is equivalent to Appendix 9 and the concordance is high between instructors, then the discrepancy in outcomes might be because the community of instructors are rating too high in the technical competencies (they are rating 2 when they should have rated 1). Further instructor standardisation will be needed to address this.

The implementation of mixed EBT following GM1 ORO.FC.230 (a);(b);(f) provides a good opportunity to fine tune and verify the accuracy of the grading system because an appendix 9 is carry out every year. The authority may not allow EBT baseline unless the accuracy of the grading system is demonstrated.

More information on how to complete the transition from Appendix 9 to grading under an EBT programme can be found in the EASA safety material checklist 'Oversight guidance for transition to EBT'.

AMC1 ORO.FC.231(d)(2) and ORO.FC.231(d)(2)

This NPA already provides explanation about this topic in the explanatory note to ORO.FC.231.

The concept of this provision is transposed from the 'Alternative training and qualification programme' (ATQP). However, to adapt the concept to EBT, the requirement suffered a complete shift.

Background

In ATQP, it is required to have a criterion-referenced system to be able to measure the effectiveness of the training programme (see explanation of ATQP below). This criterion is set by the operator.

A criterion-referenced system is set up by the regulator for legacy training in the LPC. Where Appendix 9 defines a set of manoeuvres (mandatory manoeuvres) and a set of targets (see Appendix 9 'conduct of the proficiency check — Flight tolerances') which form a criterion-referenced system.

ATQP also benefits from this criterion-referenced system of Appendix 9 because every year the ATQP pilots are required to complete an LPC (also see AMC1 ORO.FC.A.245 below point (a)(6)).

The method for the assessment in ATQP follows:

1. A task and subtask analysis of each event;
2. Each event has one or more specific training targets/objectives, which require the performance of a specific manoeuvre;
3. For each event, the proficiency that is required to be achieved should be established;
4. The conditions pertaining to each event should also be established;
5. Each event should include a range of circumstances under which the crews' performance is to be measured and evaluated;
6. The behaviour marker must be specified; and
7. The operator should measure and monitor the progression, and target must be achieved.

'AMC1 ORO.FC.A.245 Alternative training and qualification programme

COMPONENTS AND IMPLEMENTATION

(a) Alternative training and qualification programme (ATQP) components

The ATQP should comprise the following:

(…)

(6) A method for the assessment of flight crew during conversion and recurrent training and checking. The assessment process should include event-based assessment as part of the LOE. The assessment method should comply with ORO.FC.230.

(i) The qualification and checking programmes should include at least the following elements:

(A) a specified structure;

(B) elements to be tested/examined;

(C) targets and/or standards to be attained;

(D) the specified technical and procedural knowledge and skills, and behavioural markers to be exhibited.

(ii) An LOE event should comprise tasks and sub-tasks performed by the crew under a specified set of conditions. Each event has one or more specific training targets/objectives, which require the performance of a specific manoeuvre, the application of procedures, or the opportunity to practise cognitive, communication or other complex skills. For each event the proficiency that is required to be achieved should be established. Each event should include a range of circumstances under which the crews' performance is to be measured and evaluated. The conditions pertaining to each event should also be established and they may include the prevailing meteorological conditions (ceiling, visibility, wind, turbulence, etc.), the operational environment (navigation aid inoperable, etc.), and the operational contingencies (non-normal operation, etc.).

(iii) The markers specified under the operator's ATQP should form one of the core elements in determining the required qualification standard. A typical set of markers is shown in the table below:

EVENT	MARKER
Awareness of aeroplane systems:	1. Monitors and reports changes in automation status
	2. Applies closed loop principle in all relevant situations
	3. Uses all channels for updates
	4. Is aware of remaining technical resources

(iv) The topics/targets integrated into the curriculum should be measurable and progression on any training/course is only allowed if the targets are fulfilled.'

— EBT

For the measurement of pilot performance, Doc 9995 does not provide a full measurement system. Doc 9995 provides a set of OBs; however, it does not provide a grading system. This was resolved by the EBT subgroup RMT.0599 that provided a grading system (VENN) — included in this NPA. This allowed a full measurement system for EBT. This system is more of a norm-referenced system than a criterion-referenced system.

— Why EBT needs a norm-referenced system instead of criterion-referenced system

For many decades the industry has used as performance measurements the completion of manoeuvres like rejected take-off, engine failure between V1 and V2, go-around from minima with the critical engine inoperative and a clearly defined flight tolerance (e.g. – 5knots/+10 knots) to demonstrate the performance of the pilot. In this context, a pilot being able to demonstrate the ability to fly these often-repetitive manoeuvres within prescribed quantitative performance measurements and indicating an acceptable level of deviation from ideal criteria, is deemed to be 'competent'.

EBT is based on the premise that this concept is no longer appropriate as a simple indicator, due to the complexities of modern operations and automation systems, coupled with the significant attribution of serious incidents and accidents to human factors causes. The paradigm shift developed by EBT is that assessments, which are necessary during all forms of training and instruction, as well as evaluation and checking, should be determined according to performance in the defined areas of competency, and not simply by the achievement of a predetermined outcome in a specific manoeuvre.

The EBT concept continues to require the completion of certain tasks, but competent flight crew members should be able to complete the tasks reasonably expected of them under achievable conditions. Tasks remain important, but only in so much as they establish a predefined norm according to the curriculum, which in the case of recurrent EBT should be achieved. The key distinction is that EBT envisages a system of competence measurement, which looks at the total performance across a wide range of activities that include some traditional tasks.

Another reason why EBT needs a norm-referenced system is the way EBT evaluates pilots. Traditionally the pilot has been check, while EBT assesses pilots instead. EBT moves away from assessment against the execution of predefined manoeuvres and tasks based on the quality of execution (ATQP and traditional training and checking), to a use of the events as a vehicle for developing and assessing crew performance across a range of competencies.

EBT also refocuses the instructor population onto analysis of the root causes to correct inappropriate actions, rather than simply asking a flight crew member to repeat a manoeuvre with no real understanding as to why it was not successfully flown in the first instance.

For those reasons, the EBT subgroup RMT.0599 provided a competency-based grading system closer to a norm-referenced grading system, rather than a criterion-referenced system. In other words, although the EBT grading system provides a standardised methodology to pilot assessment, it is by definition a norm-referenced grading system (events do not have a set of conditions and the OBs linked to the events do not have a defined and unambiguous criterion).

While the criterion-referenced system unambiguously ascertains to what degree the objectives of the manoeuvres have been met, this would mean that instructors would need to focus on the quality of execution of the manoeuvres rather than use the events as a vehicle to develop performance across a range of competencies.

Note: A norm-referenced grading system is a type of assessment which yield an estimate of the position of the tested individual in a defined population.

Note2: A criterion-referenced system is a type of assessment where the behavioural objectives and the systematic generation of test items are designed to unambiguously ascertain to what degree the objectives have been met.

— LICENCE REVALIDATION

This NPA provides a set of rules to revalidate pilot licence under the EBT programme.

A norm-referenced system, is subject to a defined population, thus is subject to the population of pilots of a particular operator. EASA, some authorities, and the pilots' associations were concerned whether this would create a problem of level playing field for the licence revalidation.

Please note that today licence revalidation provides a:

— criterion-referenced system for the technical skills; and

— norm-referenced system for the non-technical skills (e.g. CRM assessment).

To resolve the issue, EASA launched a focused consultation[22] in the 4th quarter of 2017 and the 1st quarter of 2018. The consultation concluded that a verification of the norm-referenced system was needed to re-assure the level playing field. (Further explanation is provided in the explanatory notes to ORO.FC.231(d) point (2), AMC1 ORO.FC.231(d)(2) and GM1 ORO.FC.231(d)(2)).

A summary of this reasoning is as follows:

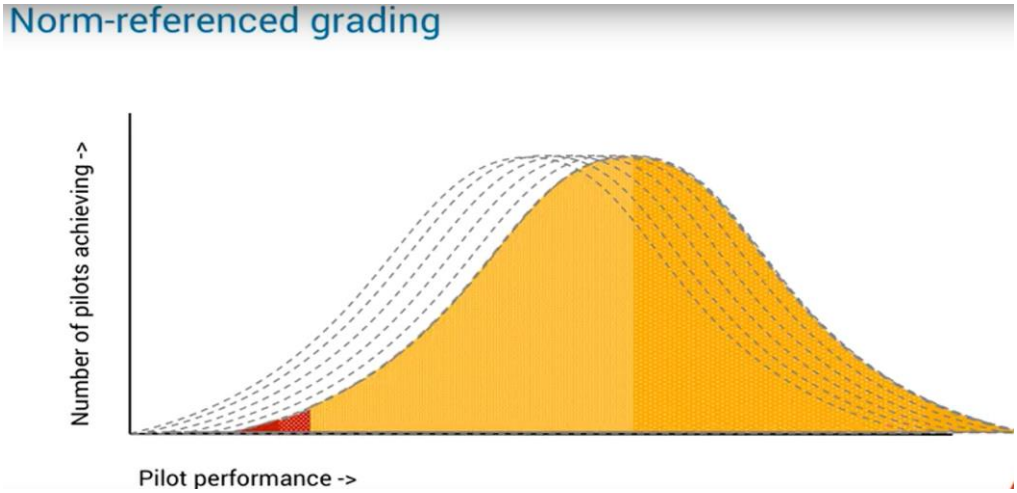
— The EBT grading is a norm-referenced grading system. Therefore, it varies from operator to operator and it depends on several factors, e.g. company standards, the design of the programme, culture of the organisations, culture of the instructors, etc.

— Within an operator a norm-referenced grading system varies throughout time. This happens because the EBT programme varies, the culture of the organisation varies, the culture of the instructors varies, the population of pilots changes, etc. Therefore, a norm-referenced grading system may provide different grading results for the same pilot performance throughout times (for example, as pilot population performance improves, better performance is needed to obtain the same grading result).

— These situations occur while the concordance between instructors may be high. Because all instructors are varying their grading in the same direction, the population of pilots is moving to the right or to the left in the graph below, and thus is shifting the grading results of a particular performance to the right or to the left of the graph.

Conclusion: Measuring competencies (especially non-technical competencies) using a norm-referenced grading may be more appropriate; however, we also need to verify the grading system against a criterion-referenced system in order to ensure legal assurance and level playing field in the revalidation of pilot licences.

[22] EASA performed a focused consultation in 4Q2017 and 1Q2018 with several stakeholders outside the EBT subgroup RMT.0599. This consultation included the main group of RMT.0599 and other actors of the aviation industry such as the national aerospace centre of Holland (NLR), nominated person for crew training, inspectors and consultants.



SUMMARY

The current system provides for the LPC of the Aircrew Regulation a criterion-reference grading, which measures performance against a fixed set of predetermined criteria or learning standards established through the mandatory manoeuvres and criteria set in Appendix 9.

It is necessary for the European aviation system to apply a criterion-referenced grading system for the rating issue and revalidation.

In addition, it is necessary for the feedback on the effectiveness of training programme.

Therefore, the following tables provide an example for the grading system proposed in this NPA (VENN 1 to 5):

— The line between 1 and 2 should have the lowest variation possible between operators by a verification against a criterion-referenced system, while above grade 2, a norm-referenced system may be followed. This means that it may vary in the course of time and therefore the same performance may not obtain the same grading results in the course of time.

year 1	1	2	3	4	5	Norm-referenced system
	Not proficient	proficient				Criterion-referenced system

year 2	1	2	3	4	5	Norm-referenced system
	Not proficient	proficient				Criterion-referenced system

Observe how the grading system in year 2 provides a grading of 5 to a lower pilot performance than year 1 and year 3.

year 3	1	2	3	4	5	Norm-referenced system
	Not proficient	proficient				Criterion-referenced system

AMC1 ORO.FC.231(d)

The EASA EBT checklist for mixed EBT implementation provides the criteria to complete Appendix 9

(e.g. Element 3.6 may credit the item 3.4)

3.4.0 to 3.4.14 (M)	Normal and abnormal operations of systems. Minimum of 3 for the crew.
3.6.1 to 3.6.9 (M)	Abnormal and emergency procedures. Minimum of 3 for the crew.

(e) SUITABLE TRAINING DEVICES AND VOLUME TO COMPLETE THE OPERATOR'S APPROVED EBT PROGRAMME

(1) Each EBT module shall be conducted in an FSTD with a qualification level adequate to complete proficiency check/training.

(2) The operator shall provide sufficient volume of hours in a suitable training device for the pilot to complete the operator's approved EBT programme.

ORO.FC.231(e) point (1)

EASA is currently updating the requirements for FSTD through RMT.0196 'Update of flight simulation training devices requirements'. More information about this RMT is available under https://www.easa.europa.eu/document-library/rulemaking-subjects/update-flight-simulation-training-devices-requirements.

Currently Appendix 9 to the Aircrew Regulation requires the FSTD used to revalidate a type rating in the context of CAT to meet the standard required for 'training to proficiency'. There was a consensus in the RMG to provide a similar requirement for the EBT programmes. However, the actual drafting of the text for this provision was agreed with EASA FSTD experts and members of RMT.0196. RMG RMT.0599 did not have experts in this subject and therefore the text was simply accepted with no further discussion.

The reasoning behind the text proposed is related to the EASA certificate awarded to each FSTD. Each certificate (see EASA form 145 in Appendix IV to Annex VI (Part-ARA) to the Aircrew Regulation) contains a table in paragraph 'L' named 'Guidance information for training, testing and checking considerations'. The line 'Proficiency check YES/NO' covers this item.

Below are some of the considerations of the RMG for the actual and future development of FSTDs to maximise effectiveness when used as part of an EBT programme:

(a) Environmental effects:

(1) Weather

(2) Real-time full environment simulation without limitations and demand on the instructor to code effects, layers of clouds, etc. repetitively during a session

(3) Enhance the availability of cumulonimbus and storms with strong correlation to motion cues

(4) Availability of multiple storms and CBs to create a more realistic and challenging weather profile

(5) Greater variation in precipitation effects

(6) Better-modelled ground effects, particular variations in friction caused by water, snow and ice

(7) ATC

(8) To maximise realism and the benefits of EBT, the ATC environment needs simulation with context-specific ATC interactions. Creating a normal, dynamic and distracting ATC environment is challenging for an instructor to achieve and is a diversion from the instructor's primary task of observing flight crew members.

(b) Aircraft effects

(c) Greater accuracy in modelled engine malfunctions based on engine original equipment manufacturer (OEM) data with motion and sound effects that are more realistic.

Finer adjustments when creating sensed and non-sensed malfunctions, so that the instructor can create realistic distractions that may not result in a complete failure of the system. For example, slow leaks of fluids able to be stopped and contained, variations in temperatures and pressures, intermittent cautions based on a condition being sensed momentarily, and then restored.

Currently, EASA is working on a process to allow Blended Learning (ABLE) to support FSTD training. This will optimise the use of available FSTD time.

When this process is in place as an approved AMC, the requirement for FSTD training may be replaced by requirements for training in any combination of devices supporting the specific tasks.

AMC1 ORO.FC.231(e) Evidence-based training

VOLUME AND FSTD

(a) The EBT programme has been developed to include a notional exemplar of 48 FSTD hours over a 3-year programme for each flight crew member.

(b) Subject to authority approval, the operator may reduce the number of FSTD hours provided an equivalent level of safety is achieved. The programme should never be less than 36 FSTD hours.

(c) In addition, the EBT programme should be performed in a full-flight simulator (FFS) level C or D.

AMC1 ORO.FC.231(e) point (a)

The provision is transposed from Doc 9995 (Part II paragraph 1.1.1).

'Appendices 2 to 7 form the basis for the construction of EBT recurrent assessment and training programmes. In order to address all assessment and training topics at the defined frequency, a training programme of 48 FSTD hours over a three-year cycle for each flight crew member has been assumed. This EBT recurrent assessment and training should be conducted in an FSTD qualified for the purpose'.

Part I paragraph 3.6.1

'The EBT recurrent assessment and training of the competencies (contained in Appendix 1 to Part II) are considered over a three-year recurrent assessment and training cycle. For the purposes of the construction of model training programmes as listed in Appendices 2 to 7 to Part II, the programme has been developed to include a notional exemplar 48 hours for each crew member over a three-year period in a suitably qualified flight simulation training device (FSTD). The training programme is divided into modules. The three phases of a module (evaluation, manoeuvres training and scenario-based training) are described in Chapter 7 of Part I.'

(f) EQUIVALENCY OF MALFUNCTIONS

(1) Each flight crew member shall receive assessment and training in the management of aircraft system malfunctions.

(2) Aircraft system malfunctions that place a significant demand on a proficient crew shall be organised by reference to the following characteristics:

(i) immediacy;

(ii) complexity;

(iii) degradation of aircraft control;

(iv) loss of instrumentation; and

(v) management of consequences.

(3) Crew shall be exposed to at least one malfunction for each characteristic at the frequency determined by the table of assessment and training topics.

(4) Demonstrated proficiency in the management of one malfunction is considered equivalent to demonstrated proficiency in the management of other malfunctions with the same characteristics.

AMC1 ORO.FC.231(f) Evidence-based training

EQUIVALENCY OF MALFUNCTIONS — PROCESS

(a) The equivalency of malfunctions process should be undertaken by subject matter experts (SMEs) who hold or have held a type rating on the aeroplane type.

(b) Steps of the equivalency of malfunctions:

Step 1: Look (review) at all aircraft system malfunctions provided by the OEM. For example, FCOM, or AFM for other manufacturers is normally not an exhaustive list of malfunctions.

Step 2: Determine and retain in a list only malfunctions that place a significant demand on a proficient crew, in isolation from an environmental or operational context.

Step 3: For each retained malfunction, determine the applicable characteristic or characteristics.

Step 4: Develop the EBT FSTD programme to incorporate malfunctions at the frequency specified in the table of assessment and training topics.

(c) Malfunctions included in the equivalency of malfunctions but not included in the EBT FSTD programme require review and appropriate procedural knowledge training, conducted in suitable alternative environment (classroom, flight procedure training device, computer-based training, etc.).

AMC1 ORO.FC.231(f) point (b) Step 1

Look (review) at all aircraft system malfunctions provided by the OEM instead of a more prescriptive wording such as flight crew operating manual, because each manufacturer has a different title for the document which contains the malfunctions relative to the aircraft (e.g. Airbus label this FCOM, Boeing FCOM and AFM – other manufacturers use AFM). The quick reference handbook (QRH) is normally not an exhaustive list of malfunctions.

AMC1 ORO.FC.231(f) point (b) Steps 1 and 2

Steps 1 and 2 provide a similar concept to today's AMC1 ORO.FC.230 (a)(4)(i)(A), where the list of major system malfunctions is selected (as per industry best practices) from the list of malfunctions of the real aircraft (not from the list of malfunctions provided by the FSTD). Then the operator selects the ones that are considered 'major' and covers them in a 3-year training period. The EBT malfunction clustering follows a similar approach where from the list of malfunctions of the real aircraft, the operator selects the one that put a significant demand on a proficient crew.

GM1 ORO.FC.231(f) has been developed to illustrate the concept of significant demand on a proficient crew.

Once the malfunction is determined as significant demand, this means that it will have one or more of the 5 characteristics included in GM2 ORO.FC.231(f).

AMC1 ORO.FC.231(f) point (c)

This point is introduced in the AMC as per Doc 9995 paragraph 3.8.2 which provides the following text:

'3.8.2 Practical training in the management of aircraft system malfunctions. Aircraft system malfunctions to be considered for the evaluation and scenario-based training phases are those that place a significant demand on a proficient crew. All malfunctions not covered by this characteristic continue to require review and appropriate procedural knowledge training with different means than considered in the recurrent EBT training conducted in an FSTD.'

and from Table I-3-1. 'Malfunction characteristics and crew performance'

'Note — This refers to the case of recurrent training and assessment conducted in an FSTD qualified by the CAA at the appropriate level for recurrent training and assessment. Other malfunctions not covered by the characteristics detailed in 3.8.2 and 3.8.3 continue to require review and appropriate procedural knowledge training conducted in a less qualified but suitable environment (classroom, flight procedures training device, etc.), as an additional component of EBT. This is intended simply as a means of offloading the need to perform such training in a highly qualified FSTD, which has much greater potential benefit in other areas'.

AMC1 ORO.FC.231(f) point (c) — wording 'malfunctions included in the equivalency of malfunctions'

The wording proposed is related to the definition of 'malfunction clustering' proposed in Annex I to the Air OPS Regulation.

***AMC1 ORO.FC.231(f) point (c) — wording '*Equivalency of malfunctions (malfunction clustering):** Equivalency of Malfunctions contains all the malfunctions that put a significant demand on a proficient crew, regardless if they are included or not in the FSTD programme.

Point (c) was transposed from Doc 9995, Paragraph 3.8.2, and table I-3-1 Note:

'All malfunctions not covered by this characteristic continue to require review and appropriate procedural knowledge training with different means than considered in the recurrent EBT training conducted in an FSTD'

AMC1 ORO.FC.231(f) point (c) — wording 'EBT FSTD programme'

This refers to the 3-year EBT FSTD programme.

AMC1 ORO.FC.231(f)(3) Evidence-based training

CREW EXPOSURE TO AT LEAST ONE MALFUNCTION FOR EACH CHARACTERISTIC

Unless specified in the OSD, each crew member should be exposed to the characteristics of degraded control and loss of instrumentation in the role of pilot flying.

AMC1 ORO.FC.231(f)(3)

The RMG considered this provision an important safety objective; and therefore, originally this provision was at implementing rule level. However, in order to provide flexibility to operators when malfunction clustering has a limited amount of emergencies pertaining to degradation of aircraft control and loss of instrumentation (which varies from aircraft type to aircraft type), the RMG moved this provision to AMC level. The limitation explained before creates a burden and limits the construction of line-orientated scenarios (EVAL and SBT). This

feedback derives from operators who have already implemented mixed EBT (e.g. Thomas Cook Scandinavia, Alitalia, Iberia, etc.). Having this provision at AMC level allows for AltMoC in accordance with ORO.GEN.120.

GM1 ORO.FC.231(f) Evidence-based training

EQUIVALENCY OF MALFUNCTIONS — SIGNIFICANT DEMAND ON A PROFICIENT CREW

(a) A procedure for a malfunction (e.g. non-normal, abnormal, emergency) may be considered to place significant demand on a proficient crew member if it results in one or more of the following:

(1) time criticality;

(2) multiple paths within the procedures (e.g. decision trees);

(3) multiple inoperative or degraded systems;

(4) a high potential for undetected errors (e.g. removal of flight protections); and

(5) significant increases of workload (e.g. removal of automation).

(b) When a malfunction is placing a significant demand on a proficient crew, it means it has one or more of the characteristics (see more in GM2.ORO.FC.231(f)).

GM1 ORO.FC.231(f)

Once the malfunction is determined as a significant demand, this means that the malfunction has one or more of the characteristics determined in GM2 ORO.FC.231(f) – Immediacy, complexity, degradation of aircraft control, loss of instrumentation, and management of consequences.

GM2 ORO.FC.231(f) Evidence-based training

EQUIVALENCY OF MALFUNCTIONS — MALFUNCTION CHARACTERISTICS

The following may be considered suitable definitions for each of the characteristics:

(a) ‘Immediacy’: System malfunctions requiring immediate and urgent crew intervention or decision (e.g. malfunctions with memory items)

(b) ‘Complexity’: System malfunctions requiring recovery procedures with multiple options to analyse and/or multiple decision paths to apply

(c) ‘Degradation of aircraft control’: System malfunctions resulting in significant degradation of flight controls in combination with abnormal handling characteristics

(d) ‘Loss of instrumentation’: System malfunctions that require monitoring and management of the flight path using degraded or alternative displays

(e) ‘Management of consequences’: System malfunctions affecting significantly the flight crew standard task sharing and/or the workload management and/or the decision-making process during an extensive period

Note:

Equivalency of malfunctions may be undertaken in consultation with the aircraft OEM. The objective of the OEM consultation is to review the operator analysis regarding the OEM operational certification (e.g. OSD) documents and to the general OEM operation and training policy.

GM3 ORO.FC.231(f) Evidence-based training

EQUIVALENCY OF MALFUNCTIONS — ISOLATION FROM AN ENVIRONMENTAL OR OPERATIONAL CONTEXT

When considering significant demand on a proficient crew, subject matter experts may consider that there are no significant environmental and operational threats. For example, the aircraft is close to a suitable aerodrome with environmental conditions permitting all published approaches to be made, with no pre-existing malfunctions and sufficient fuel for several hours (e.g. A320 or B737 overhead Ibiza - Spain, at FL350 with visible moisture at 30 000 ft, at the aerodrome wind calm, CAVOK, ISA).

GM4 ORO.FC.231(f) Evidence-based training

EQUIVALENCY OF MALFUNCTIONS PROCESS — DELPHI

(a) The operator reviews/looks at aircraft system malfunctions provided in the official documentation of the OEM, for example for Airbus the FCOM, or AFM for other manufacturers.

(b) Before launching the equivalency of malfunctions survey and when the aircraft system malfunctions list is very long, the operator may slightly shorten the list by removing the malfunctions that surely will not have a significant demand of a proficiency crew (see GM on SIGNIFICANT DEMAND ON A PROFICIENT CREW)

(c) A group of EBT instructors statistically relevant will be selected to perform the equivalency of malfunctions survey. 50 % of the instructors' community will be used as a reference. In small instructors' communities, it may be necessary to refer to 100%. In operators with large instructors' communities, the number of instructors statistically relevant may be less than 50 %.

(d) The group of instructors selected in point (c) will rate each of the malfunctions listed in points (a) and (b)

(1) Each instructor will rate each one of the 5 characteristics in each malfunction listed in point (b).

(2) The rate will be 0 when the malfunction does not have the characteristic (the characteristic does not appear in the malfunction).

(3) The rate will be 1 to 5 when the characteristic appears in the malfunction. Rating 1 when the characteristic is not relevant for the malfunction and rate 5 when the characteristic is very relevant.

(4) The instructors will rate individually (e.g. home, classroom, etc.) to avoid exchange of opinions with other instructors.

(e) An average rate of the whole instructors' community as a result of point (d) will be calculated for each characteristic of each malfunction.

(f) A second round of survey will be performed with the same instructors and the same list. This time the operator will provide the average calculated in point (e) and ask them if in light of the average they would like to change their rating.

(g) When an instructor changes their rating, the old rate will be discarded.

(h) A new average will be calculated for each characteristic of each malfunction at the end of the second survey. The final average will be rounded to the closest integer number.

(i) The operator may select an average rate of the characteristics (e.g. rate 2 or 3) at which or above which the characteristic is considered to be present in the malfunction, thus it places a significant demand on a proficient crew.

GM4 ORO.FC.231(f)

The Delphi method is a structured communication technique or method, originally developed as a systematic, interactive forecasting method that relies on a panel of experts. The experts answer questionnaires in two or more rounds. After each round, a facilitator or change agent provides an anonymised summary of the experts' forecasts from the previous round as well as the reasons they provided for their judgements. Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of their panel. It is believed that during this process the range of the answers will decrease and the group will converge towards the 'correct' answer. Finally, the process is stopped after a predefined stop criterion (e.g. number of rounds, achievement of consensus, stability of results) and the mean or median scores of the final rounds determine the results.

As a reference, the figure of 50 % of the instructor community was provided, for the following reasons:

— The malfunction clustering should adjust to the level of training and culture of the company. Therefore, the number of instructors should be sufficient.

— The EBT should include the instructors and examiners as much as possible and this community should participate as much as possible in the development of the programme. A high level of participation may indicate that instructors and examiners are committed to implementing EBT.

— Minimise the errors: a large community of subject matter experts (50 % of instructors and examiners) are more likely to provide unbiased results, personal views, and biased opinions may be discarded by the average results.

Safety promotion material — Equivalency of malfunctions (DELPHI)

EASA has planned SPT.012 to support the implementation of EBT. The following material was developed:

SPT.012 — safety promotion task 012 — safety material for EBT — EQUIVALENCY OF MALFUNCTIONS

EQUIVALENCY OF MALFUNCTIONS PROCESS — DELPHI — CRITERIA ON ELABORATION OF MALFUNCTION CLUSTERING

The analysis of the grouping of abnormal and emergency procedures should only be carried out by a TRI EBT/SFI EBT or TRE EBT/SFE EBT in possession of the type rating of the airplane to be analysed.

Abnormal and emergencies should be considered in isolation from any environmental or operational context. However, the operator should establish a minimum standardisation guide for those instructors/examiners who are going to carry out the study, in which some guidance is provided to analyse the procedures depending on the flight phase or conditions present, because significant differences will appear at the time evaluation. For instance, an abnormal procedure AIR PACK 1+2 FAULT has not the same consequences below FL100 or at the maximum aircraft Flight Level.

Standardisation guidance:

— The subject matter experts developing the malfunction clustering should consider that the abnormal/emergency condition will remain when steps to fix the malfunction are included in the malfunction procedure (e.g. the failed engine will not restart, or the fuel pump remains failed after the

reset, or the electric generator is not fixed after the reset, etc.). To this end, the operator should reproduce the malfunction in the FSTD programme in the same way (no restart of the engine, or successful reset of the fuel pump or electric generator) in order to meet the characteristics requirement. The operator may include successful resets or restart in addition to the malfunctions considered for the characteristics. When a reset puts a significant demand in a proficient crew, then both options should be included in the malfunction clustering and therefore the same malfunction should be evaluated for both cases: for successful reset/restart and for unsuccessful reset/restart.

— Whenever the possibility of icing is specified in the abnormal/emergency procedure, then it is assumed that this meteorological condition is present (e.g. in case of 'pitot heating', it is assumed that the conditions of icing are present). This case should follow the same principle of the previous paragraph, where the EBT FSTD programme should include the icing condition when triggering the pitot heating.

— Other possibilities require proper analysis.

Grading:

— The grading varies from 1 to 5. 1 corresponds to the lowest level of malfunction characteristic. 5 corresponds to the highest.

— The abnormal/emergency procedures to be graded are the standard malfunctions for the type of aircraft (e.g. the malfunctions of the FCOM in A320) approved for the EBT programme.

— The other malfunctions of the different versions of the aircraft models in the operator's fleet (e.g. A321 / 319 / 320B4S, etc.) will be subject to a later revision and will be included in the 3-year cycle within the EBT topic 'Operation- or Type-specific'.

Minimum criteria:

A minimum of guidance is established when assigning a value to each of the characteristics of abnormal/emergency procedures for the standardisation purpose of the analysis.

URGENCY:

'Immediacy': System malfunctions requiring immediate and urgent crew intervention or decision (e.g. malfunctions with memory items.)

— If the caution or warning displays only crew awareness: minimum rating 1.

— If it contains an amber land as soon as possible (ASAP) warning: minimum rating 2.

— If it contains the red land as soon as possible (ASAP) notice: minimum rating 3.

— If it is a procedure of memory steps: minimum rating 5.

COMPLEXITY:

'Complexity': System malfunctions requiring recovery procedures with multiple options to analyse and/or multiple decision paths to apply '.

— If the caution or warning displays only crew awareness: minimum rating 1.

— If the caution or warning includes steps: minimum rating 2.

— If the caution or warning contains or must be followed by a computer reset: minimum rating 2 (depending on the complexity of the reset).

DEGRADATION OF CONTROL:

'Degradation of aircraft control': System malfunctions resulting in significant degradation of flight control in combination with abnormal handling characteristics.

Any condition that implies an extra difficulty to fly the plane will be taken into account for the characteristic of degradation of control (which may not be limited to the flight control system). For instance, loss of flight laws protections, loss of power plant, etc. The following guidance applies:

— Single engine flying (engine failure in multi-engine aircraft): minimum rating is 3 (except for some aircraft types with automatic yaw compensation in engine failures).

— Alternative law flight (direct law with landing gear down): minimum rating 3/4.

LOSS OF INSTRUMENTATION:

'Loss of instrumentation': System malfunctions that require monitoring and management of the flight path using degraded or alternative displays.

The characteristic to be assessed is not solely due to loss of cockpit displays. Abnormal/emergency procedures that imply flying with loss of relevant information should also be assessed. This principle increases the number of malfunctions available for this characteristic. This allows a better design of EBT FSTD sessions.

— Loss of display units: minimum rate 2.

— Significant loss of primary information related to systems (characteristics speeds, flap or slat position, fuel figures, etc.): minimum rate 2.

— Loss of information related to abnormal and emergency procedures (FWC 1 + 2 FAULT, SDAC 1 + 2 FAULT, etc.): minimum rate 3.

— Loss of information due to single failure (1 ADR Fault, 1 IR Fault, discrepancy messages, etc.): minimum rate 2.

— Loss of information due to double failures (1+2 ADR Fault, 1+2 IR Fault, disagree messages, etc.): minimum rate 3/4.

— Total loss of information (ADR 1+2+3 Fault, IR 1+2+3 fault, unreliable speed indication, etc.): minimum rate 5.

MANAGEMENT OF THE CONSEQUENCES:

'Management of consequences': System malfunctions affecting significantly the flight crew standard task sharing and/or the workload management and/or the decision-making process during an extensive period.

— Consequences in the category of approach and landing or the required CAT II/III equipment: minimum rating 2.

— Consequences in the minimum navigation requirements: minimum rating 2.

— APP PROCEDURE in the STS: minimum rating 3.

— Single engine landing: minimum rating 3.

The operator, once the malfunction clustering analysis has been completed, may reflect in its training manual the maximum and minimum difficulty values of each one of the characteristics of the equivalency of malfunctions (malfunction clustering). Depending on the difficulty value, the malfunction will be included in

the different phases of an evaluation session (LOE) and in a training session (LOFT) (e.g. maximum LOE value 20, while SBT accepts the maximum of 25 points).

(g) EQUIVALENCY OF APPROACHES RELEVANT TO OPERATIONS

The operator shall ensure that flight crew members receive regular training in the conduct of approach types and approach methods relevant to operations that:

(1) place an additional demand on a proficient crew.

(2) require specific approval.

AMC1 ORO.FC.231(g) Evidence-based training

ADDITIONAL DEMAND ON A PROFICIENT CREW

(a) In order to identify approaches that place an additional demand on a proficient crew, an operator should:

(1) review its operational network;

(2) select approaches with one or more of the following characteristics:

(i) approach design;

(ii) frequency of exposure; and

(iii) degraded approach guidance; and

(3) include the selected approaches at the frequency given in the EBT programme.

Note: Only approaches listed within Section 2 of the EBT programme need to be selected by this process.

(b) Demonstrated proficiency in the conduct of an approach with one characteristic is considered equivalent to demonstrated proficiency in the management of other approaches in the operational network with the same characteristics.

AMC2 ORO.FC.231(g) Evidence-based training

EQUIVALENCY OF APPROACHES RELEVANT TO OPERATIONS — SPECIFIC APPROVAL

The operator may extend the interval for recurrent training and checking of approaches requiring specific approval to the frequency given in the EBT programme.

GM1 ORO.FC.231(g) Evidence-based training

EQUIVALENCY OF APPROACHES RELEVANT TO OPERATIONS — APPROACH CHARACTERISTICS

The following may be considered suitable examples for each of the approach characteristics:

(a) Design:

(1) Unusual approach design feature — for example, offset final approach track

(2) Unusual runway design feature — for example, non-standard lighting or marking

(b) Frequency:

(1) Infrequently visited airfields — for example, alternate airfields

(2) Infrequently flown approaches at commonly visited airfields — for example, circling approach, CAT 2

(c) Degraded guidance:

(1) Degraded internal guidance or aircraft equipment — for example, head-up display (HUD) failure

(2) Degraded external guidance or ground equipment — for example, GPS signal failure

GM2 ORO.FC.231(g) Evidence-based training

SELECTED APPROACHES AT THE FREQUENCY GIVEN IN THE EBT PROGRAMME

The table of assessment and training topics of the EBT programme for each generation provides the type of approach and frequency.

Include at least one approach of each type and method which has at least one characteristic at the frequency determined in the table of assessment and training topics.

ORO.FC.231(g) and related AMC and GM

The RMG developed a definition of the concept as follows: Equivalency of approaches refers to approaches relevant to operation determined by a defined method, leading to a reduced frequency of approaches with an increased focus on the operational relevance rather than just the conduct of an approach which is not realistic in the operational context.

— Introduction

Doc 9995 recommends approach clustering ('equivalency of approach types') as a way to avoid repetitive training on approaches that require the same actions by the pilot ('underlying elements of flight crew performance to conduct them'). It also recommends avoiding those approaches that are typically flown during line operations ('Frequency of training may be reduced for types of approaches that are conducted regularly in line operations.'). However, Doc 9995 does not explain how to carry out an 'equivalency of approach types' process.

Additionally, the recurrent training requirements specified in Part-SPA do not reflect the reality of normal operations. For instance, the use of the HUD in Generation 3 and 4 aircraft types is usually mandated by the operator for all phases of flight, and therefore the requirement to carry out the approaches for recurrent training specified in Part-SPA does not reflect the EBT concept of incorporating approaches that are not conducted regularly in line operations.

— Approach Types

The industry has moved from essentially 3 different approach genres (non-precision, precision and low-visibility operations (LVOs)) to a multitude of different approaches utilising satellite- and ground-based enhancements. This has given way to the curved approaches and approaches with varying gradients. While an aircraft's acquisition of the flight path has changed, the 'underlying performance' for crews to perform the approaches has changed little, as the OEMs have made the pilot interface with the autopilot and the displays very similar to conventional approaches (i.e. ILS). The main change from a pilot's viewpoint is the introduction of HUD and emergency vision assurance system (EVAS).

Essentially, ICAO Annex 6 has delineated the approach types as two-dimensional (2D) and three-dimensional (3D) approaches, and Type A and B in accordance with the 'achieved' minima. Most Generation 3 and 4 aircraft types have the same autopilot/pilot interface and displays for all 3D approach methods, irrespective of whether or not the approach is Type A or Type B. Variations do exist for the conduct of 2D methods depending on OEM.

Doc 9995 groups aircraft into generations, with the biggest groups being the Generation 4 and 3 jets. The delineation between the two generations is based upon whether or not the aircraft has fly-by-wire and flight envelope protections. While this delineation is entirely relevant and useful to derive recurrent training programmes, it does not necessarily reflect the avionics capability or the pilots interface with the autopilot. For example, the 747-8 sits in Generation 3 as it has conventional flight controls. Therefore, it would unnecessarily penalise some aircraft types by clustering them in accordance with the EBT Generation.

— HUD and EVAS

Generation 4 and Generation 3 aircraft types fitted with a HUD utilise it for all approaches, irrespective of whether or not they are Type A or Type B utilising 3D or 2D methods. This is the standard mode of operation.

Similarly, the use of EVAS, although not currently fitted to Generation 3 and 4 aircraft types, is again the standard mode of operation and utilised for all approaches. For recurrent training, flying additional approaches to revalidate the use of the HUD is simply replicating normal line operations with a little benefit. The operator can assure themselves of pilot proficiency in the use of HUD and EVAS, if fitted, through the 'line evaluation of competence', when it will be used in the real operational context.

— Go-around training

Go-around training is not considered in this section because the go-around training frequency is defined by the table of assessment and training topics, and is in excess of that required by Part-SPA.

— Approach clustering

In the absence of guidance in Doc 9995, the principles used for malfunction clustering have been adopted to create a similar concept for approach clustering. Two principles in particular have been considered:

- approaches that place an additional demand on a proficient crew; and
- approaches should be selected according to certain characteristics.

For the first principle, the emphasis has been changed from 'significant demand' to 'additional demand'. This is because the approach will normally be flown at the end of a scenario within the SBT. That scenario will have included malfunctions and other training topics that have already added 'significant demand' on the crew. The approach chosen should therefore contain good training value and realism, without compromising the learning by adding workload on top of workload. For example, a scenario involving a significant malfunction has better value and realism if concluded with an autoland rather than a circling approach.

For the second principle, the concept of approach characteristics has been adopted. Doc 9995 lists eight 'parameters' that can be used in a clustering process; however, many seem to be types of approaches

rather than characteristics. Instead, it was determined that approach characteristics can be divided into three groups, which are listed in the AMC with examples given in the GM.

— Types and frequency of approach training

As stated earlier, the EBT Generation delineation of aircraft types is not useful when comparing avionics and pilot interface/display information. Many Generation 3 and 4 aircraft types have a single button push for all approaches, with little or no changes in the displayed information. It would seem therefore appropriate to analyse the aircraft in these Generations to review the appropriate types to develop an 'approach generation/group'.

A focus of EBT is to remove extraneous training for which there is little safety benefit, or evidence of need, and in particular, those approaches that are regularly performed in line operations. Additionally, an operator will seek a simple system that allows for the variation in the definition of training topics throughout the semester to cater for the trainees' needs. Mandating repetitive approaches would not be beneficial to the operator or the trainee alike.

Using the frequencies defined in Doc 9995, and applying the emphasis intended by EBT, the following has been derived.

Type	Flight method	Phase	Frequency
A	3D	EVAL & SBT	B
B	3D	EVAL & SBT	B
A	2D	MT	B

The operator's policy generally defines which flight method should be used on line operations to conduct these kind of approaches.

These recommendations should be followed by crews during LOE.

During SBT or manoeuvres validation phase, it should be considered interesting to adapt the conduct of the selected approaches in order to develop specific competencies.

There is no intention to define here that a pilot has to be PF for each approach; this is because it is part of the line-orientated scenarios. Any approach that is required to be flown in the PF role-specifically should be classified as 'skills retention'; therefore, it should be trained in the manoeuvres training phase (MT).

The above approaches should be flown simulating normal operations. EVS or HUDs should be utilised if required in normal operations.

The allocation of the types of approaches into either the EVAL and SBT phases, or MT phase, was determined by the purpose of the exercise. For the 3D approaches, these are the most commonly flown in normal operations, and would therefore be the most relevant and realistic to be included in training scenarios. They will additionally be chosen to place an additional demand on a proficient crew.

In contrast, a 2D approach is typically flown less frequently, and normally only if a 3D approach is unavailable due to aircraft or airport downgrade. For some modern aircraft types (e.g. A380, Boeing 787), it requires multiple, unrealistic failures before a 2D approach is required. Additionally, the flight crew procedures to fly a 2D approach typically demand more automation management skill than a 3D

approach. The MT phase is precisely what this is for: to enable pilot skill retention in flying low-probability but higher-risk manoeuvres. The principle behind this type of training is skills retention.

The B frequency was considered appropriate for two reasons. Firstly, to align with the malfunction clustering B frequency, and secondly to fit in with the requirements of EVAL and SBT. In a typical EBT programme, there will be eight to ten approaches in these phases per year. As noted earlier, it would be inappropriate to add approaches with additional workload to scenarios that already have significant demand for a proficient crew. Therefore, mandating at least two 3D approaches of different flight methods with additional demand per year was considered the correct number.

AMC2 ORO.FC.231(g)

The rationale behind this AMC is that the operator has conducted a review of the approaches and taken them into account in placing a demand on a proficient crew and the characteristics. Therefore, more is done in terms of approaches within an operational context than is done today. EBT offers a frequency of B for specific approvals. Currently ATQP also offers a frequency B for specific approvals.

(h) LINE EVALUATION OF COMPETENCE

(1) Each enrolled flight crew member shall periodically undertake a line evaluation of competence in an aircraft in flight to demonstrate the safe, effective and efficient conduct of normal operations specified in the operations manual.

(2) The validity period of a line evaluation of competence shall be 12 months. The validity period shall be counted from the end of the month when the line evaluation of competence was undertaken. When the line evaluation of competence is undertaken within the last 6 months of the validity period, the new validity period shall be counted from the original expiry date.

(3) The operator approved for EBT may, with the approval of the competent authority, extend the validity of the line evaluation of competence to:

(i) 2 years; or

(ii) 3 years, subject to a feedback system for the monitoring of line operations.

(4) Evaluation of competencies during line operations shall be conducted by a suitably qualified commander nominated by the operator and trained in EBT concepts and the assessment of competencies.

(5) For successful completion, each flight crew member shall demonstrate each competency at or above the minimum acceptable level of performance.

ORO.FC.231(h) wording 'competence'

The heading of the rule is 'line evaluation of competence'. The word 'competence' was selected instead of 'competency', because the RMG wanted to reflect that an assessment of the competencies must be made and the pilot has to reach a certain level of performance: 'competence'.

ORO.FC.231(h)(1)

The safety objective is stated in the IR. The sentence 'undertake a line evaluation in an aircraft in flight to ensure safe, effective and efficient conduct' was transposed from Doc 9995, FOREWORD and in Part I, paragraph 1.6:

'The aim of this programme is to develop and evaluate the identified competencies required to operate safely, effectively and efficiently in a commercial air transport environment'

ORO.FC.231(h)(1) wording 'aircraft in flight'

The wording 'aircraft in flight' is used in this IR to remove any ambiguity as to where the line evaluation may be undertaken. The RMG noted that in GM1 ORO.FC.230 point (c) there is a mention of 'line check and proficiency training and checking' in an FSTD. This will not be transferred into GM1 ORO.FC.231.

ORO.FC.231(h)(2) wording 'period of validity'

The wording for 'period of validity' is similar to that used in ORO.FC.245 (d).

The validity window has been increased to 6 months; this is also in line with other periods of validity that exist in Part-FCL (e.g. revalidation of a rating).

ORO.FC.231(h)(3)(i)

The intent of this rule is to continue to permit those operators who had been conducting ATQPs for more than 24 months and can therefore continue to apply a 24-month Line Evaluation (Check under ATQP) periodicity when they transition to an EBT programme. It is worthy of note that this does not apply under the mixed EBT implementation phase. ORO.FC.230 & 245 remain applicable.

Discretion exists under this IR for a competent authority to grant a 24-month validity period for line checks to those operators who had not previously conducted an ATQP programme. However, the competent authority shall ensure that the operator is fully conversant with a competency-based evaluation system prior to applying this rule. Further guidance will be issued in a safety promotion document – EASA EBT manual.

The reason behind allowing extensions of validity periods in the line evaluation of competence (line check) is the following:

— Legacy training requires 1 line check per year.

— ATQP provides an alleviation of 1 line check every 2 years because it requires a line orientated evaluation per year. That means that 2 LOEs substitute 1 line check.

— EBT provides more opportunities than ATQP for LOE, because in the evaluation and in the scenario-based training both scenarios are line-orientated flights and required twice per year (EBT requires 2 modules a year).

ORO.FC.231(h)(4)

The use of a suitably qualified commander, as required in AMC1 ORO.FC.230 (3)(v), has been retained under EBT.

AMC1 ORO.FC.231(h) Evidence-based training

LINE EVALUATION OF COMPETENCE

(a) The purpose of the line evaluation of competence is to verify the capability of the flight crew member(s) to undertake line operations, including preflight and post-flight activities as specified in the operations manual. The route should be representative of typical sectors undertaken in normal operations. The commander, or any pilot who may be required to relieve the commander, should also demonstrate their competency in the role.

(b) Each flight crew member should be assessed according to the competency framework and grading sytem approved for their operator's approved EBT programme.

(c) Flight crew members should be assessed in duties as pilot flying and pilot monitoring; they should be evaluated in each role. Therefore, they should be checked on one flight sector as pilot flying and on another flight sector as pilot monitoring.

(d) The operator should inform the competent authority about the suitably qualified commander nominated to undertake line evaluations of competence. The commander should be trained following the applicable provisions contained in AMC1 ORO.FC.145 (a)(3)

(e) The person conducting the line evaluation of competence should occupy an observer's seat. For aeroplanes, in the case of long-haul operations where additional operating flight crew members are carried, the person may fulfil the function of a cruise relief pilot and should not occupy either pilot's seat during take-off, departure, initial cruise, descent, approach and landing.

(f) Unless credit related to the line evaluation of competence is defined in the mandatory parts of the OSD for the relevant types or variant, the extension of the validity of line evaluation of competence is only achievable for operation of a single type or variant.

AMC1 ORO.FC.231(h)

The AMC was developed following the principles contained in the AMC1 ORO.FC.230 point (b)(3) on line check. For some of the points, there is almost a direct transposition with only minor amendments. For others, the amendments are extensive.

AMC1 ORO.FC.231(h) point (a)

The requirement is extracted from AMC1 ORO.FC.230 (b)(3)(i) with the proper modifications:

'The commander, or any pilot who may be required to relieve the commander, should also demonstrate his/her ability to 'manage' the operation and take appropriate command decisions.'

AMC1 ORO.FC.231(h) point (f)

The RMG following the principles contained in ORO.FC.240 agreed to not allow extension of validity of the line evaluation of competence further away than those allowed in ORO.FC.240.

ORO.FC.240 and AMC1 ORO.FC.240 allow consecutive line checks; therefore, a check is required to performed every year; however, this is made alternatively in each type, so a check is performed for each single type every 2 years. This can be seen as an extension of the validity period of the line evaluation of competence.

AMC2 ORO.FC.231(h)(3) Evidence-based training

LINE EVALUATION OF COMPETENCE

In order to extend the validity of the line evaluation of competence to:

(a) 2 years, the operator should comply with the minimum experience to substitute ORO.FC.230 (AMC1 ORO.FC.231(a)(1)) and the majority of EBT instructors delivering the EBT modules should demonstrate their ability to efficiently complete the operator's line evaluation of competence;

(b) 3 years, in addition to point (1) above, the operator should have a feedback system for the monitoring of line operations (e.g. LOQE/FOQA), which:

(1) identifies threats in the airline's operating environment;

(2) identifies threats within the airline's operations;

(3) assesses the degree of transference of training to the line operations;

(4) checks the quality and usability of procedures;

(5) identifies design problems in the human/machine interface;

(6) understand pilots' shortcuts and workarounds; and

(7) assesses safety margins.

AMC2 ORO.FC.231(h)(3)

The 2–3-year extension of the line evaluation of competence (LEoC) provides a vehicle for operators who have ATQP to continue with the credits they have under an ATQP. The safety case is that an ATQP operator needs 2 years of ATQP before is approved for an extension of the line check. This requirement is mirrored here, as the operator will need 2 years of mixed EBT implementation to extend the LEoC.

To encourage an operator to use line operations safety data programmes because they provide further safety enhancements, the 3-year extension is offered if the safety data programme is integrated within the EBT programme.

The requirement of the safety data programme was transposed from FAA AC120-90 dated 27th April 2006 paragraph 5.

AMC2 ORO.FC.231(h)(3) point (a)

One of the purposes of a line check is to verify the ability of a pilot to undertake normal line operations in the real aircraft. The validity of the line evaluation of competence is extended with the condition that the pilot ability to undertake normal line operations is maintained. For that purpose, the majority of the EBT instructors who provide the EBT modules must be line pilots who completed a line evaluation of competence themselves as specified in the operations manual, in order to assess properly the ability of the pilots to undertake normal line operations.

The requirements are related to ORO.FC.231:

'(2) The features of the operator's approved EBT programme shall:

(i) assess and develop the competencies required by flight crew members for safe, effective and efficient operations of aircraft

Operations in the context refers to normal, abnormal and emergency operations of aircraft'.

GM1 ORO.FC.231(h) Evidence-based training

LINE EVALUATION OF COMPETENCE

(a) Line evaluation of competence, route and aerodrome knowledge, and recent experience requirements are intended to verify the capability of the flight crew member(s) to operate safely, effectively and efficiently under line operating conditions, including preflight and post-flight activities as specified in the operations manual, whereas other checks and emergency and safety equipment training are primarily intended to prepare flight crew members for abnormal/emergency procedures.

(b) The line evaluation of competence 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.

GM1 ORO.FC.231(h)

This text was inspired from the current regulatory material of AMC1 ORO.FC.230 and GM1 ORO.FC.230. However, the RMG proposed some small amendments. Some of them are explained below:

The RMT noted GM1 ORO.FC.230 point (c).

'(c) Proficiency training and checking

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

The RMG decided to not transpose this provision into GM1 ORO.FC.231.

GM1 ORO.FC.231(h) point (a)

'Line operations' is used instead of 'normal line operation' because 'normal line operations' will imply that if the crew face a failure in the aircraft, they may not be able to complete the line check.

'including preflight and post-flight activities as specified in the operations manual' is introduced (this wording is not present in AMC or GM to ORO.FC.230) to clarify the scope of the line evaluation of competence. The EBT subgroup RMT.0599 believes that the current regulation in regard to 'line checks' (ORO.FC.230) should also clarify this item.

GM1 ORO.FC.231(h)(4) Evidence-based training

SUITABLY QUALIFIED COMMANDER TRAINED IN EBT CONCEPTS AND THE ASSESSMENT OF COMPETENCIES

(a) AMC1.ORO.FC.145(a)(3) 'Provision of training' provides under 'EBT instructor training' suitable learning objectives which may be used to qualify the commander nominated by the operator to perform line evaluation of competence. The course may comprise theoretical and practical training. At the completion, the commander should:

(1) have knowledge of EBT, including the following underlying principles:

(i) competency-based training;

(ii) learning from positive performance;

(iii) building resilience; and

(iv) data-driven training;

(2) conduct objective observations based on a competency framework, and document evidence of observed performance;

(3) relate specific performance observations of competencies;

(4) analyse trainee performance to determine competency-based training needs and recognise strengths;

(5) evaluate performance using a competency-based grading system;

(6) facilitate trainee learning, focusing on specific competency-based training needs; and

(7) conduct a debrief using facilitation techniques.

(b) Instructors may be given credits on the topics of point (c) if they have previously demonstrated competencies in those topics.

New ORO.FC.231(i)

(i) GROUND TRAINING

(1) Each flight crew member shall undergo ground training and training on the location and use of all emergency and safety equipment carried on the aircraft at least every 12 calendar months.

(2) The operator may, with the approval of the competent authority, extend the period of training on the location and use of all emergency and safety equipment carried on the aircraft to 24 months.

ORO.FC.231(i)(1)

The provision was drafted as follows:

The RMG:

(a) transposed the existing ORO.FC.230 of the Air OPS Regulation:

'(…)

(d) Emergency and safety equipment training and checking

Each flight crew member shall complete training and checking on the location and use of all emergency and safety equipment carried. The validity period of an emergency and safety equipment check shall be 12 calendar months.

(…)

(f) Each flight crew member shall undergo ground training and flight training in an FSTD or an aircraft, or a combination of FSTD and aircraft training, at least every 12 calendar months. (…)'

(b) combined the 2 points.

(c) removed the word 'check' because in EBT the concept of checking is removed. Also in the industry, training and checking are combined; therefore, the text is intended to reflect industry's practice.

(d) finalised the provision by adjusting the text to the EBT regulation.

ORO.FC.231 (i)(2)

The provision is transposed from ORO.FC.A.245 of the Air OPS Regulation and reworded as appropriated. The alleviation is consistent with the existing alleviation provided for the ATQP.

AMC1 ORO.FC.231(i) Evidence-based training

GROUND TRAINING

(a) Ground training

(1) The ground training programme should include:

(i) aircraft systems;

(ii) operational procedures and requirements; and

(iii) accident/incident and occurrence review.

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

(3) When the ground training is conducted within 3 calendar months prior to the expiry of the 12-calendar-month-period, the next ground training should be completed within 12 calendar months of the original expiry date of the previous training.

(b) Emergency and safety equipment training

(1) Emergency and safety equipment training should be conducted in an aircraft or a suitable alternative training device.

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

(i) actual donning of a life-jacket, where fitted;

(ii) actual donning of protective breathing equipment, where fitted;

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

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

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

(vi) security procedures.

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

(i) actual operation of all types of exits;

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

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

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

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

(vi) demonstration in the use of the life rafts, where fitted; and

(vii) particularly in the case where no cabin crew is required, first aid appropriate to the aircraft type, the kind of operation and the crew complement.

(4) The successful resolution of aircraft emergencies requires interaction between flight crew and cabin/technical crew and emphasis should be placed on the importance of effective coordination and two-way communication between all crew members in various emergency situations.

(5) Emergency and safety equipment training should include joint practice in aircraft evacuations 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 cabin/technical crew training should include joint discussion of emergency scenarios.

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

(7) Knowledge of the emergency and safety equipment training should be verified by a questionnaire or other suitable methods.

(8) When the emergency and safety equipment training is conducted within 3 calendar months prior to the expiry of the 12-calendar-month-period, the next emergency and safety equipment training should be completed within 12 calendar months of the original expiry date of the previous training.

(c) Emergency and safety equipment training — Extension of period of training

(1) The emergency and safety equipment training programme should establish and maintain at least an equivalent level of proficiency achieved by complying with the provisions of (b). The level of flight crew training proficiency shall be demonstrated prior to being granted approval to extend the period of training by the competent authority.

(2) The operator applying for an approval to extend the period of emergency and safety equipment training should provide the competent authority with an implementation plan, including a description of the level of flight crew training proficiency to be achieved. The implementation plan should comprise the following:

(i) A safety case, which should:

(A) demonstrate that the required or equivalent level of training proficiency is maintained;

(B) incorporate the programme of implementation, to include controls and validity checks;

(C) minimise risk during all phases of the programme's implementation and operation; and

(D) include oversight, including review and audits.

(ii) A feedback loop in order to validate and refine the programme, and to ascertain that the programme meets its proficiency objectives. The feedback should be used as a tool to validate that the programme is implemented; this enables substantiation of the programme, and that proficiency and training objectives have been met. The feedback loop should include data from the emergency and safety equipment training programme. In addition, the evaluation process should describe whether the overall targets/objectives of training are being achieved and should prescribe any corrective action that needs to be undertaken.

(iii) Documentation that details the scope and requirements of the programme, including the following:

(A) the operator's training needs and established operational and training objectives;

(B) a description of the process for designing and obtaining approval for the operator's emergency and safety equipment training programmes. This should include

quantified operational and training objectives identified by the operator's internal monitoring programmes. External sources may also be used; and

(C) a description of how the programme will develop a support and feedback process to form a self-correcting training system.

(3) When the emergency and safety equipment training is conducted within 6 calendar months prior to the expiry of the 24-calendar-month-period, the next emergency and safety equipment training should be completed within 24 calendar months of the original expiry date of the previous training.

AMC1 ORO.FC.231(i)

The proposed AMC points (a) and (b) are transposed from AMC1 ORO.FC.230.

The proposed AMC point (c) is based on the principles established in ORO.FC.A.245 and AMC1 ORO.FC.A.245 'Alternative training and qualification programme'.

AMC1 ORO.FC.231(i) point (a)(1)(ii)

The provision is transposed from AMC1 ORO.FC.230 point (a)(1) 'ground training' point (i)(B), which states:

'(B) operational procedures and requirements, including ground de-icing/anti-icing and pilot incapacitation;'

However, 'de-icing/anti-icing and pilot incapacitation' is deleted because it is already provided in the 'table of assessment and training topics' as a training topic.

AMC1 ORO.FC.231(i) point (a)(3) 'ground training'

The word used in AMC1 ORO.FC.230 is 'ground and refresher training'; however, this wording will be modified in order to align with the title of the AMC and therefore avoid duplication and misunderstanding.

AMC1 ORO.FC.231(i) point (b)(3)(iv)

The provision is transposed from AMC1 ORO.FC.230 point (a)(2) 'Emergency and safety equipment training' point (iii)(F). However, the provisions for helicopters are deleted as currently EBT, in accordance with Doc 9995, is only provided for some types of aeroplanes.

EASA is currently working on the development of an EBT data report for helicopters in order to allow first a mixed EBT implementation and in the future an EBT programme for helicopters.

AMC1 ORO.FC.231(i) point (b)(7)

As explained above, AMC1 ORO.FC.231(i) points (a) and (b) are transposed from AMC1 ORO.FC.230; however, the training elements and the checking elements are scattered across point (a) and point (b) of AMC1 ORO.FC.230. As in ORO.FC.231 both elements are combined in a single point, point (b)(7) is introduced; however, the wording is modified as in EBT the word 'checking' is not used.

AMC1 ORO.FC.231(i) point (c)

The requirement is transposed from the existing ATQP provision (see ORO.FC.A.245 of the Air OPS Regulation). The reason behind using the ATQP provisions is that emergency and safety equipment is out of the scope of EBT competencies; therefore, the ATQP provision is fit for purpose for the extension of validity. The maximum validity of 24 months is also transposed from ATQP.

AMC1 ORO.FC.231(i) point (c)(1)

This point is transposed from ORO.FC.245.A point (b) and adapted for the purposed of the AMC regarding ground training. This requirement provides the safety objective if an extension is requested, which is to achieve and maintain the level of proficiency set out in point (b)

In ATQP, ORO.FC.245.A.245 point (b) is then reflected in AMC1 ORO.FC.A.245 point (a)(1)(i) 'documentation'.

However, the proposal for ground training under the EBT programme does not impose these requirements. This does not mean that the competent authority is not entitled to ask for it; however, as the scope of the ground training is limited and the safety objectives of the EBT are demonstrated elsewhere, the proposed regulation tries to avoid unnecessary burdens.

AMC1 ORO.FC.231(i) point (c)(2)(iii)

The provision is transposed from AMC1 ORO.FC.A.245.point (a)(1) 'documentation'; however, the following adjustments have been made:

Point (i) of AMC1 ORO.FC.A.245 is not included;

Point (ii) of AMC1 ORO.FC.A.245 is transposed with no change;

Point (iii) of AMC1 ORO.FC.A.245 is transposed with slight modifications;

Point (iv) of AMC1 ORO.FC.A.245 — only the concept is transposed and provision is made to express the safety objective.

Extract of AMC1 ORO.FC.A.245

'(1) Documentation that details the scope and requirements of the programme, including the following:

(i) The programme should demonstrate that the operator is able to improve the training and qualification standards of flight crew to a level that exceeds the standards prescribed in ORO.FC and Subpart E of Annex V (SPA.LVO).

(ii) The operator's training needs and established operational and training objectives.

(iii) A description of the process for designing and gaining approval for the operator's flight crew qualification programmes. This should include quantified operational and training objectives identified by the operator's internal monitoring programmes. External sources may also be used.

(iv) A description of how the programme will:

(A) enhance safety;

(B) improve training and qualification standards of flight crew;

(C) establish attainable training objectives;

(D) integrate CRM in all aspects of training;

(E) develop a support and feedback process to form a self-correcting training system;

(F) institute a system of progressive evaluations of all training to enable consistent and uniform monitoring of the training undertaken by flight crew;

(G) enable the operator to be able to respond to new aeroplane technologies and changes in the operational environment;

(H) foster the use of innovative training methods and technology for flight crew instruction and the evaluation of training systems; and

(l) make efficient use of training resources, specifically to match the use of training media to the training needs'.

ORO.FC.240 Operation on more than one type or variant

AMC1 ORO.FC.240 Operation on more than one type or variant

GENERAL

(a) Aeroplanes

(1) When a flight crew member operates more than one aeroplane class, type or variant, as determined by the operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for class-single pilot or type-single pilot, but not within a single licence endorsement, the operator should ensure that the flight crew member does not operate more than:

(i) three reciprocating engine aeroplane types or variants;

(ii) three turbo-propeller aeroplane types or variants;

(iii) one turbo-propeller aeroplane type or variant and one reciprocating engine aeroplane type or variant; or

(iv) one turbo-propeller aeroplane type or variant and any aeroplane within a particular class.

(2) When a flight crew member operates more than one aeroplane type or variant within one or more licence endorsement, as determined by the operational suitability data established in accordance with Commission Regulation (EU) No 748/2012, the operator should ensure that:

(i) the minimum flight crew complement specified in the operations manual is the same for each type or variant to be operated;

(ii) the flight crew member does not operate more than two aeroplane types or variants for which a separate licence endorsement is required, unless credits related to the training, checking, and recent experience requirements are defined in operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for the relevant types or variants; and

(iii) only aeroplanes within one licence endorsement are flown in any one flight duty period, unless the operator has established procedures to ensure adequate time for preparation.

(3) When a flight crew member operates more than one aeroplane type or variant as determined by the operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for type-single pilot and type-multi pilot, but not within a single licence endorsement, the operator should comply with points (a)(2) and (4).

(4) When a flight crew member operates more than one aeroplane type or variant as determined by the operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for type multi-pilot, but not within a single licence endorsement, or combinations of aeroplane types or variants as determined by the operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for class single-pilot and type multi-pilot, the operator should comply with the following:

(i) point (a)(2);

(ii) before exercising the privileges of more than one licence endorsement:

(A) flight crew members should have completed two consecutive ~~operator proficiency checks~~ OPCs and should have:

— 500 hours in the relevant crew position in CAT operations with the same operator; or

— for IFR and VFR night operations with performance class B aeroplanes, 100 hours or flight sectors in the relevant crew position in CAT operations with the same operator, if at least one licence endorsement is related to a class. A check flight should be completed before the pilot is released for duties as commander;

(B) in the case of a pilot having experience with an operator and exercising the privileges of more than one licence endorsement, and then being promoted to command with the same operator on one of those types, the required minimum experience as commander is 6 months and 300 hours, and the pilot should have completed two consecutive ~~operator proficiency checks~~ OPCs before again being eligible to exercise more than one licence endorsement;

(iii) before commencing training for and operation of another type or variant, flight crew members should have completed 3 months and 150 hours flying on the base aeroplane, which should include at least one proficiency check, unless credits related to the training, checking and recent experience requirements are defined in operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for the relevant types or variants;

(iv) after completion of the initial line check on the new type, 50 hours flying or 20 sectors should be achieved solely on aeroplanes of the new type rating, unless credits related to the training, checking and recent experience requirements are defined in operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for the relevant types or variants;

(v) recent experience requirements established in Commission Regulation (EU) No 1178/2011 for each type operated;

(vi) the period within which line flying experience is required on each type should be specified in the operations manual;

(vii) when credits are defined in operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for the relevant type or variant, this should be reflected in the training required in ORO.FC.230 and:

(A) ORO.FC.230 (b) requires two ~~operator proficiency checks~~ OPCs every year. When credits are defined in operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for ~~operator proficiency checks~~ OPCs to alternate between the types, each ~~operator proficiency check~~ OPC should revalidate the ~~operator proficiency check~~ OPC for the other type(s). The ~~operator proficiency~~

~~check~~ OPC may be combined with the proficiency checks for revalidation or renewal of the aeroplane type rating or the instrument rating in accordance with Commission Regulation (EU) No 1178/2011. For approved EBT programmes, ORO.FC.231(a)(3) requires to complete a minimum of 2 modules of the EBT programme, separated by a period of more than 3 months, within a 12-month period, and is trained according to assessment and training topics distributed across a 3-year period at the defined frequency relevant to the type or variant of aircraft. When credits are defined in operational suitability data established in accordance with Commission Regulation (EU) No 748/2012, EBT modules should alternate between types. The EBT modules may be combined for revalidation or renewal of the aeroplane type rating or the instrument rating in accordance with Commission Regulation (EU) No 1178/2011. When operating more than one type of different generation, the operator has to fulfil both generation base line programmes as per AMC2 ORO.FC.231(a).

(B) ORO.FC.230 (c) requires one line check every year. When credits are defined in operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for line checks to alternate between types or variants, each line check should revalidate the line check for the other type or variant. For approved EBT programmes, ORO.FC.231(h) requires one line evaluation of competence every year. When credits are defined in operational suitability data established in accordance with Commission Regulation (EU) No 748/2012 for line evaluation of competence to alternate between types or variants, each line evaluation of competence should revalidate the line evaluation of competence for the other type or variant.

(C) Annual emergency and safety equipment training and checking should cover all requirements for each type. For approved EBT programmes, ORO.FC.231(i) allows an operator, with the approval of the competent authority, to extend the period of training on the location and use of all emergency and safety equipment for each type to 24 months.

(b) Helicopters […]

AMC1 ORO.FC.240

The RMG developed the AMC and concluded:

— ORO.FC.140 is applicable to EBT and does not require modification.

‘ORO.FC.140 Operation on more than one type or variant

(a) Flight crew members operating more than one type or variant of aircraft shall: comply with the requirements prescribed in this Subpart for each type or variant, unless credits related to the training, checking, and recent experience requirements are defined in the mandatory part of the operational suitability data established in accordance with Regulation (EU) No 748/2012 for the relevant types or variants.

(b) Appropriate procedures and/or operational restrictions shall be specified in the operations manual for any operation on more than one type or variant.’

— ORO.FC.240 is applicable to EBT and does not require modification. However, some minor modifications were needed in AMC1 ORO.FC.240.

— Part-FCL of the Aircrew Regulation and AMC1 FCL.740 point (a) should specify that in case of operations on more than one type or variant, two modules shall be performed on each type or variant for revalidation.

— The group discussed iwhether the simulators of the module should be performed in the same aircraft type or it is possible to perform the simulators in different aircraft types. The conclusion was that simulators should be performed in the same aircraft type.

— Finally, the RMG concluded that in case of different generations of aircraft, the operator has to fulfil both generations' EBT programme requirements as per AMC 2,3,4,5 to 6 ORO.FC.231(a).

Appendix II to Part-ORO of Regulation (EU) No 965/2012

APPENDIX II — EBT PROGRAMME

The EBT programme shall ensure that flight crew members are exposed to assessment and training topics relevant to the type or variant of aircraft on which they operate. Aircraft types not included shall not apply EBT.

AMC1 to Appendix II — EBT programme

AIRCRAFT TYPE BY GENERATIONS

Generation 4 — Jet AMC2 ORO.FC.231(a)	A318/A319/A320/A321 (including neo), A330, A340-200/300, A340-500/600, B777, A380, B787, A350, Bombardier C Series, Embraer E170/E175/E190/E195
Generation 3 — Jet AMC3 ORO.FC.231(a)	A310/A300-600, B737-300/400/500, B737-600/700/800 (NG), B737 MAX, B757, B767, B747-400, B747-8, B717, BAE 146, MD11, MD80, MD90, F70, F100, Bombardier CRJ Series, Embraer ERJ 135/145
Generation 3 — Turboprop AMC4 ORO.FC.231(a)	ATR 42-600, ATR 72-600, Bombardier Dash 8-400, BAE ATP, Embraer 120, Saab 2000
Generation 2 — Jet AMC5 ORO.FC.231(a)	A300 (except A300-600), BAC111, B727, B737-100/200, B747-100/200/300, DC9, DC10, F28, L1011
Generation 2 — Turboprop AMC6 ORO.FC.231(a)	ATR 42, ATR 72 (all series except -600), BAE J-41, Fokker F27/50, Bombardier Dash 7 and Dash 8-100/200/300 Series, Convair 580-600 Series, Shorts 330 and 360, Saab 340
Generation 1 — Jet AMC7 ORO.FC.231(a)	DC8, B707

GM1 to Appendix II — EBT programme

FLIGHT PHASE FOR ACTIVATION

Abbreviation	*Flight phase*	*Part I, 3.3.3 Phase #*	*Description*
ALL	All	All flight phases	Any or all phases of flight
GND	Flight planning, preflight, engine start and taxi-out Taxi-in, engine shut-down, post-flight and flight closing	Phase 1 and Phase 8	Ground phases up to when the crew increases thrust for taking-off. From the speed that permits the aircraft to be manoeuvred by means of taxiing for arriving at a parking area until the crew completes post-flight and flight closing duties.
TO	Take-off	Phase 2	This phase begins when the crew increases the thrust for taking-off. It ends after the speed and configuration are established at a defined manoeuvring altitude or to continue the climb for cruise.
CLB	Climb	Phase 3	This phase begins when the crew establishes the aircraft at a defined speed and configuration enabling the aircraft to increase altitude for the purpose of cruise. It ends with the aircraft established at a predetermined constant initial cruise altitude at a defined speed.
CRZ	Cruise	Phase 4	The cruise phase begins when the crew establishes the aircraft at a defined speed and predetermined constant initial cruise altitude and proceeds in the direction of a destination. It ends with the beginning of descent for an approach.
DES	Descent	Phase 5	This phase begins when the crew departs the cruise altitude for an approach at a particular destination. It ends when the crew initiates changes in aircraft configuration and/or speed to facilitate a landing on a particular runway.
APP	Approach	Phase 6	This phase begins when the crew initiates changes in aircraft configuration and/or speeds enabling the aircraft to manoeuvre for landing on a particular runway. It ends when the aircraft is in the landing configuration and the crew is dedicated to land on a specific runway. It also

Abbreviation	*Flight phase*	*Part I, 3.3.3 Phase #*	*Description*
			includes go-around where the crew aborts the descent to the planned landing runway during the approach phase. Go-around ends after speed and configuration are established at a defined manoeuvring altitude or to continue the climb for cruise.
LDG	Landing	Phase 7	This phase begins when the aircraft is in the landing configuration and the crew is dedicated to touchdown on a specific runway. It ends when the speed permits the aircraft to be manoeuvred by means of taxiing for arrival at a parking area.

AMC2 to Appendix II — EBT programme

GENERATION 4 (JET) — TABLE OF ASSESSMENT AND TRAINING TOPICS REFERRED TO IN AMC2 ORO.FC.231(a)

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
	Generation 4 Jet — Recurrent assessment and training matrix						*Competency map*								
Section 1															
Manoeuvres training phase	Rejected take-off	A	TO	Engine failure after the application of take-off thrust and before reaching V1	Demonstrate manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detect deviations through instrument scanning Maintain spare mental capacity during manual aircraft control Maintain the aircraft within the flight envelope Apply knowledge of the relationship between aircraft attitude, speed and thrust	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
	Failure of critical engine between V1 & V2	A	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement	x			x					
	Failure of critical engine between V1 & V2	B	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x			x					
	Emergency descent	C	CRZ	Initiation of emergency descent from normal cruise altitude		The manoeuvre is considered to be completed once the aircraft is stabilised in emergency descent configuration (and profile)	x		x	x					
	Engine-out approach & go-around	A	APP	With a critical engine failed, manually flown normal precision approach to DA, followed by manually flown go-around, the whole manoeuvre to be flown without visual reference		This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement (describe generally critical part of manoeuvre)	x			x					
	Go-around	A	APP	Go-around, all engines operative		High energy, initiation during the approach at 150 to 300 m (500 to 1 000 ft) below the missed approach level-off altitude	x		x	x					
			APP	Go-around, all engines operative followed by visual circuit, manually flown		Initiation of go-around from DA followed by visual circuit and landing	x		x	x					
			APP	Go-around, all engines operative		During flare/rejected landing	x		x	x					
	Engine-out landing	A	LDG	With a critical engine failed, normal landing		Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					
Section 2 Equivalency of Approaches relevant to operations															
MT phase	Approach type A or B	B	APP	Approach type A or B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type A	B	APP	Approach type A flight method 2D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations	Approaches flown from FAF to landing or go around	x		x	x					

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT phases	Approach type A	B	APP	Approach type A flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type B	B	APP	Approach type B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations	Approaches flown from FAF to landing or go around	x		x	x					
Section 3 Training topics frequency (A) in alphabetical order.															
Evaluation and scenario-based training phases	Adverse weather	A	GND	Thunderstorm, heavy rain, turbulence, ice build-up to include de-icing issues, as well as high- temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios.	Anticipate adverse weather Prepare for suspected adverse weather Recognise adverse weather Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Predictive wind shear warning before take-off, as applicable	x	x				x			
			ALL			Adverse-weather scenario, e.g. thunderstorm activity, precipitation, icing		x			x	x		x	
			TO			Wind shear encounter during take-off, not predictive	x			x			x		X
			TO			Predictive wind shear warning during take-off	x	x				x	x		
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			CRZ			Wind shear encounter scenario during cruise	x		x			x	x	x	
			APP			Reactive wind shear warning during approach or go-around	x		x	x			x		
			APP			Predictive wind shear warning during approach or go-around	x	x				x	x		
			APP			Thunderstorm encounter during approach or on missed approach	x					x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Non-precision approach in cold temperature conditions, requiring altitude compensation for temperature, as applicable to type	x	x					x		
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x				x			

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Automation management	A	CLB CRZ DES APP	The purpose of this topic is to encourage and develop effective flight path management through proficient and appropriate use of the flight management system(s), guidance and automation including transitions between modes, monitoring, mode awareness, vigilance and flexibility needed to change from one mode to another. Included in this topic is the means of mitigating errors described as: mishandled auto flight systems, inappropriate mode selection, flight management system(s) and autopilot usage.	Know how and when to use the flight management system(s), guidance and automation Demonstrate correct methods for engagement and disengagement of the auto flight system(s) Demonstrate appropriate use of flight guidance, auto thrust and other automation systems Maintain mode awareness of the auto flight system(s), including engagement and automatic transitions Revert to different modes when appropriate Detect deviations from the desired aircraft state (flight path, speed, attitude, thrust, etc.) and take appropriate action. Anticipate mishandled auto flight system Recognise mishandled auto flight system. Take appropriate action if necessary Restore correct auto flight state Identify and manage consequences	ACAS warning, recovery and subsequent engagement of automation	x		x						
			ALL			FMS tactical programming issues, e.g. step climb, runway changes, late clearances, destination re-programming, executing diversion	x		x						X
			CLB CRZ DES APP			Recoveries from TAWS, management of energy state to restore automated flight	x		x	x					
			CLB CRZ DES APP			Amendments to ATC cleared levels during altitude capture modes to force mode awareness and intervention	x		x				x		
			TO			Late ATC clearance to an altitude below acceleration altitude	x		x				x		
			TO APP			Engine-out special terrain procedures	x		x				x		
			CRZ			Forcing AP disconnect followed by re-engagement, recovery from low- or high-speed events in cruise	x		x	x			x		
			CRZ			Engine failure in cruise to onset of descent using automation	x		x						
			CRZ			Emergency descent	x		x						X
			DES APP			Managing high-energy descent capturing descent path from above (correlation with unstable approach training)	x		x				x		X
			APP			No ATC clearance received prior to commencement of approach or final descent	x		x				x		
			APP			Reactive wind shear and recovery from the consequent high-energy state	x		x				x		
			APP			Non-precision or infrequently flown approaches using the maximum available level of automation	x		x						X
			APP			Gear malfunction during approach		x				x		x	
			APP			ATC clearances to waypoints beyond programmed descent point for a coded final descent point during an approach utilising a final descent that is commanded by the flight management system.	x		x				x		X

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates communication; leadership and teamwork; problem-solving and decision-making; situation awareness and management of information; workload management. Emphasis should be placed on the development of leadership, shown by EBT data sources to be a highly effective competency in mitigating risk and improving safety through pilot performance	<u>Communication:</u> Demonstrate effective use of language, responsiveness to feedback and that plans are stated and ambiguities resolved. <u>Leadership and teamwork:</u> Use appropriate authority to ensure focus on the task. Support others in completing tasks. <u>Problem-solving and decision-making:</u> Detect deviations from the desired state, evaluate problems, identify risk, consider alternatives and select the best course of action. Continuously review progress and adjust plans. <u>Situation awareness and management of information:</u> Have an awareness of the aircraft state in its environment; project and anticipate changes. <u>Workload management:</u> Prioritise, delegate and receive assistance to maximise focus on the task. Continuously monitor the flight progress	GPS failure prior to commencement of approach associated with position drift and a terrain alert					x	x	x		X
			DES			Cabin crew report of water noise below the forward galley indicating a possible toilet pipe leak, with consequent avionics failures					x	x	x		
			CRZ			Smoke removal but combined with a diversion until landing completed.		x			x	x	x	x	X
			APP			ACAS warning immediately following a go-around, with a descent manoeuvre required.		x			x	x	x	x	
	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOPs). This is not intended to list scenarios, but instructors should ensure that observed non-compliances are taken as learning opportunities throughout the programme. In all modules of the programme, the FSTD should as far as possible be treated like an aircraft, and non-compliances should not be accepted simply for expediency.	Recognise that a compliance failure has occurred Make a verbal announcement Take appropriate action if necessary Restore safe flight path if necessary Manage consequences	The following are examples of potential compliance failures, and not intended to be developed as scenarios as part of an EBT module: 1. Requesting flap beyond limit speed 2. Flaps or slats in the wrong position for phase of flight or approach 3. Omitting an action as part of a procedure 4. Failing to initiate or complete a checklist 5. Using the wrong checklist for the situation	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Go-around management	A	APP	Any threat or error that can result in circumstances that require a decision to perform go-around, in addition to the execution of the go-around. Go-around scenarios should be fully developed to encourage effective leadership and teamwork, in addition to problem-solving and decision-making, plus execution using manual aircraft control or the flight management system(s) and automation as applicable. Design should include the element of surprise and scenario-based go-arounds should not be predictable and anticipated. This topic is completely distinct from the go-around manoeuvre listed in the manoeuvres training section that is intended only to practise psychomotor skill and a simple application of the procedures		Adverse-weather scenario leading to a reactive wind shear warning during approach	x	x					x	x	
			APP			Adverse-weather scenario leading to a predictive wind shear warning during approach or go-around	x	x					x	x	
			APP			Adverse-weather scenario, e.g. thunderstorm activity, heavy precipitation or icing forcing decision at or close to DA/MDA	x					x	x	x	
			APP			DA with visual reference in heavy precipitation with doubt about runway surface braking capability	x					x	x	x	
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP			Lost or difficult communications resulting in no approach clearance prior to commencement of approach or final descent	x		x				x		
			APP			Birds: large flocks of birds below DA once visual reference has been established				x		x	x		
			APP			System malfunction, landing gear malfunction during the approach									

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Manual aircraft control	A	CLB CRZ DES APP	Controls the flight path through manual control	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Flight with unreliable airspeed, which may be recoverable or not recoverable	x			x			x		X
			CLB CRZ DES APP			Alternate flight control modes according to malfunction characteristics	x			x				x	X
			CLB CRZ DES APP			ACAS RA to descend or ATC immediate descent	x	x		x					
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	x			x	x				
			TO			Scenario immediately after take-off which requires an immediate and overweight landing			x	x	x	x			
			TO			Adverse wind, crosswinds with or without strong gusts on take-off	x			x					
			TO			Adverse weather, wind shear, wind shear encounter during take-off, with or without reactive warnings	x			x			x		
			TO			Engine failure during initial climb, typically 30-60 m (100-200 ft) (autopilot off)	x	x		x				x	
			CRZ			Wind shear encounter scenario during cruise, significant and rapid change in wind speed or down/updrafts, without wind shear warning	x		x			x	x	x	
			APP			Adverse weather, wind shear, wind shear encounter with or without warning during approach	x		x	x			x		
			APP			Adverse weather, deterioration in visibility or cloud base, or adverse wind, requiring a go-around from visual circling approach, during the visual segment	x	x	x	x		x	x	x	
			APP LDG			Adverse wind, crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
			APP LDG			Adverse weather, adverse wind, approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP LDG			Circling approach at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights									
			APP LDG			Runway incursion during approach, which can be triggered by ATC at various altitudes or by visual contact during the landing phase	x			x			x		
			LDG			Adverse wind, visibility, type-specific, special consideration for long-bodied aircraft, landing in minimum visibility for visual reference, with crosswind	x	x		x			x		
			LDG			System malfunction, auto flight failure at DA during a low-visibility approach requiring a go-around flown manually	x		x	x			x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Approach planned with autoland, followed by a failure below 1000 feet requiring a go-around, and an immediate landing due to fuel shortage.	x		x		x		x		
Evaluation and scenario-based training phases	Monitoring, cross checking, error management, mismanaged aircraft state	A	ALL	The scenarios should be realistic and relevant, and should be used for the purpose of demonstration and reinforcement of effective flight path monitoring. Modules in the FSTD should be treated like those in an aircraft so that trainees have the opportunity to develop competency with the practice of the right techniques and attitudes related to these topics through pilot performance, and that instructors have the opportunity to assess and train these topics in a realistic environment. As shown by the EBT data report, these topics are of key importance to improve safety in operations. In addition, the operator may also use these topics to develop scripted role-playing scenarios in the form of ISI training. These scenarios cater for the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. Demonstration scenarios may also be used. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training.	Recognise mismanaged aircraft state. Observe behaviour: how pilot is mitigating errors, how pilot is performing cross checking, how pilot is monitoring performance and dealing with a mismanaged aircraft state, so the instructors should ensure that observed deviations, errors and mistakes are taken as learning opportunities throughout the programme. Monitor flight path excursions. Detect errors and threats through proper cross checking performance. Make appropriate interventions either verbally or by taking control if applicable. Take appropriate action if necessary Restore desired aircraft state Identify and manage consequences	Deviations from the flight path, in pitch attitude, speed, altitude, bank angle		x					x		
			ALL			In-seat instruction: Simple automation errors (e.g. incorrect mode selection, attempted engagement without the necessary conditions, entering wrong altitude or speed, failure to execute the desired mode) culminating in a need for direct intervention from the PM, and where necessary taking control.		x					x		
			APP			In-seat instruction: Unstable approach or speed/path/vertical rate not congruent with required state for given flight condition	x	x					x	x	
			LDG			In-seat instruction: Demonstration exercise — recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM	x			x			x		
	Unstable approach	A	DES APP	Reinforce stabilised approach philosophy and adherence to defined parameters. Encourage go-arounds when crews are outside these parameters. Develop and sustain competencies related to the management of high-energy situations		ATC or terrain related environment creating a high-energy descent with the need to capture the optimum profile to complete the approach in a stabilised configuration	x		x				x		
			DES APP			ATC or terrain related environment creating a high-energy descent leading to unstable conditions and requiring a go-around	x		x				x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
Section 3 Training topics frequency (B) per phase and in alphabetical order.															
Evaluation ,manoeuvres training, and scenario-based training phases	Upset prevention training	B	N/A	Compliance with AMC1 or 2 ORO.FC.220&230	Include upset prevention elements in Table 1 for the recurrent training programme at least every 12 calendar months, such that all the elements are covered over a period not exceeding 3 years.	See Table 1 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								
Evaluation and scenario-based training phases	Adverse wind	B	TO	Adverse wind/crosswind. This includes tailwind but not ATC mis-reporting of the actual wind	Recognise adverse-wind conditions Observe limitations Apply appropriate procedures Maintain directional control and safe flight path	Take-off with different crosswind/tailwind/gust conditions						x		x	
			TO			Take-off with unreported tailwind		x			x				
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswind including shifting wind directions				x		x	x		
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP LDG			Crosswind with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	ALL	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: • Immediacy • Complexity • Degradation of aircraft control • Loss of primary instrumentation • Management of consequences	Recognise system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormal associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences The operator should vary malfunctions for each characteristic over the EBT cycle.	For full details, see the Malfunction Equivalency methodology. At least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below 7 for each crew member every year. (i) System malfunctions requiring immediate and urgent crew intervention or decision, e.g. fire, smoke, loss of pressurisation at high altitude, failures during take-off, brake failure during landing. (ii) System malfunctions requiring complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures, major dual system electrical. (iii) System malfunctions resulting in significant degradation of flight controls in combination with abnormal handling characteristics, e.g. jammed flight controls, certain degradation of FBW control, Jammed horizontal stabiliser; Flaps and/or slats locked, other malfunctions resulting in degraded flight controls. (iv) System failures that require monitoring and management of the flight path using degraded or alternative displays, unreliable primary flight path information, unreliable airspeed, e.g. flight with unreliable airspeed (v) System failures that require extensive management of their consequences (independent of operation or environment), e.g. fuel leak.	Intentionally blank								
			TO			MEL items with crew operating procedures applicable during take-off						x			X
			TO			Response to an additional factor that is affected by MEL item (e.g. system failure, runway state)		x		x		x			X
			GND			Malfunction during preflight preparation and prior to departure	x					x	x		
			CLB			Malfunction after departure	x					x	x		X
			ALL			Malfunctions requiring immediate attention (e.g. bleed fault during engine start, hydraulic failure during taxi)	x				x			x	
			CLB CRZ			Fuel leak (management of consequences)	x				x		x		X
			TO			Take-off high speed below V1	x				x	x			
			TO			Take-off high speed above V1	x					x			
			TO			Initial climb	x					x			
			APP			On approach	x					x		x	
			APP			Go-around	x					x		x	
			LDG			During landing	x	x		x		x	x		

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
	Generation 4 Jet — Recurrent assessment and training matrix						*Competency map*								
Evaluation and scenario-based training phases	Aircraft system management	B		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It links with the topic 'compliance' Where a system is not managed according to normal or defined procedures, this is determined as a non-compliance	See 'compliance' topic above. There are no defined scenarios, but the instructor should focus on learning opportunities when system management non-compliances manifest themselves during other scenarios. Underpinning knowledge of systems and their interactions should be developed and challenged, and not merely the application of normal procedures	Intentionally blank								X
			CRZ APP LDG			Minimum fuel, caused by extended delays, weather...etc. where the crew would need to managed a minimum fuel situation.					x	x	x	x	
	Approach, visibility close to minimum	B	APP	Any situation where visibility becomes a threat	Recognise actual conditions Observe aircraft and/or procedural limitations Apply appropriate procedure if applicable Maintain directional control and safe flight path	Approach in poor visibility	x		x	x				x	
			APP			Approach in poor visibility with deteriorations necessitating a decision to perform go-around	x		x	x					
			LDG			Landing in poor visibility				x		x	x		
	Landing	B	LDG	Pilots should have opportunities to practise landings in demanding situations at the defined frequency. Data indicates that landing problems have their roots in a variety of factors, including appropriate decision-making, in addition to manual aircraft control skills if difficult environmental conditions exist. The purpose of this item is to ensure that pilots are exposed to this during the programme	Landing in demanding environmental conditions, with malfunctions as appropriate	This topic should be combined with the adverse-weather topic, aircraft system malfunctions topic or any topic that can provide exposure to a landing in demanding conditions	Intentionally blank								
	Runway or taxiway condition	B	GND TO LDG	Contamination or surface quality of the runway, taxiway, or tarmac including foreign objects	Recognise hazardous runway condition Observe limitations Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Planned anticipated hazardous conditions with dispatch information provided to facilitate planning and execution of appropriate procedures						x			X
			GND TO LDG			Unanticipated hazardous conditions, e.g. unexpected heavy rain resulting in flooded runway surface		x			x	x			
			TO			Stop/go decision in hazardous conditions					x	x		x	

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
	Generation 4 Jet — Recurrent assessment and training matrix						*Competency map*								
Evaluation and scenario-based training phases	Surprise	B	ALL	The data analysed during the development of this manual and of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a surprise, or an unexpected event. The element of surprise should be distinguished from what is sometimes referred to as the 'startle factor', the latter being a physiological reaction. Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrence, so that pilots do not become overly familiar with repetitions of the same scenarios. Variations should be the focus of EBT programme design, and not left to the discretion of individual instructors, in order to preserve programme integrity and fairness	Exposure to an unexpected event or sequence of events at the defined frequency	Intentionally blank	Intentionally blank								
	Terrain	B	ALL	Alert, warning, or conflict	Anticipate terrain threats Prepare for terrain threats Recognise unsafe terrain clearance Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Restore safe flight path Manage consequences	ATC clearance giving insufficient terrain clearance	x	x			x				X
			ALL			Demonstration of terrain avoidance warning systems (this scenario element may be done in an ISI.)						x	x	x	
			TO CLB			Engine failure where performance is marginal leading to TAWS warning		x		x				x	
			DES			'Virtual mountain' meaning the surprise element of an unexpected warning. Care should be exercised in creating a level of realism, so this can best be achieved by an unusual and unexpected change of route during the descent						x	x	x	
	Workload, distraction, pressure	B	ALL	This is not considered a topic for specific attention on its own, but more as a reminder to programme developers to ensure that pilots are exposed to immersive training scenarios which expose them to manageable high workload and distractions during the course of the EBT programme, at the defined frequency	Manage available resources efficiently to prioritise and perform tasks in a timely manner under all circumstances	Intentionally blank	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 3 Training topics frequency (C) per phase and in alphabetical order.															
Evaluation, manoeuvres training and scenario-based training phases	Upset recovery	C	N/A	Compliance with AMC1 or 2 ORO.FC.220&230 An aeroplane upset is defined as an undesired aeroplane state in flight characterised by unintentional divergences from parameters normally experienced during line operations or training. An aeroplane upset may involve pitch and/or bank angle divergences as well as inappropriate airspeeds for the conditions. The example scenario elements may be done in ISI, as non-ISI or a combination of both. Include the recovery exercises in Table 2 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years.	Recognise upset condition Take appropriate action Assure aircraft control Maintain or restore a safe flight path Assess consequential issues Manage outcomes	See Table 2 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank							
			CLB CRZ DES APP			Upset recognition: Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist			x	x			x	x	
			TO APP			Upset recognition and recovery — Severe wind shear or wake turbulence during take-off or approach			x	x		x	x		X
			CLB DES			Upset recognition and recovery — as applicable and relevant to aircraft type, demonstration at a suitable intermediate level, with turbulence as appropriate; practise steep turns and note the relationship between bank angle, pitch and stalling speed				x			x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence to trigger overspeed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)			x	x		x	x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence and significant temperature rise to trigger low-speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	x			x			x		X
			CRZ			Upset recognition and recovery — demonstration at a normal cruising altitude, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			APP			Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			CLB DES			In-seat instruction: Recovery – Demonstration: the instructor should position the aircraft within but close to the edge of the normal flight envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the normal flight envelope				x			x		X
EVAL and SBT phases	ATC	C	ALL	ATC error. Omission, miscommunication, garbled, poor quality transmission. All of these act as distractions to be managed by the crew. The scenarios should be combined where possible with others of the same or higher weighting, the principle reason being to create distractions.	Respond to communications appropriately Recognise, clarify and resolve any ambiguities Refuse or question unsafe instructions. Use standard phraseology whenever possible	ATC role-play: the instructor provides scripted instructions, as a distraction to the crew	x	x			x				
			ALL			Controller error, provided by the instructor according to a defined scripted scenario	x	x				x	x		
			ALL			Frequency congestion, with multiple aircraft using the same frequency		x							
			ALL			Poor quality transmissions		x							

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
	Generation 4 Jet — Recurrent assessment and training matrix						*Competency map*								
Evaluation and scenario-based training phases	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that impacts performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only for the practice of psychomotor skill and reinforcement of procedures in managing engine failures	Recognise engine failure Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Take-off low speed	x			x		x		x	
			TO			Take-off high speed below V1	x			x		x		x	
			TO			Take-off above V1	x					x	x	x	
			TO			Initial climb	x					x	x		
			APP			Engine malfunction	x					x		x	
			CRZ			Engine failure in cruise (with autopilot)	x		x				x		
			LDG			On landing				x					
	Fire and smoke management	C	GND	This includes engine, electric, pneumatic, cargo fire, smoke or fumes	Recognise fire, smoke or fumes Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Fire in cargo or cabin/cockpit at gate	x	x				x		x	
			GND			Fire during taxi	x	x				x		x	X
			GND			Fire with no cockpit indication	x	x				x		x	X
			TO			Take-off low speed	x			x	x	x			X
			TO			Take-off high speed below V1	x			x	x	x			
			TO			Take-off high speed above V1	x				x	x			
			TO			Initial climb	x				x	x			
			CRZ			Cargo fire						x	x	x	
			APP			Engine fire in approach (extinguishable)		x				x			
			APP			Engine fire in approach (non-extinguishable)		x			x	x			
			APP			Flight deck or cabin fire		x			x	x			X
	Loss of communications	C	GND	Lost or difficult communications. Either through pilot mis-selection or a failure external to the aircraft. This could be for a few seconds or a total loss.	Recognise loss of communications Take appropriate action Execute appropriate procedure as applicable Use alternative ways to communicate Manage consequences	Loss of communications during ground manoeuvring	x	x							
			TO			Loss of communications after take-off	x					x			X
			APP			Loss of communications during approach phase, including go-around	x	x				x	x		X
	Managing loading, fuel, performance errors	C	ALL	A calculation error by one or more pilots, or someone involved with the process, or the process itself, e.g. incorrect information on the load sheet	Anticipate the potential for errors in load/fuel/performance data Recognise inconsistencies Manage/avoid distractions Make changes to paperwork/aircraft system(s) to eliminate error Identify and manage consequences	This can be a demonstrated error, in that the crew may be instructed to deliberately insert incorrect data, for example to take off from an intersection with full-length performance information. The crew will be asked to intervene when acceleration is sensed to be lower than normal, and this may be part of the operator procedures, especially when operating mixed fleets with considerable variations in MTOM.	x	x						x	

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
	Generation 4 Jet — Recurrent assessment and training matrix						*Competency map*								
Evaluation and scenario-based training phasess	Navigation	C	GND	External NAV failure. Loss of GPS satellite, ANP exceeding RNP, loss of external NAV source(s)	Recognise a NAV degradation. Take appropriate action Execute appropriate procedure as applicable Use alternative NAV guidance Manage consequences	External failure or a combination of external failures degrading aircraft navigation performance	x		x			x	x		
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance		x			x	x	x		
	Operations- or type-specific	C	ALL	Intentionally blank	Intentionally blank	Intentionally blank	Intentionally blank								
	Operations of special airport approval	C	APP LDG	See equivalency of approaches relevant to operations.	The operator should comply with the national qualification requirements published in the Aeronautical Information Publication	Intentionally blank	Intentionally blank								
	Pilot incapacitation	C	TO	Consequences for the non-incapacitated pilot	Recognise incapacitation Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences	During take-off	x	x			x	x			X
			APP			During approach	x			x				x	X
	Traffic	C	CLB CRZ DES	Traffic conflict. ACAS RA or TA, or visual observation of conflict, which requires evasive manoeuvring	Anticipate potential loss of separation Recognise loss of separation Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	ACAS warning requiring crew intervention		x				x	x	x	
	Wind shear recovery	C	TO	With or without warnings including predictive. A wind shear scenario is ideally combined into an adverse-weather scenario containing other elements.	Anticipate potential for wind shear Avoid known wind shear or prepare for suspected wind shear Recognise wind shear encounter Take appropriate action Apply appropriate procedure correctly Assure aircraft control Recognise out of wind shear condition Maintain or restore a safe flight path Assess consequential issues and manage outcomes	Predictive wind shear warning during take-off					x	x			
			TO			Wind shear encounter during take-off	x				x	x			
			TO			Wind shear encounter after rotation						x		x	
			TO			Predictive wind shear after rotation					x	x			
			APP			Predictive wind shear during approach	x				x	x			
			APP			Wind shear encounter during approach	x				x	x			

AMC3 to Appendix II — EBT programme

GENERATION 3 (JET) — TABLE OF ASSESSMENT AND TRAINING TOPICS REFERRED TO IN AMC3 ORO.FC.231(a)

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
	Generation 3 Jet — Recurrent assessment and training matrix						*Competency map*								
Section 1															
Manoeuvres training phase	Rejected take-off	A	TO	Engine failure after the application of take-off thrust and before reaching V1	Demonstrate manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detect deviations through instrument scanning Maintain spare mental capacity during manual aircraft control Maintain the aircraft within the flight envelope Apply knowledge of the relationship between aircraft attitude, speed and thrust	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
	Failure of critical engine between V1 & V2	A	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement	x			x					
	Failure of critical engine between V1 & V2	B	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x			x					
	Emergency descent	C	CRZ	Initiation of emergency descent from normal cruise altitude		The manoeuvre is considered to be completed once the aircraft is stabilised in emergency descent configuration (and profile)	x		x	x					
	Engine-out approach & go-around	A	APP	With a critical engine failed, manually flown normal precision approach to DA, followed by manually flown go-around, the whole manoeuvre to be flown without visual reference		This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement (describe generally critical part of manoeuvre)	x			x					
	Go-around	A	APP	Go-around, all engines operative		High energy, initiation during the approach at 150 to 300 m (500 to 1 000 ft) below the missed approach level-off altitude	x		x	x					
			APP	Go-around, all engines operative followed by visual circuit, manually flown		Initiation of go-around from DA followed by visual circuit and landing	x		x	x					
			APP	Go-around, all engines operative		During flare/rejected landing	x		x	x					
	Engine-out landing	A	LDG	With a critical engine failed, normal landing		Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					
Section 2 Equivalency of Approaches relevant to operations															
MT phase	Approach type A or B	B	APP	Approach type A or B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type A	B	APP	Approach type A flight method 2D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		x
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations.	Approaches flown from FAF to landing or go around	x		x	x					

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT phases	Approach type A	B	APP	Approach type A flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		x
	Approach typed B	B	APP	Approach type B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations.	Approaches flown from FAF to landing or go around	x		x	x					
Section 3 Training topics frequency (A) in alphabetical order.															
Evaluation and scenario-based training phases	Adverse weather	A	GND	Thunderstorm, heavy rain, turbulence, ice build-up to include de-icing issues, as well as high- temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios.	Anticipate adverse weather Prepare for suspected adverse weather Recognise adverse weather Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Predictive wind shear warning before take-off, as applicable	x	x				x			
			ALL			Adverse-weather scenario, e.g. thunderstorm activity, precipitation, icing		x			x	x		x	
			TO			Wind shear encounter during take-off, not predictive	x			x			x		X
			TO			Predictive wind shear warning during take-off	x	x				x	x		
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			CRZ			Wind shear encounter scenario during cruise	x		x			x	x	x	
			APP			Reactive wind shear warning during approach or go-around	x		x	x			x		
			APP			Predictive wind shear warning during approach or go-around	x	x				x	x		
			APP			Thunderstorm encounter during approach or on missed approach	x					x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Non-precision approach in cold temperature conditions, requiring altitude compensation for temperature, as applicable to type	x	x					x		
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x				x			

Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix						*Competency map*								
Evaluation and scenario-based training phases	Automation management	A	CLB CRZ DES APP	The purpose of this topic is to encourage and develop effective flight path management through proficient and appropriate use of the flight management system(s), guidance and automation including transitions between modes, monitoring, mode awareness, vigilance and flexibility needed to change from one mode to another. Included in this topic is the means of mitigating errors described as: mishandled auto flight systems, inappropriate mode selection, flight management system(s) and autopilot usage.	Know how and when to use the flight management system(s), guidance and automation Demonstrate correct methods for engagement and disengagement of the auto flight system(s) Demonstrate appropriate use of flight guidance, auto thrust and other automation systems Maintain mode awareness of the auto flight system(s), including engagement and automatic transitions Revert to different modes when appropriate Detect deviations from the desired aircraft state (flight path, speed, attitude, thrust, etc.) and take appropriate action. Anticipate mishandled auto flight system Recognise mishandled auto flight system. Take appropriate action if necessary Restore correct auto flight state Identify and manage consequences	ACAS warning, recovery and subsequent engagement of automation	x		x						
			ALL		FMS tactical programming issues, e.g. step climb, runway changes, late clearances, destination re-programming, executing diversion	x		x						X
			CLB CRZ DES APP		Recoveries from TAWS, management of energy state to restore automated flight	x		x	x					
			CLB CRZ DES APP		Amendments to ATC cleared levels during altitude capture modes to force mode awareness and intervention	x		x				x		
			TO		Late ATC clearance to an altitude below acceleration altitude	x		x				x		
			TO APP		Engine-out special terrain procedures	x		x				x		
			CRZ		Forcing AP disconnect followed by re-engagement, recovery from low- or high-speed events in cruise	x		x	x			x		
			CRZ		Engine failure in cruise to onset of descent using automation	x		x						
			CRZ		Emergency descent	x		x						X
			DES APP		Managing high-energy descent capturing descent path from above (correlation with unstable approach training)	x		x				x		X
			APP		No ATC clearance received prior to commencement of approach or final descent	x		x				x		
			APP		Reactive wind shear and recovery from the consequent high-energy state	x		x				x		
			APP		Non-precision or infrequently flown approaches using the maximum available level of automation	x		x						X
			APP		Gear malfunction during approach		x				x		x	
			APP		ATC clearances to waypoints beyond programmed descent point for a coded final descent point during an approach utilising a final descent that is commanded by the flight management system.	x		x				x		X

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates communication; leadership and teamwork; problem-solving and decision-making; situation awareness and management of information; workload management. Emphasis should be placed on the development of leadership, shown by EBT data sources to be a highly effective competency in mitigating risk and improving safety through pilot performance	<u>Communication:</u> Demonstrate effective use of language, responsiveness to feedback and that plans are stated and ambiguities resolved. <u>Leadership and teamwork:</u> Use appropriate authority to ensure focus on the task. Support others in completing tasks. <u>Problem-solving and decision-making:</u> Detect deviations from the desired state, evaluate problems, identify risk, consider alternatives and select the best course of action. Continuously review progress and adjust plans. <u>Situation awareness and management of information:</u> Have an awareness of the aircraft state in its environment; project and anticipate changes. <u>Workload management:</u> Prioritise, delegate and receive assistance to maximise focus on the task. Continuously monitor the flight progress	GPS failure prior to commencement of approach associated with position drift and a terrain alert					x	x	x		X
			DES			Cabin crew report of water noise below the forward galley indicating a possible toilet pipe leak, with consequent avionics failures					x	x	x		
			CRZ			Smoke removal but combined with a diversion until landing completed.		x			x	x	x	x	X
			APP			ACAS warning immediately following a go-around, with a descent manoeuvre required.		x			x	x	x	x	
	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOPs). This is not intended to list scenarios, but instructors should ensure that observed non-compliances are taken as learning opportunities throughout the programme. In all modules of the programme, the FSTD should as far as possible be treated like an aircraft, and non-compliances should not be accepted simply for expediency.	Recognise that a compliance failure has occurred Make a verbal announcement Take appropriate action if necessary Restore safe flight path if necessary Manage consequences	The following are examples of potential compliance failures, and not intended to be developed as scenarios as part of an EBT module: 1. Requesting flap beyond limit speed 2. Flaps or slats in the wrong position for phase of flight or approach 3. Omitting an action as part of a procedure 4. Failing to initiate or complete a checklist 5. Using the wrong checklist for the situation	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Go-around management	A	APP	Any threat or error that can result in circumstances that require a decision to perform go-around, in addition to the execution of the go-around. Go-around scenarios should be fully developed to encourage effective leadership and teamwork, in addition to problem-solving and decision-making, plus execution using manual aircraft control or the flight management system(s) and automation as applicable. Design should include the element of surprise and scenario-based go-arounds should not be predictable and anticipated. This topic is completely distinct from the go-around manoeuvre listed in the manoeuvres training section that is intended only to practise psychomotor skill and a simple application of the procedures		Adverse-weather scenario leading to a reactive wind shear warning during approach	x	x					x	x	
			APP			Adverse-weather scenario leading to a predictive wind shear warning during approach or go-around	x	x					x	x	
			APP			Adverse-weather scenario, e.g. thunderstorm activity, heavy precipitation or icing forcing decision at or close to DA/MDA	x					x	x	x	
			APP			DA with visual reference in heavy precipitation with doubt about runway surface braking capability	x					x	x	x	
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP			Lost or difficult communications resulting in no approach clearance prior to commencement of approach or final descent	x		x				x		
			APP			Birds: large flocks of birds below DA once visual reference has been established				x		x	x		
			APP			System malfunction, landing gear malfunction during the approach									

Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix						*Competency map*								
Evaluation and scenario-based training phases	Manual aircraft control	A	Controls the flight path through manual control	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Flight with unreliable airspeed, which may be recoverable or not recoverable	x			x			x		X
					Alternate flight control modes according to malfunction characteristics	x			x				x	X
					ACAS RA to descend or ATC immediate descent	x	x		x					
					TAWS warning when deviating from planned descent routing, requiring immediate response	x			x	x				
					Scenario immediately after take-off which requires an immediate and overweight landing			x	x	x	x			
					Adverse wind, crosswinds with or without strong gusts on take-off	x			x					
					Adverse weather, wind shear, wind shear encounter during take-off, with or without reactive warnings	x			x			x		
					Engine failure during initial climb, typically 30-60 m (100-200 ft) (autopilot off)	x	x		x				x	
					Wind shear encounter scenario during cruise, significant and rapid change in wind speed or down/updrafts, without wind shear warning	x		x			x	x	x	
					Adverse weather, wind shear, wind shear encounter with or without warning during approach	x		x	x			x		
					Adverse weather, deterioration in visibility or cloud base, or adverse wind, requiring a go-around from visual circling approach, during the visual segment	x	x	x	x		x	x	x	
					Adverse wind, crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
					Adverse weather, adverse wind, approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
					Circling approach at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights									
					Runway incursion during approach, which can be triggered by ATC at various altitudes or by visual contact during the landing phase	x			x			x		
					Adverse wind, visibility, type-specific, special consideration for long-bodied aircraft, landing in minimum visibility for visual reference, with crosswind	x	x		x			x		
					System malfunction, auto flight failure at DA during a low-visibility approach requiring a go-around flown manually	x		x	x			x		

CLB CRZ DES APP	CLB CRZ DES APP	CLB CRZ DES APP
DES	TO	TO
TO	CRZ	APP
APP	APP	APP LDG
APP LDG	APP LDG	APP LDG
LDG	LDG	

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Approach planned with autoland, followed by a failure below 1000 feet requiring a go-around, and an immediate landing due to fuel shortage.	x		x		x		x		
Evaluation and scenario-based training phases	Monitoring, cross checking, error management, mismanaged aircraft state	A	ALL	The scenarios should be realistic and relevant, and should be used for the purpose of demonstration and reinforcement of effective flight path monitoring. Modules in the FSTD should be treated like those in an aircraft so that trainees have the opportunity to develop competency with the practice of the right techniques and attitudes related to these topics through pilot performance, and that instructors have the opportunity to assess and train these topics in a realistic environment. As shown by the EBT data report, these topics are of key importance to improve safety in operations. In addition, the operator may also use these topics to develop scripted role-playing scenarios in the form of ISI training. These scenarios cater for the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. Demonstration scenarios may also be used. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training.	Recognise mismanaged aircraft state. Observe behaviour: how pilot is mitigating errors, how pilot is performing cross checking, how pilot is monitoring performance and dealing with a mismanaged aircraft state, so the instructors should ensure that observed deviations, errors and mistakes are taken as learning opportunities throughout the programme. Monitor flight path excursions. Detect errors and threats through proper cross checking performance. Make appropriate interventions either verbally or by taking control if applicable. Take appropriate action if necessary Restore desired aircraft state Identify and manage consequences	Deviations from the flight path, in pitch attitude, speed, altitude, bank angle		x					x		
			ALL			In-seat instruction: Simple automation errors (e.g. incorrect mode selection, attempted engagement without the necessary conditions, entering wrong altitude or speed, failure to execute the desired mode) culminating in a need for direct intervention from the PM, and where necessary taking control.		x					x		
			APP			In-seat instruction: Unstable approach or speed/path/vertical rate not congruent with required state for given flight condition	x	x					x	x	
			LDG			In-seat instruction: Demonstration exercise — recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM	x			x			x		
	Unstable approach	A	DES APP	Reinforce stabilised approach philosophy and adherence to defined parameters. Encourage go-arounds when crews are outside these parameters. Develop and sustain competencies related to the management of high-energy situations		ATC or terrain related environment creating a high-energy descent with the need to capture the optimum profile to complete the approach in a stabilised configuration	x		x				x		
			DES APP			ATC or terrain related environment creating a high-energy descent leading to unstable conditions and requiring a go-around	x		x				x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
Section 3 Training topics frequency (B) per phase and in alphabetical order.															
Evaluation ,manoeuvres training, and scenario-based training phases	Upset prevention training	B	N/A	Compliance with AMC1 or 2 ORO.FC.220&230	Include upset prevention elements in Table 1 for the recurrent training programme at least every 12 calendar months, such that all the elements are covered over a period not exceeding 3 years.	See Table 1 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								
Evaluation and scenario-based training phases	Adverse wind	B	TO	Adverse wind/crosswind. This includes tailwind but not ATC mis-reporting of the actual wind	Recognise adverse-wind conditions Observe limitations Apply appropriate procedures Maintain directional control and safe flight path	Take-off with different crosswind/tailwind/gust conditions						x		x	
			TO			Take-off with unreported tailwind		x			x				
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswind including shifting wind directions				x		x	x		
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP LDG			Crosswind with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	ALL	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: • Immediacy • Complexity • Degradation of aircraft control • Loss of primary instrumentation • Management of consequences	Recognise system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormal associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences The operator should vary malfunctions for each characteristic over the EBT cycle.	For full details, see the Malfunction Equivalency methodology. At least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below 7 for each crew member every year. (i) System malfunctions requiring immediate and urgent crew intervention or decision, e.g. fire, smoke, loss of pressurisation at high altitude, failures during take-off, brake failure during landing. (ii) System malfunctions requiring complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures, major dual system electrical. (iii) System malfunctions resulting in significant degradation of flight controls in combination with abnormal handling characteristics, e.g. jammed flight controls, certain degradation of FBW control, Jammed horizontal stabiliser; Flaps and/or slats locked, other malfunctions resulting in degraded flight controls. (iv) System failures that require monitoring and management of the flight path using degraded or alternative displays, unreliable primary flight path information, unreliable airspeed, e.g. flight with unreliable airspeed (v) System failures that require extensive management of their consequences (independent of operation or environment), e.g. fuel leak.	Intentionally blank								
			TO			MEL items with crew operating procedures applicable during take-off						x			X
			TO			Response to an additional factor that is affected by MEL item (e.g. system failure, runway state)		x		x		x			X
			GND			Malfunction during preflight preparation and prior to departure	x					x	x		
			CLB			Malfunction after departure	x					x	x		X
			ALL			Malfunctions requiring immediate attention (e.g. bleed fault during engine start, hydraulic failure during taxi)	x				x			x	
			CLB CRZ			Fuel leak (management of consequences)	x				x		x		X
			TO			Take-off high speed below V1	x				x	x			
			TO			Take-off high speed above V1	x					x			
			TO			Initial climb	x					x			
			APP			On approach	x					x		x	
			APP			Go-around	x					x		x	
			LDG			During landing	x	x		x		x	x		

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Aircraft system management	B		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It links with the topic 'compliance' Where a system is not managed according to normal or defined procedures, this is determined as a non-compliance	See 'compliance' topic above. There are no defined scenarios, but the instructor should focus on learning opportunities when system management non-compliances manifest themselves during other scenarios. Underpinning KNO of systems and their interactions should be developed and challenged, and not merely the application of normal procedures	Intentionally blank								x
			CRZ APP LDG			Minimum fuel, caused by extended delays, weather…etc. where the crew would need to managed a minimum fuel situation.					x	x	x	x	
	Approach, visibility close to minimum	B	APP	Any situation where visibility becomes a threat	Recognise actual conditions Observe aircraft and/or procedural limitations Apply appropriate procedure if applicable Maintain directional control and safe flight path	Approach in poor visibility	x		x	x				x	
			APP			Approach in poor visibility with deteriorations necessitating a decision to perform go-around	x		x	x					
			LDG			Landing in poor visibility				x		x	x		
	Landing	B	LDG	Pilots should have opportunities to practise LDGs in demanding situations at the defined frequency. Data indicates that LDG problems have their roots in a variety of factors, including appropriate decision-making, in addition to manual aircraft control skills if difficult environmental conditions exist. The purpose of this item is to ensure that pilots are exposed to this during the programme	Landing in demanding environmental conditions, with malfunctions as appropriate	This topic should be combined with the adverse-weather topic, aircraft system malfunctions topic or any topic that can provide exposure to a landing in demanding conditions	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Surprise	B	ALL	The data analysed during the development of this manual and of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a surprise, or an unexpected event. The element of surprise should be distinguished from what is sometimes referred to as the 'startle factor', the latter being a physiological reaction. Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrence, so that pilots do not become overly familiar with repetitions of the same scenarios. Variations should be the focus of EBT programme design, and not left to the discretion of individual instructors, in order to preserve programme integrity and fairness	Exposure to an unexpected event or sequence of events at the defined frequency	Intentionally blank	Intentionally blank								
Evaluation and scenario-based training phases	Wind shear recovery	B	TO	With or without warnings including predictive. A wind shear scenario is ideally combined into an adverse-weather scenario containing other elements.	Anticipate potential for wind shear Avoid known wind shear or prepare for suspected wind shear Recognise wind shear encounter Take appropriate action Apply appropriate procedure correctly Assure aircraft control Recognise out of wind shear condition Maintain or restore a safe flight path Assess consequential issues and manage outcomes	Predictive wind shear warning during take-off					x	x			
			TO			Wind shear encounter during take-off	x				x	x			
			TO			Wind shear encounter after rotation						x		x	
			TO			Predictive wind shear after rotation					x	x			
			APP			Predictive wind shear during approach	x				x	x			
			APP			Wind shear encounter during approach	x				x	x			
Evaluation and scenario-based training phases	Workload, distraction, pressure	B	ALL	This is not considered a topic for specific attention on its own, but more as a reminder to programme developers to ensure that pilots are exposed to immersive training scenarios which expose them to manageable high workload and distractions during the course of the EBT programme, at the defined frequency	Manage available resources efficiently to prioritise and perform tasks in a timely manner under all circumstances	Intentionally blank	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 3 Training topics frequency (C) per phase and in alphabetical order.															
Evaluation, manoeuvres training and scenario-based training phases	Upset recovery	C	N/A	Compliance with AMC1 or 2 ORO.FC.220&230 An aeroplane upset is defined as an undesired aeroplane state in flight characterised by unintentional divergences from parameters normally experienced during line operations or training. An aeroplane upset may involve pitch and/or bank angle divergences as well as inappropriate airspeeds for the conditions. The example scenario elements may be done in ISI, as non-ISI or a combination of both. Include the recovery exercises in Table 2 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years.	Recognise upset condition Take appropriate action Assure aircraft control Maintain or restore a safe flight path Assess consequential issues Manage outcomes	See Table 2 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank							
			CLB CRZ DES APP			Upset recognition: Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist			x	x			x	x	
			TO APP			Upset recognition and recovery — Severe wind shear or wake turbulence during take-off or approach			x	x		x	x		X
			CLB DES			Upset recognition and recovery — as applicable and relevant to aircraft type, demonstration at a suitable intermediate level, with turbulence as appropriate; practise steep turns and note the relationship between bank angle, pitch and stalling speed				x			x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence to trigger overspeed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)			x	x		x	x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence and significant temperature rise to trigger low-speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	x			x			x		X
			CRZ			Upset recognition and recovery — demonstration at a normal cruising altitude, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			APP			Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			CLB DES			In-seat instruction: Recovery – Demonstration: the instructor should position the aircraft within but close to the edge of the normal flight envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the normal flight envelope				x			x		X
EVAL and SBT	ATC	C	ALL	ATC error. Omission, miscommunication, garbled, poor quality transmission. All of these act as distractions to be managed by the crew. The scenarios should be combined where possible with others of the same or higher weighting, the principle reason being to create distractions.	Respond to communications appropriately Recognise, clarify and resolve any ambiguities Refuse or question unsafe instructions. Use standard phraseology whenever possible	ATC role-play: the instructor provides scripted instructions, as a distraction to the crew	x	x			x				
			ALL			Controller error, provided by the instructor according to a defined scripted scenario	x	x				x	x		
			ALL			Frequency congestion, with multiple aircraft using the same frequency		x							
			ALL			Poor quality transmissions		x							

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that impacts performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only for the practice of psychomotor skill and reinforcement of procedures in managing engine failures	Recognise engine failure Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Take-off low speed	x			x		x		x	
			TO			Take-off high speed below V1	x			x		x		x	
			TO			Take-off above V1	x					x	x	x	
			TO			Initial climb	x					x	x		
			APP			Engine malfunction	x					x		x	
			CRZ			Engine failure in cruise (with autopilot)	x		x				x		
			LDG			On landing				x					
	Fire and smoke management	C	GND	This includes engine, electric, pneumatic, cargo fire, smoke or fumes	Recognise fire, smoke or fumes Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Fire in cargo or cabin/cockpit at gate	x	x				x		x	
			GND			Fire during taxi	x	x				x		x	X
			GND			Fire with no cockpit indication	x	x				x		x	X
			TO			Take-off low speed	x			x	x	x			X
			TO			Take-off high speed below V1	x			x	x	x			
			TO			Take-off high speed above V1	x				x	x			
			TO			Initial climb	x				x	x			
			CRZ			Cargo fire						x	x	x	
			APP			Engine fire in approach (extinguishable)		x				x			
			APP			Engine fire in approach (non-extinguishable)		x			x	x			
			APP			Flight deck or cabin fire		x			x	x			X
	Loss of communications	C	GND	Lost or difficult communications. Either through pilot mis-selection or a failure external to the aircraft. This could be for a few seconds or a total loss.	Recognise loss of communications Take appropriate action Execute appropriate procedure as applicable Use alternative ways to communicate Manage consequences	Loss of communications during ground manoeuvring	x	x							
			TO			Loss of communications after take-off	x					x			X
			APP			Loss of communications during approach phase, including go-around	x	x				x	x		X
	Managing loading, fuel, performance errors	C	ALL	A calculation error by one or more pilots, or someone involved with the process, or the process itself, e.g. incorrect information on the load sheet	Anticipate the potential for errors in load/fuel/performance data Recognise inconsistencies Manage/avoid distractions Make changes to paperwork/aircraft system(s) to eliminate error Identify and manage consequences	This can be a demonstrated error, in that the crew may be instructed to deliberately insert incorrect data, for example to take off from an intersection with full-length performance information. The crew will be asked to intervene when acceleration is sensed to be lower than normal, and this may be part of the operator procedures, especially when operating mixed fleets with considerable variations in MTOM.	x	x						x	

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Navigation	C	GND	External NAV failure. Loss of GPS satellite, ANP exceeding RNP, loss of external NAV source(s)	Recognise a NAV degradation. Take appropriate action Execute appropriate procedure as applicable Use alternative NAV guidance Manage consequences	External failure or a combination of external failures degrading aircraft navigation performance	x		x			x	x		
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance		x			x	x	x		
	Operations- or type-specific	C	ALL	Intentionally blank	Intentionally blank	Intentionally blank	Intentionally blank								
	Operations of special airport approval	C	APP LDG	See equivalency of approaches relevant to operations.	The operator should comply with the national qualification requirements published in the Aeronautical Information Publication	Intentionally blank	Intentionally blank								
	Pilot incapacitation	C	TO	Consequences for the non-incapacitated pilot	Recognise incapacitation Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences	During take-off	x	x			x	x			X
			APP			During approach	x			x				x	X
Evaluation and scenario-based training phases	Runway or taxiway condition	C	GND TO LDG	Contamination or surface quality of the runway, taxiway, or tarmac including foreign objects	Recognise hazardous runway condition Observe limitations Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Planned anticipated hazardous conditions with dispatch information provided to facilitate planning and execution of appropriate procedures						x			X
			GND TO LDG			Unanticipated hazardous conditions, e.g. unexpected heavy rain resulting in flooded runway surface		x			x	x			
			TO			Stop/go decision in hazardous conditions					x	x		x	
	Terrain	C	ALL	Alert, warning, or conflict	Anticipate terrain threats Prepare for terrain threats Recognise unsafe terrain clearance Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Restore safe flight path Manage consequences	ATC clearance giving insufficient terrain clearance	x	x			x				X
			ALL			Demonstration of terrain avoidance warning systems (this scenario element may be done in an ISI.)						x	x	x	
			TO CLB			Engine failure where performance is marginal leading to TAWS warning		x		x				x	
			DES			'Virtual mountain' meaning the surprise element of an unexpected warning. Care should be exercised in creating a level of realism, so this can best be achieved by an unusual and unexpected change of route during the descent						x	x	x	
	Traffic	C	CLB CRZ DES	Traffic conflict. ACAS RA or TA, or visual observation of conflict, which requires evasive manoeuvring	Anticipate potential loss of separation Recognise loss of separation Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	ACAS warning requiring crew intervention		x				x	x	x	

AMC4 to Appendix II — EBT programme

GENERATION 3 (TURBOPROP) — TABLE OF ASSESSMENT AND TRAINING TOPICS REFERRED TO IN AMC4 ORO.FC.231(a)

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Section 1															
Manoeuvres training phase	Rejected take-off	A	TO	Engine failure after the application of take-off thrust and before reaching V1	Demonstrate manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detect deviations through instrument scanning Maintain spare mental capacity during manual aircraft control Maintain the aircraft within the flight envelope Apply knowledge of the relationship between aircraft attitude, speed and thrust	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
	Failure of critical engine between V1 & V2	A	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement	x			x					
	Failure of critical engine between V1 & V2	B	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x			x					
	Emergency descent	C	CRZ	Initiation of emergency descent from normal cruise altitude		The manoeuvre is considered to be completed once the aircraft is stabilised in emergency descent configuration (and profile)	x		x	x					
	Engine-out approach & go-around	A	APP	With a critical engine failed, manually flown normal precision approach to DA, followed by manually flown go-around, the whole manoeuvre to be flown without visual reference		This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement (describe generally critical part of manoeuvre)	x			x					
	Go-around	A	APP	Go-around, all engines operative		High energy, initiation during the approach at 150 to 300 m (500 to 1 000 ft) below the missed approach level-off altitude	x		x	x					
			APP	Go-around, all engines operative followed by visual circuit, manually flown		Initiation of go-around from DA followed by visual circuit and landing	x		x	x					
			APP	Go-around, all engines operative		During flare/rejected landing	x		x	x					
	Engine-out landing	A	LDG	With a critical engine failed, normal landing		Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					
Section 2 Equivalency of Approaches relevant to operations															
MT phase	Approach type A or B	B	APP	Approach type A or B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type A	B	APP	Approach type A flight method 2D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		x
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations.	Approaches flown from FAF to landing or go around	x		x	x					

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT phases	Approach type A	B	APP	Approach type A flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		x
	Approach type B	B	APP	Approach type B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations.	Approaches flown from FAF to landing or go around	x		x	x					
Section 3 Training topics frequency (A) in alphabetical order.															
Evaluation and scenario-based training phases	Adverse weather	A	GND	Thunderstorm, heavy rain, turbulence, ice build-up to include de-icing issues, as well as high- temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios.	Anticipate adverse weather Prepare for suspected adverse weather Recognise adverse weather Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Predictive wind shear warning before take-off, as applicable	x	x				x			
			ALL			Adverse-weather scenario, e.g. thunderstorm activity, precipitation, icing		x			x	x		x	
			TO			Wind shear encounter during take-off, not predictive	x			x			x		X
			TO			Predictive wind shear warning during take-off	x	x				x	x		
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			CRZ			Wind shear encounter scenario during cruise	x		x			x	x	x	
			APP			Reactive wind shear warning during approach or go-around	x		x	x			x		
			APP			Predictive wind shear warning during approach or go-around	x	x				x	x		
			APP			Thunderstorm encounter during approach or on missed approach	x					x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Non-precision approach in cold temperature conditions, requiring altitude compensation for temperature, as applicable to type	x	x					x		
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x				x			

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Automation management	A	CLB CRZ DES APP	The purpose of this topic is to encourage and develop effective flight path management through proficient and appropriate use of the flight management system(s), guidance and automation including transitions between modes, monitoring, mode awareness, vigilance and flexibility needed to change from one mode to another. Included in this topic is the means of mitigating errors described as: mishandled auto flight systems, inappropriate mode selection, flight management system(s) and autopilot usage.	Know how and when to use the flight management system(s), guidance and automation Demonstrate correct methods for engagement and disengagement of the auto flight system(s) Demonstrate appropriate use of flight guidance, auto thrust and other automation systems Maintain mode awareness of the auto flight system(s), including engagement and automatic transitions Revert to different modes when appropriate Detect deviations from the desired aircraft state (flight path, speed, attitude, thrust, etc.) and take appropriate action. Anticipate mishandled auto flight system Recognise mishandled auto flight system. Take appropriate action if necessary Restore correct auto flight state Identify and manage consequences	ACAS warning, recovery and subsequent engagement of automation	x		x						
			ALL			FMS tactical programming issues, e.g. step climb, runway changes, late clearances, destination re-programming, executing diversion	x		x						X
			CLB CRZ DES APP			Recoveries from TAWS, management of energy state to restore automated flight	x		x	x					
			CLB CRZ DES APP			Amendments to ATC cleared levels during altitude capture modes to force mode awareness and intervention	x		x				x		
			TO			Late ATC clearance to an altitude below acceleration altitude	x		x				x		
			TO APP			Engine-out special terrain procedures	x		x				x		
			CRZ			Forcing AP disconnect followed by re-engagement, recovery from low- or high-speed events in cruise	x		x	x			x		
			CRZ			Engine failure in cruise to onset of descent using automation	x		x						
			CRZ			Emergency descent	x		x						X
			DES APP			Managing high-energy descent capturing descent path from above (correlation with unstable approach training)	x		x				x		X
			APP			No ATC clearance received prior to commencement of approach or final descent	x		x				x		
			APP			Reactive wind shear and recovery from the consequent high-energy state	x		x				x		
			APP			Non-precision or infrequently flown approaches using the maximum available level of automation	x		x						X
			APP			Gear malfunction during approach		x				x		x	
			APP			ATC clearances to waypoints beyond programmed descent point for a coded final descent point during an approach utilising a final descent that is commanded by the flight management system.	x		x				x		X

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates communication; leadership and teamwork; problem-solving and decision-making; situation awareness and management of information; workload management. Emphasis should be placed on the development of leadership, shown by EBT data sources to be a highly effective competency in mitigating risk and improving safety through pilot performance	<u>Communication:</u> Demonstrate effective use of language, responsiveness to feedback and that plans are stated and ambiguities resolved. <u>Leadership and teamwork:</u> Use appropriate authority to ensure focus on the task. Support others in completing tasks. <u>Problem-solving and decision-making:</u> Detect deviations from the desired state, evaluate problems, identify risk, consider alternatives and select the best course of action. Continuously review progress and adjust plans. <u>Situation awareness and management of information:</u> Have an awareness of the aircraft state in its environment; project and anticipate changes. <u>Workload management:</u> Prioritise, delegate and receive assistance to maximise focus on the task. Continuously monitor the flight progress	GPS failure prior to commencement of approach associated with position drift and a terrain alert					x	x	x		X
			DES			Cabin crew report of water noise below the forward galley indicating a possible toilet pipe leak, with consequent avionics failures					x	x	x		
			CRZ			Smoke removal but combined with a diversion until landing completed.		x			x	x	x	x	X
			APP			ACAS warning immediately following a go-around, with a descent manoeuvre required.		x			x	x	x	x	
	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOPs). This is not intended to list scenarios, but instructors should ensure that observed non-compliances are taken as learning opportunities throughout the programme. In all modules of the programme, the FSTD should as far as possible be treated like an aircraft, and non-compliances should not be accepted simply for expediency.	Recognise that a compliance failure has occurred Make a verbal announcement Take appropriate action if necessary Restore safe flight path if necessary Manage consequences	The following are examples of potential compliance failures, and not intended to be developed as scenarios as part of an EBT module: 1. Requesting flap beyond limit speed 2. Flaps or slats in the wrong position for phase of flight or approach 3. Omitting an action as part of a procedure 4. Failing to initiate or complete a checklist 5. Using the wrong checklist for the situation	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Go-around management	A	APP	Any threat or error that can result in circumstances that require a decision to perform go-around, in addition to the execution of the go-around. Go-around scenarios should be fully developed to encourage effective leadership and teamwork, in addition to problem-solving and decision-making, plus execution using manual aircraft control or the flight management system(s) and automation as applicable. Design should include the element of surprise and scenario-based go-arounds should not be predictable and anticipated. This topic is completely distinct from the go-around manoeuvre listed in the manoeuvres training section that is intended only to practise psychomotor skill and a simple application of the procedures		Adverse-weather scenario leading to a reactive wind shear warning during approach	x	x					x	x	
			APP			Adverse-weather scenario leading to a predictive wind shear warning during approach or go-around	x	x					x	x	
			APP			Adverse-weather scenario, e.g. thunderstorm activity, heavy precipitation or icing forcing decision at or close to DA/MDA	x					x	x	x	
			APP			DA with visual reference in heavy precipitation with doubt about runway surface braking capability	x					x	x	x	
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP			Lost or difficult communications resulting in no approach clearance prior to commencement of approach or final descent	x		x				x		
			APP			Birds: large flocks of birds below DA once visual reference has been established				x		x	x		
			APP			System malfunction, landing gear malfunction during the approach									

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Manual aircraft control	A	CLB CRZ DES APP	Controls the flight path through manual control	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Flight with unreliable airspeed, which may be recoverable or not recoverable	x			x			x		X
			CLB CRZ DES APP			Alternate flight control modes according to malfunction characteristics	x			x				x	X
			CLB CRZ DES APP			ACAS RA to descend or ATC immediate descent	x	x		x					
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	x			x	x				
			TO			Scenario immediately after take-off which requires an immediate and overweight landing			x	x	x	x			
			TO			Adverse wind, crosswinds with or without strong gusts on take-off	x			x					
			TO			Adverse weather, wind shear, wind shear encounter during take-off, with or without reactive warnings	x			x			x		
			TO			Engine failure during initial climb, typically 30-60 m (100-200 ft) (autopilot off)	x	x		x				x	
			CRZ			Wind shear encounter scenario during cruise, significant and rapid change in wind speed or down/updrafts, without wind shear warning	x		x			x	x	x	
			APP			Adverse weather, wind shear, wind shear encounter with or without warning during approach	x		x	x			x		
			APP			Adverse weather, deterioration in visibility or cloud base, or adverse wind, requiring a go-around from visual circling approach, during the visual segment	x	x	x	x		x	x	x	
			APP LDG			Adverse wind, crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
			APP LDG			Adverse weather, adverse wind, approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP LDG			Circling approach at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights									
			APP LDG			Runway incursion during approach, which can be triggered by ATC at various altitudes or by visual contact during the landing phase	x			x			x		
			LDG			Adverse wind, visibility, type-specific, special consideration for long-bodied aircraft, landing in minimum visibility for visual reference, with crosswind	x	x		x			x		
			LDG			System malfunction, auto flight failure at DA during a low-visibility approach requiring a go-around flown manually	x		x	x			x		

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Approach planned with autoland, followed by a failure below 1000 feet requiring a go-around, and an immediate landing due to fuel shortage.	x		x		x		x		
Evaluation and scenario-based training phases	Monitoring, cross checking, error management, mismanaged aircraft state	A	ALL	The scenarios should be realistic and relevant, and should be used for the purpose of demonstration and reinforcement of effective flight path monitoring. Modules in the FSTD should be treated like those in an aircraft so that trainees have the opportunity to develop competency with the practice of the right techniques and attitudes related to these topics through pilot performance, and that instructors have the opportunity to assess and train these topics in a realistic environment. As shown by the EBT data report, these topics are of key importance to improve safety in operations. In addition, the operator may also use these topics to develop scripted role-playing scenarios in the form of ISI training. These scenarios cater for the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. Demonstration scenarios may also be used. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training.	Recognise mismanaged aircraft state. Observe behaviour: how pilot is mitigating errors, how pilot is performing cross checking, how pilot is monitoring performance and dealing with a mismanaged aircraft state, so the instructors should ensure that observed deviations, errors and mistakes are taken as learning opportunities throughout the programme. Monitor flight path excursions. Detect errors and threats through proper cross checking performance. Make appropriate interventions either verbally or by taking control if applicable. Take appropriate action if necessary Restore desired aircraft state Identify and manage consequences	Deviations from the flight path, in pitch attitude, speed, altitude, bank angle		x					x		
			ALL			In-seat instruction: Simple automation errors (e.g. incorrect mode selection, attempted engagement without the necessary conditions, entering wrong altitude or speed, failure to execute the desired mode) culminating in a need for direct intervention from the PM, and where necessary taking control.		x					x		
			APP			In-seat instruction: Unstable approach or speed/path/vertical rate not congruent with required state for given flight condition	x	x					x	x	
			LDG			In-seat instruction: Demonstration exercise — recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM	x			x			x		
	Unstable approach	A	DES APP	Reinforce stabilised approach philosophy and adherence to defined parameters. Encourage go-arounds when crews are outside these parameters. Develop and sustain competencies related to the management of high-energy situations		ATC or terrain related environment creating a high-energy descent with the need to capture the optimum profile to complete the approach in a stabilised configuration	x		x				x		
			DES APP			ATC or terrain related environment creating a high-energy descent leading to unstable conditions and requiring a go-around	x		x				x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
Section 3 Training topics frequency (B) per phase and in alphabetical order.															
Evaluation ,manoeuvres training, and scenario-based training phases	Upset prevention training	B	N/A	Compliance with AMC1 or 2 ORO.FC.220&230	Include upset prevention elements in Table 1 for the recurrent training programme at least every 12 calendar months, such that all the elements are covered over a period not exceeding 3 years.	See Table 1 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	ALL	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: • Immediacy • Complexity • Degradation of aircraft control • Loss of primary instrumentation • Management of consequences	Recognise system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormal associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences The operator should vary malfunctions for each characteristic over the EBT cycle.	For full details, see the Malfunction Equivalency methodology. At least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below 7 for each crew member every year. (i) System malfunctions requiring immediate and urgent crew intervention or decision, e.g. fire, smoke, loss of pressurisation at high altitude, failures during take-off, brake failure during landing. (ii) System malfunctions requiring complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures, major dual system electrical. (iii) System malfunctions resulting in significant degradation of flight controls in combination with abnormal handling characteristics, e.g. jammed flight controls, certain degradation of FBW control, Jammed horizontal stabiliser; Flaps and/or slats locked, other malfunctions resulting in degraded flight controls. (iv) System failures that require monitoring and management of the flight path using degraded or alternative displays, unreliable primary flight path information, unreliable airspeed, e.g. flight with unreliable airspeed (v) System failures that require extensive management of their consequences (independent of operation or environment), e.g. fuel leak.	Intentionally blank								
			TO			MEL items with crew operating procedures applicable during take-off						x			X
			TO			Response to an additional factor that is affected by MEL item (e.g. system failure, runway state)		x		x		x			X
			GND			Malfunction during preflight preparation and prior to departure	x					x	x		
			CLB			Malfunction after departure	x					x	x		X
			ALL			Malfunctions requiring immediate attention (e.g. bleed fault during engine start, hydraulic failure during taxi)	x				x			x	
			CLB CRZ			Fuel leak (management of consequences)	x				x		x		X
			TO			Take-off high speed below V1	x				x	x			
			TO			Take-off high speed above V1	x					x			
			TO			Initial climb	x					x			
			APP			On approach	x					x		x	
			APP			Go-around	x					x		x	
			LDG			During landing	x	x		x		x	x		
scenario-based	Aircraft system management	B		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It links with the topic 'compliance' Where a system is not managed according to normal or defined	See 'compliance' topic above. There are no defined scenarios, but the instructor should focus on learning opportunities when system management non-compliances manifest themselves during other scenarios. Underpinning KNO of systems and their interactions should be developed and challenged, and not merely the application of normal procedures	Intentionally blank								x

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			CRZ APP LDG		procedures, this is determined as a non-compliance	Minimum fuel, caused by extended delays, weather…etc. where the crew would need to managed a minimum fuel situation.					x	x	x	x	
	Approach, visibility close to minimum	B	APP	Any situation where visibility becomes a threat	Recognise actual conditions Observe aircraft and/or procedural limitations Apply appropriate procedure if applicable Maintain directional control and safe flight path	Approach in poor visibility	x		x	x				x	
			APP			Approach in poor visibility with deteriorations necessitating a decision to perform go-around	x		x	x					
			LDG			Landing in poor visibility				x		x	x		
	Landing	B	LDG	Pilots should have opportunities to practise LDGs in demanding situations at the defined frequency. Data indicates that LDG problems have their roots in a variety of factors, including appropriate decision-making, in addition to manual aircraft control skills if difficult environmental conditions exist. The purpose of this item is to ensure that pilots are exposed to this during the programme	Landing in demanding environmental conditions, with malfunctions as appropriate	This topic should be combined with the adverse-weather topic, aircraft system malfunctions topic or any topic that can provide exposure to a landing in demanding conditions	Intentionally blank								
Evaluation and scenario-based training phases	Surprise	B	ALL	The data analysed during the development of this manual and of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a surprise, or an unexpected event. The element of surprise should be distinguished from what is sometimes referred to as the 'startle factor', the latter being a physiological reaction. Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrence, so that pilots do not become overly familiar with repetitions of the same scenarios. Variations should be the focus of EBT programme design, and not left to the discretion of individual instructors, in order to preserve programme integrity and fairness	Exposure to an unexpected event or sequence of events at the defined frequency	Intentionally blank	Intentionally blank								
	Terrain	B	ALL	Alert, warning, or conflict	Anticipate terrain threats	ATC clearance giving insufficient terrain clearance	x	x			x				X

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			ALL		Prepare for terrain threats Recognise unsafe terrain clearance Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Restore safe flight path Manage consequences	Demonstration of terrain avoidance warning systems (this scenario element may be done in an ISI.)					x	x	x	
			TO CLB			Engine failure where performance is marginal leading to TAWS warning		x		x				x	
			DES			'Virtual mountain' meaning the surprise element of an unexpected warning. Care should be exercised in creating a level of realism, so this can best be achieved by an unusual and unexpected change of route during the descent						x	x	x	
Evaluation and scenario-based training phase	Wind shear recovery	B	TO	With or without warnings including predictive. A wind shear scenario is ideally combined into an adverse-weather scenario containing other elements.	Anticipate potential for wind shear Avoid known wind shear or prepare for suspected wind shear Recognise wind shear encounter Take appropriate action Apply appropriate procedure correctly Assure aircraft control Recognise out of wind shear condition Maintain or restore a safe flight path Assess consequential issues and manage outcomes	Predictive wind shear warning during take-off					x	x			
			TO			Wind shear encounter during take-off	x				x	x			
			TO			Wind shear encounter after rotation						x		x	
			TO			Predictive wind shear after rotation					x	x			
			APP			Predictive wind shear during approach	x				x	x			
			APP			Wind shear encounter during approach	x				x	x			
	Workload, distraction, pressure	B	ALL	This is not considered a topic for specific attention on its own, but more as a reminder to programme developers to ensure that pilots are exposed to immersive training scenarios which expose them to manageable high workload and distractions during the course of the EBT programme, at the defined frequency	Manage available resources efficiently to prioritise and perform tasks in a timely manner under all circumstances	Intentionally blank	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Section 3 Training topics frequency (C) per phase and in alphabetical order.															
Evaluation, manoeuvres training and scenario-based training phases	Upset recovery	C	N/A	Compliance with AMC1 or 2 ORO.FC.220&230 An aeroplane upset is defined as an undesired aeroplane state in flight characterised by unintentional divergences from parameters normally experienced during line operations or training. An aeroplane upset may involve pitch and/or bank angle divergences as well as inappropriate airspeeds for the conditions. The example scenario elements may be done in ISI, as non-ISI or a combination of both. Include the recovery exercises in Table 2 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years.	Recognise upset condition Take appropriate action Assure aircraft control Maintain or restore a safe flight path Assess consequential issues Manage outcomes	See Table 2 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank							
			CLB CRZ DES APP			Upset recognition: Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist			x	x			x	x	
			TO APP			Upset recognition and recovery — Severe wind shear or wake turbulence during TO or APP			x	x		x	x		X
			CLB DES			Upset recognition and recovery — as applicable and relevant to aircraft type, demonstration at a suitable intermediate level, with turbulence as appropriate; practise steep turns and note the relationship between bank angle, pitch and stalling speed				x			x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence to trigger overspeed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)			x	x		x	x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence and significant temperature rise to trigger low-speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	x			x			x		X
			CRZ			Upset recognition and recovery — demonstration at a normal cruising altitude, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			APP			Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			CLB DES			ISI: Recovery – Demonstration: the instructor should position the acft within but close to the edge of the normal flight envelope before handing control to the trainee to demonstrate the restoration of normal flight. It should be flown within the normal flight envelope				x			x		X

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT phases	Adverse wind	C	TO	Adverse wind/crosswind. This includes tailwind but not ATC mis-reporting of the actual wind	Recognise adverse-wind conditions Observe limitations Apply appropriate procedures Maintain directional control and safe flight path	Take-off with different crosswind/tailwind/gust conditions						x			x
			TO			Take-off with unreported tailwind		x			x				
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswind including shifting wind directions				x		x	x		
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP LDG			Crosswind with or without strong gusts on APP, final and LDG (within and beyond limits)	x			x		x			
EVAL and SBT phases	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that impacts performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only for the practice of psychomotor skill and reinforcement of procedures in managing engine failures	Recognise engine failure Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Take-off low speed	x			x		x		x	
			TO			Take-off high speed below V1	x			x		x		x	
			TO			Take-off above V1	x					x	x	x	
			TO			Initial climb	x					x	x		
			APP			Engine malfunction	x					x		x	
			CRZ			Engine failure in cruise (with autopilot)	x		x				x		
			LDG			On landing				x					

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Fire and smoke management	C	GND	This includes engine, electric, pneumatic, cargo fire, smoke or fumes	Recognise fire, smoke or fumes Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Fire in cargo or cabin/cockpit at gate	x	x				x		x	
			GND			Fire during taxi	x	x				x		x	X
			GND			Fire with no cockpit indication	x	x				x		x	X
			TO			Take-off low speed	x			x	x	x			X
			TO			Take-off high speed below V1	x			x	x	x			
			TO			Take-off high speed above V1	x				x	x			
			TO			Initial climb	x				x	x			
			CRZ			Cargo fire						x	x	x	
			APP			Engine fire in approach (extinguishable)		x				x			
			APP			Engine fire in approach (non-extinguishable)		x			x	x			
			APP			Flight deck or cabin fire		x			x	x			X
	Loss of communications	C	GND	Lost or difficult communications. Either through pilot mis-selection or a failure external to the aircraft. This could be for a few seconds or a total loss.	Recognise loss of communications Take appropriate action Execute appropriate procedure as applicable Use alternative ways to communicate Manage consequences	Loss of communications during ground manoeuvring	x	x							
			TO			Loss of communications after take-off	x					x			X
			APP			Loss of communications during approach phase, including go-around	x	x				x	x		X

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Managing loading, fuel, performance errors	C	ALL	A calculation error by one or more pilots, or someone involved with the process, or the process itself, e.g. incorrect information on the load sheet	Anticipate the potential for errors in load/fuel/performance data Recognise inconsistencies Manage/avoid distractions Make changes to paperwork/aircraft system(s) to eliminate error Identify and manage consequences	This can be a demonstrated error, in that the crew may be instructed to deliberately insert incorrect data, for example to take off from an intersection with full-length performance information. The crew will be asked to intervene when acceleration is sensed to be lower than normal, and this may be part of the operator procedures, especially when operating mixed fleets with considerable variations in MTOM.	x	x							x
	Navigation	C	GND	External NAV failure. Loss of GPS satellite, ANP exceeding RNP, loss of external NAV source(s)	Recognise a NAV degradation. Take appropriate action Execute appropriate procedure as applicable Use alternative NAV guidance Manage consequences	External failure or a combination of external failures degrading aircraft navigation performance	x		x			x	x		
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance		x			x	x	x		
	Operations- or type-specific	C	ALL	Intentionally blank	Intentionally blank	Intentionally blank	Intentionally blank								
	Operations of special airport approval	C	APP LDG	See equivalency of approaches relevant to operations.	The operator should comply with the national qualification requirements published in the Aeronautical Information Publication	Intentionally blank	Intentionally blank								
Evaluation and scenario-based training phases	Pilot incapacitation	C	TO	Consequences for the non-incapacitated pilot	Recognise incapacitation Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences	During take-off	x	x			x	x			X
			APP			During approach	x			x				x	X
	Runway or taxiway condition	C	GND TO LDG	Contamination or surface quality of the runway, taxiway, or tarmac including foreign objects	Recognise hazardous runway condition Observe limitations Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Planned anticipated hazardous conditions with dispatch information provided to facilitate planning and execution of appropriate procedures						x			X
			GND TO LDG			Unanticipated hazardous conditions, e.g. unexpected heavy rain resulting in flooded runway surface		x			x	x			
			TO			Stop/go decision in hazardous conditions					x	x		x	
	Traffic	C	CLB CRZ DES	Traffic conflict. ACAS RA or TA, or visual observation of conflict, which requires evasive manoeuvring	Anticipate potential loss of separation Recognise loss of separation Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	ACAS warning requiring crew intervention		x				x	x	x	

AMC5 to Appendix II — EBT programme

GENERATION 2 (JET) — TABLE OF ASSESSMENT AND TRAINING TOPICS REFERRED TO IN AMC5 ORO.FC.231(a)

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 1															
Manoeuvres training phase	Rejected take-off	A	TO	Engine failure after the application of take-off thrust and before reaching V1	Demonstrate manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detect deviations through instrument scanning Maintain spare mental capacity during manual aircraft control Maintain the aircraft within the flight envelope Apply knowledge of the relationship between aircraft attitude, speed and thrust	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
	Failure of critical engine between V1 & V2	A	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement	x			x					
	Failure of critical engine between V1 & V2	B	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x			x					
	Emergency descent	C	CRZ	Initiation of emergency descent from normal cruise altitude		The manoeuvre is considered to be completed once the aircraft is stabilised in emergency descent configuration (and profile)	x		x	x					
	Engine-out approach & go-around	A	APP	With a critical engine failed, manually flown normal precision approach to DA, followed by manually flown go-around, the whole manoeuvre to be flown without visual reference		This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement (describe generally critical part of manoeuvre)	x			x					
	Go-around	A	APP	Go-around, all engines operative		High energy, initiation during the approach at 150 to 300 m (500 to 1 000 ft) below the missed approach level-off altitude	x		x	x					
			APP	Go-around, all engines operative followed by visual circuit, manually flown		Initiation of go-around from DA followed by visual circuit and landing	x		x	x					
			APP	Go-around, all engines operative		During flare/rejected landing	x		x	x					
	Engine-out landing	A	LDG	With a critical engine failed, normal landing		Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					
Section 2 Equivalency of Approaches relevant to operations															
MT phase	Approach type A or B	B	APP	Approach type A or B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type A	B	APP	Approach type A flight method 2D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		x
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations.	Approaches flown from FAF to landing or go around	x		x	x					

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT phases	Approach type A	B	APP	Approach type A flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		x
	Approach type B	B	APP	Approach type B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations.	Approaches flown from FAF to landing or go around	x		x	x					
Section 3 Training topics frequency (A) in alphabetical order.															
Evaluation and scenario-based training phases	Adverse weather	A	GND	Thunderstorm, heavy rain, turbulence, ice build-up to include de-icing issues, as well as high- temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios.	Anticipate adverse weather Prepare for suspected adverse weather Recognise adverse weather Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Predictive wind shear warning before take-off, as applicable	x	x				x			
			ALL			Adverse-weather scenario, e.g. thunderstorm activity, precipitation, icing		x			x	x		x	
			TO			Wind shear encounter during take-off, not predictive	x			x			x		X
			TO			Predictive wind shear warning during take-off	x	x				x	x		
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			CRZ			Wind shear encounter scenario during cruise	x		x			x	x	x	
			APP			Reactive wind shear warning during approach or go-around	x		x	x			x		
			APP			Predictive wind shear warning during approach or go-around	x	x				x	x		
			APP			Thunderstorm encounter during approach or on missed approach	x					x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Non-precision approach in cold temperature conditions, requiring altitude compensation for temperature, as applicable to type	x	x					x		
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x				x			

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT	Approach, visibility close to minimum	A	APP	Any situation where visibility becomes a threat	Recognise actual conditions Observe aircraft and/or procedural limitations Apply appropriate procedure if applicable Maintain directional control and safe flight path	Approach in poor visibility	x		x	x				x	
			APP			Approach in poor visibility with deteriorations necessitating a decision to perform go-around	x		x	x					
			LDG			Landing in poor visibility				x		x	x		
Evaluation and scenario-based training phases	Automation management	A	CLB CRZ DES APP	The purpose of this topic is to encourage and develop effective flight path management through proficient and appropriate use of the flight management system(s), guidance and automation including transitions between modes, monitoring, mode awareness, vigilance and flexibility needed to change from one mode to another. Included in this topic is the means of mitigating errors described as: mishandled auto flight systems, inappropriate mode selection, flight management system(s) and autopilot usage.	Know how and when to use the flight management system(s), guidance and automation Demonstrate correct methods for engagement and disengagement of the auto flight system(s) Demonstrate appropriate use of flight guidance, auto thrust and other automation systems Maintain mode awareness of the auto flight system(s), including engagement and automatic transitions Revert to different modes when appropriate Detect deviations from the desired aircraft state (flight path, speed, attitude, thrust, etc.) and take appropriate action. Anticipate mishandled auto flight system Recognise mishandled auto flight system. Take appropriate action if necessary Restore correct auto flight state Identify and manage consequences	ACAS warning, recovery and subsequent engagement of automation	x		x						
			ALL			FMS tactical programming issues, e.g. step climb, runway changes, late clearances, destination re-programming, executing diversion	x		x						X
			CLB CRZ DES APP			Recoveries from TAWS, management of energy state to restore automated flight	x		x	x					
			CLB CRZ DES APP			Amendments to ATC cleared levels during altitude capture modes to force mode awareness and intervention	x		x				x		
			TO			Late ATC clearance to an altitude below acceleration altitude	x		x				x		
			TO APP			Engine-out special terrain procedures	x		x				x		
			CRZ			Forcing AP disconnect followed by re-engagement, recovery from low- or high-speed events in cruise	x		x	x			x		
			CRZ			Engine failure in cruise to onset of descent using automation	x		x						
			CRZ			Emergency descent	x		x						X
			DES APP			Managing high-energy descent capturing descent path from above (correlation with unstable approach training)	x		x				x		X
			APP			No ATC clearance received prior to commencement of approach or final descent	x		x				x		
			APP			Reactive wind shear and recovery from the consequent high-energy state	x		x				x		
			APP			Non-precision or infrequently flown approaches using the maximum available level of automation	x		x						X
			APP			Gear malfunction during approach		x				x		x	
			APP			ATC clearances to waypoints beyond programmed descent point for a coded final descent point during an approach utilising a final descent that is commanded by the flight management system.	x		x				x		X

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates communication; leadership and teamwork; problem-solving and decision-making; situation awareness and management of information; workload management. Emphasis should be placed on the development of leadership, shown by EBT data sources to be a highly effective competency in mitigating risk and improving safety through pilot performance	Communication: Demonstrate effective use of language, responsiveness to feedback and that plans are stated and ambiguities resolved. Leadership and teamwork: Use appropriate authority to ensure focus on the task. Support others in completing tasks. Problem-solving and decision-making: Detect deviations from the desired state, evaluate problems, identify risk, consider alternatives and select the best course of action. Continuously review progress and adjust plans. Situation awareness and management of information: Have an awareness of the acft state in its environment; project and anticipate changes. Workload management: Prioritise, delegate and receive assistance to maximise focus on the task. Continuously monitor the flight progress	GPS failure prior to commencement of approach associated with position drift and a terrain alert				x	x	x		X
			DES			Cabin crew report of water noise below the forward galley indicating a possible toilet pipe leak, with consequent avionics failures					x	x	x		
			CRZ			Smoke removal but combined with a diversion until landing completed.		x			x	x	x	x	X
			APP			ACAS warning immediately following a go-around, with a descent manoeuvre required.		x			x	x	x	x	
Evaluation and scenario-based training phases	Go-around management	A	APP	Any threat or error that can result in circumstances that require a decision to perform go-around, in addition to the execution of the go-around. Go-around scenarios should be fully developed to encourage effective leadership and teamwork, in addition to problem-solving and decision-making, plus execution using manual aircraft control or the flight management system(s) and automation as applicable. Design should include the element of surprise and scenario-based go-arounds should not be predictable and anticipated. This topic is completely distinct from the go-around manoeuvre listed in the manoeuvres training section that is intended only to practise psychomotor skill and a simple application of the procedures		Adverse-weather scenario leading to a reactive wind shear warning during approach	x	x					x	x	
			APP			Adverse-weather scenario leading to a predictive wind shear warning during APP or G/A	x	x					x	x	
			APP			Adverse-weather scenario, e.g. thunderstorm activity, heavy precipitation or icing forcing decision at or close to DA/MDA	x					x	x	x	
			APP			DA with visual reference in heavy precipitation with doubt about runway surface braking capability	x					x	x	x	
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP			Adverse-wind scenario, strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP			Lost or difficult communications resulting in no approach clearance prior to commencement of approach or final descent	x		x				x		
			APP			Birds: large flocks of birds below DA once visual reference has been established				x		x	x		

Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix						*Competency map*								
		APP			System malfunction, landing gear malfunction during the approach									

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Manual aircraft control	A	CLB CRZ DES APP	Controls the flight path through manual control	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Flight with unreliable airspeed, which may be recoverable or not recoverable	x			x			x		X
			CLB CRZ DES APP			Alternate flight control modes according to malfunction characteristics	x			x				x	X
			CLB CRZ DES APP			ACAS RA to descend or ATC immediate descent	x	x		x					
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	x			x	x				
			TO			Scenario immediately after take-off which requires an immediate and overweight landing			x	x	x	x			
			TO			Adverse wind, crosswinds with or without strong gusts on take-off	x			x					
			TO			Adverse weather, wind shear, wind shear encounter during take-off, with or without reactive warnings	x			x			x		
			TO			Engine failure during initial climb, typically 30-60 m (100-200 ft) (autopilot off)	x	x		x				x	
			CRZ			Wind shear encounter scenario during cruise, significant and rapid change in wind speed or down/updrafts, without wind shear warning	x		x			x	x	x	
			APP			Adverse weather, wind shear, wind shear encounter with or without warning during approach	x		x	x			x		
			APP			Adverse weather, deterioration in visibility or cloud base, or adverse wind, requiring a go-around from visual circling approach, during the visual segment	x	x	x	x		x	x	x	
			APP LDG			Adverse wind, crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
			APP LDG			Adverse weather, adverse wind, approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP LDG			Circling approach at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights									
			APP LDG			Runway incursion during approach, which can be triggered by ATC at various altitudes or by visual contact during the landing phase	x			x			x		
			LDG			Adverse wind, visibility, type-specific, special consideration for long-bodied aircraft, landing in minimum visibility for visual reference, with crosswind	x	x		x			x		
			LDG			System malfunction, auto flight failure at DA during a low-visibility approach requiring a go-around flown manually	x		x	x			x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Approach planned with autoland, followed by a failure below 1000 feet requiring a go-around, and an immediate landing due to fuel shortage.	x		x		x		x		
Evaluation and scenario-based training phases	Monitoring, cross checking, error management, mismanaged aircraft state	A	ALL	The scenarios should be realistic and relevant, and should be used for the purpose of demonstration and reinforcement of effective flight path monitoring. Modules in the FSTD should be treated like those in an aircraft so that trainees have the opportunity to develop competency with the practice of the right techniques and attitudes related to these topics through pilot performance, and that instructors have the opportunity to assess and train these topics in a realistic environment. As shown by the EBT data report, these topics are of key importance to improve safety in operations. In addition, the operator may also use these topics to develop scripted role-playing scenarios in the form of ISI training. These scenarios cater for the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. Demonstration scenarios may also be used. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training.	Recognise mismanaged aircraft state. Observe behaviour: how pilot is mitigating errors, how pilot is performing cross checking, how pilot is monitoring performance and dealing with a mismanaged aircraft state, so the instructors should ensure that observed deviations, errors and mistakes are taken as learning opportunities throughout the programme. Monitor flight path excursions. Detect errors and threats through proper cross checking performance. Make appropriate interventions either verbally or by taking control if applicable. Take appropriate action if necessary Restore desired aircraft state Identify and manage consequences	Deviations from the flight path, in pitch attitude, speed, altitude, bank angle		x					x		
			ALL			In-seat instruction: Simple automation errors (e.g. incorrect mode selection, attempted engagement without the necessary conditions, entering wrong altitude or speed, failure to execute the desired mode) culminating in a need for direct intervention from the PM, and where necessary taking control.		x					x		
			APP			In-seat instruction: Unstable approach or speed/path/vertical rate not congruent with required state for given flight condition	x	x					x	x	
			LDG			In-seat instruction: Demonstration exercise — recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM	x			x			x		
	Unstable approach	A	DES APP	Reinforce stabilised approach philosophy and adherence to defined parameters. Encourage go-arounds when crews are outside these parameters. Develop and sustain competencies related to the management of high-energy situations		ATC or terrain related environment creating a high-energy descent with the need to capture the optimum profile to complete the approach in a stabilised configuration	x		x				x		
			DES APP			ATC or terrain related environment creating a high-energy descent leading to unstable conditions and requiring a go-around	x		x				x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
Section 3 Training topics frequency (B) per phase and in alphabetical order.															
Evaluation ,manoeuvres training, and scenario-based training phases	Upset prevention training	B	N/A	Compliance with AMC1 or 2 ORO.FC.220&230	Include upset prevention elements in Table 1 for the recurrent training programme at least every 12 calendar months, such that all the elements are covered over a period not exceeding 3 years.	See Table 1 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								
Evaluation and scenario-based training phases	Adverse wind	B	TO	Adverse wind/crosswind. This includes tailwind but not ATC mis-reporting of the actual wind	Recognise adverse-wind conditions Observe limitations Apply appropriate procedures Maintain directional control and safe flight path	Take-off with different crosswind/tailwind/gust conditions						x		x	
			TO			Take-off with unreported tailwind		x			x				
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswind including shifting wind directions				x		x	x		
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP LDG			Crosswind with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	ALL	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: • Immediacy • Complexity • Degradation of aircraft control • Loss of primary instrumentation • Management of consequences	Recognise system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormal associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences The operator should vary malfunctions for each characteristic over the EBT cycle.	For full details, see the Malfunction Equivalency methodology. At least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below 7 for each crew member every year. (i) System malfunctions requiring immediate and urgent crew intervention or decision, e.g. fire, smoke, loss of pressurisation at high altitude, failures during take-off, brake failure during landing. (ii) System malfunctions requiring complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures, major dual system electrical. (iii) System malfunctions resulting in significant degradation of flight controls in combination with abnormal handling characteristics, e.g. jammed flight controls, certain degradation of FBW control, Jammed horizontal stabiliser; Flaps and/or slats locked, other malfunctions resulting in degraded flight controls. (iv) System failures that require monitoring and management of the flight path using degraded or alternative displays, unreliable primary flight path information, unreliable airspeed, e.g. flight with unreliable airspeed (v) System failures that require extensive management of their consequences (independent of operation or environment), e.g. fuel leak.	Intentionally blank								
			TO			MEL items with crew operating procedures applicable during take-off						x			X
			TO			Response to an additional factor that is affected by MEL item (e.g. system failure, runway state)		x		x		x			X
			GND			Malfunction during preflight preparation and prior to departure	x					x	x		
			CLB			Malfunction after departure	x					x	x		X
			ALL			Malfunctions requiring immediate attention (e.g. bleed fault during engine start, hydraulic failure during taxi)	x				x			x	
			CLB CRZ			Fuel leak (management of consequences)	x				x		x		X
			TO			Take-off high speed below V1	x				x	x			
			TO			Take-off high speed above V1	x					x			
			TO			Initial climb	x					x			
			APP			On approach	x					x		x	
			APP			Go-around	x					x		x	
			LDG			During landing	x	x		x		x	x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Compliance	B	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOPs). This is not intended to list scenarios, but instructors should ensure that observed non-compliances are taken as learning opportunities throughout the programme. In all modules of the programme, the FSTD should as far as possible be treated like an aircraft, and non-compliances should not be accepted simply for expediency.	Recognise that a compliance failure has occurred Make a verbal announcement Take appropriate action if necessary Restore safe flight path if necessary Manage consequences	The following are examples of potential compliance failures, and not intended to be developed as scenarios as part of an EBT module: 1. Requesting flap beyond limit speed 2. Flaps or slats in the wrong position for phase of flight or approach 3. Omitting an action as part of a procedure 4. Failing to initiate or complete a checklist 5. Using the wrong checklist for the situation	Intentionally blank								
	Engine failure	B	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that impacts performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only for the practice of psychomotor skill and reinforcement of procedures in managing engine failures	Recognise engine failure Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Take-off low speed	x			x		x		x	
			TO			Take-off high speed below V1	x			x		x		x	
			TO			Take-off above V1	x					x	x	x	
			TO			Initial climb	x					x	x		
			APP			Engine malfunction	x					x		x	
			CRZ			Engine failure in cruise (with autopilot)	x		x				x		
			LDG			On landing				x					
Evaluation and scenario-based training phases	Fire and smoke management	B	GND	This includes engine, electric, pneumatic, cargo fire, smoke or fumes	Recognise fire, smoke or fumes Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Fire in cargo or cabin/cockpit at gate	x	x				x		x	
			GND			Fire during taxi	x	x				x		x	X
			GND			Fire with no cockpit indication	x	x				x		x	X
			TO			Take-off low speed	x			x	x	x			X
			TO			Take-off high speed below V1	x			x	x	x			
			TO			Take-off high speed above V1	x				x	x			
			TO			Initial climb	x				x	x			
			CRZ			Cargo fire						x	x	x	
			APP			Engine fire in approach (extinguishable)		x				x			
			APP			Engine fire in approach (non-extinguishable)		x			x	x			
			APP			Flight deck or cabin fire		x			x	x			X

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Landing	B	LDG	Pilots should have opportunities to practise LDGs in demanding situations at the defined frequency. Data indicates that LDG problems have their roots in a variety of factors, including appropriate decision-making, in addition to manual aircraft control skills if difficult environmental conditions exist. The purpose of this item is to ensure that pilots are exposed to this during the programme	Landing in demanding environmental conditions, with malfunctions as appropriate	This topic should be combined with the adverse-weather topic, aircraft system malfunctions topic or any topic that can provide exposure to a landing in demanding conditions	Intentionally blank								
	Surprise	B	ALL	The data analysed during the development of this manual and of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a surprise, or an unexpected event. The element of surprise should be distinguished from what is sometimes referred to as the 'startle factor', the latter being a physiological reaction. Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrence, so that pilots do not become overly familiar with repetitions of the same scenarios. Variations should be the focus of EBT programme design, and not left to the discretion of individual instructors, in order to preserve programme integrity and fairness	Exposure to an unexpected event or sequence of events at the defined frequency	Intentionally blank	Intentionally blank								
	Wind shear recovery	B	TO	With or without warnings including predictive. A wind shear scenario is ideally combined into an adverse-weather scenario containing other elements.	Anticipate potential for wind shear Avoid known wind shear or prepare for suspected wind shear Recognise wind shear encounter Take appropriate action Apply appropriate procedure correctly Assure aircraft control Recognise out of wind shear condition Maintain or restore a safe flight path Assess consequential issues and manage outcomes	Predictive wind shear warning during take-off					x	x				
			TO			Wind shear encounter during take-off	x				x	x				
			TO			Wind shear encounter after rotation						x		x	
			TO			Predictive wind shear after rotation					x	x			
			APP			Predictive wind shear during approach	x				x	x			
			APP			Wind shear encounter during approach	x				x	x			

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 3 Training topics frequency (C) per phase and in alphabetical order.															
Evaluation, manoeuvres training and scenario-based training phases	Upset recovery	C	N/A	Compliance with AMC1 or 2 ORO.FC.220&230 An aeroplane upset is defined as an undesired aeroplane state in flight characterised by unintentional divergences from parameters normally experienced during line operations or training. An aeroplane upset may involve pitch and/or bank angle divergences as well as inappropriate airspeeds for the conditions. The example scenario elements may be done in ISI, as non-ISI or a combination of both. Include the recovery exercises in Table 2 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years.	Recognise upset condition Take appropriate action Assure aircraft control Maintain or restore a safe flight path Assess consequential issues Manage outcomes	See Table 2 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								
			CLB CRZ DES APP			Upset recognition: Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist			x	x			x	x	
			TO APP			Upset recognition and recovery — Severe wind shear or wake turbulence during take-off or approach			x	x		x	x		X
			CLB DES			Upset recognition and recovery — as applicable and relevant to aircraft type, demonstration at a suitable intermediate level, with turbulence as appropriate; practise steep turns and note the relationship between bank angle, pitch and stalling speed				x			x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence to trigger overspeed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)			x	x		x	x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence and significant temperature rise to trigger low-speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	x			x			x		X
			CRZ			Upset recognition and recovery — demonstration at a normal cruising altitude, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			APP			Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			CLB DES			In-seat instruction: Recovery – Demonstration: the instructor should position the aircraft within but close to the edge of the normal flight envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the normal flight envelope				x			x		X
EVAL and SBT phase	Loss of communications	C	GND	Lost or difficult communications. Either through pilot mis-selection or a failure external to the aircraft. This could be for a few seconds or a total loss.	Recognise loss of communications Take appropriate action Execute appropriate procedure as applicable Use alternative ways to communicate Manage consequences	Loss of communications during ground manoeuvring	x	x							
			TO			Loss of communications after take-off	x					x			X
			APP			Loss of communications during approach phase, including go-around	x	x				x	x		X

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
	Generation 2 Jet — Recurrent assessment and training matrix						*Competency map*								
EVAL and SBT phase	Managing loading, fuel, performance errors	C	ALL	A calculation error by one or more pilots, or someone involved with the process, or the process itself, e.g. incorrect information on the load sheet	Anticipate the potential for errors in load/fuel/performance data Recognise inconsistencies Manage/avoid distractions Make changes to paperwork/aircraft system(s) to eliminate error Identify and manage consequences	This can be a demonstrated error, in that the crew may be instructed to deliberately insert incorrect data, for example to take off from an intersection with full-length performance information. The crew will be asked to intervene when acceleration is sensed to be lower than normal, and this may be part of the operator procedures, especially when operating mixed fleets with considerable variations in MTOM.	x	x						x	
	Navigation	C	GND	External NAV failure. Loss of GPS satellite, ANP exceeding RNP, loss of external NAV source(s)	Recognise a NAV degradation. Take appropriate action Execute appropriate procedure as applicable Use alternative NAV guidance Manage consequences	External failure or a combination of external failures degrading aircraft navigation performance	x		x			x	x		
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance		x			x	x	x		
	Operations- or type-specific	C	ALL	Intentionally blank	Intentionally blank	Intentionally blank	Intentionally blank								
	Operations of special airport approval	C	APP LDG	See equivalency of approaches relevant to operations.	The operator should comply with the national qualification requirements published in the Aeronautical Information Publication	Intentionally blank	Intentionally blank								
	Pilot incapacitation	C	TO	Consequences for the non-incapacitated pilot	Recognise incapacitation Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences	During take-off	x	x			x	x			X
			APP			During approach	x			x				x	X
Evaluation and scenario-based training phases	Runway or taxiway condition	C	GND TO LDG	Contamination or surface quality of the runway, taxiway, or tarmac including foreign objects	Recognise hazardous runway condition Observe limitations Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Planned anticipated hazardous conditions with dispatch information provided to facilitate planning and execution of appropriate procedures						x			X
			GND TO LDG			Unanticipated hazardous conditions, e.g. unexpected heavy rain resulting in flooded runway surface		x			x	x			
			TO			Stop/go decision in hazardous conditions					x	x		x	
	Terrain	C	ALL	Alert, warning, or conflict	Anticipate terrain threats Prepare for terrain threats Recognise unsafe terrain clearance Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Restore safe flight path Manage consequences	ATC clearance giving insufficient terrain clearance	x	x			x				X
			ALL			Demonstration of terrain avoidance warning systems (this scenario element may be done in an ISI.)						x	x	x	
			TO CLB			Engine failure where performance is marginal leading to TAWS warning		x		x				x	
			DES			'Virtual mountain' meaning the surprise element of an unexpected warning. Care should be exercised in creating a level of realism, so this can best be achieved by an unusual and unexpected change of route during the descent						x	x	x	

Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Jet — Recurrent assessment and training matrix						*Competency map*								
Traffic	C	CLB CRZ DES	Traffic conflict. ACAS RA or TA, or visual observation of conflict, which requires evasive manoeuvring	Anticipate potential loss of separation Recognise loss of separation Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	ACAS warning requiring crew intervention		x				x	x	x	

AMC6 to Appendix II — EBT programme

GENERATION 2 (TURBOPROP) — TABLE OF ASSESSMENT AND TRAINING TOPICS

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Section 1															
Manoeuvres training phase	Rejected take-off	A	TO	Engine failure after the application of take-off thrust and before reaching V1	Demonstrate manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detect deviations through instrument scanning Maintain spare mental capacity during manual aircraft control Maintain the aircraft within the flight envelope Apply knowledge of the relationship between aircraft attitude, speed and thrust	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
	Failure of critical engine between V1 & V2	A	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement	x			x					
	Failure of critical engine between V1 & V2	B	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is considered to be complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x			x					
	Emergency descent	C	CRZ	Initiation of emergency descent from normal cruise altitude		The manoeuvre is considered to be completed once the aircraft is stabilised in emergency descent configuration (and profile)	x		x	x					
	Engine-out approach & go-around	A	APP	With a critical engine failed, manually flown normal precision approach to DA, followed by manually flown go-around, the whole manoeuvre to be flown without visual reference		This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is considered to be complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement (describe generally critical part of manoeuvre)	x			x					
	Go-around	A	APP	Go-around, all engines operative		High energy, initiation during the approach at 150 to 300 m (500 to 1 000 ft) below the missed approach level-off altitude	x		x	x					
			APP	Go-around, all engines operative followed by visual circuit, manually flown		Initiation of go-around from DA followed by visual circuit and landing	x		x	x					
			APP	Go-around, all engines operative		During flare/rejected landing	x		x	x					
	Engine-out landing	A	LDG	With a critical engine failed, normal landing		Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					
Section 2 Equivalency of Approaches relevant to operations															
MT phase	Approach type A or B	B	APP	Approach type A or B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type A	B	APP	Approach type A flight method 2D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		x
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations.	Approaches flown from FAF to landing or go around	x		x	x					

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT phases	Approach type A	B	APP	Approach type A flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		x
	Approach type B	B	APP	Approach type B flight method 3D	See equivalency of approaches relevant to operations	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	APP	Approach requiring specific approval	See equivalency of approaches relevant to operations.	Approaches flown from FAF to landing or go around	x		x	x					
Section 3 Training topics frequency (A) in alphabetical order.															
Evaluation and scenario-based training phases	Adverse weather	A	GND	Thunderstorm, heavy rain, turbulence, ice build-up to include de-icing issues, as well as high- temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios.	Anticipate adverse weather Prepare for suspected adverse weather Recognise adverse weather Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Predictive wind shear warning before take-off, as applicable	x	x				x			
			ALL			Adverse-weather scenario, e.g. thunderstorm activity, precipitation, icing		x			x	x		x	
			TO			Wind shear encounter during take-off, not predictive	x			x			x		X
			TO			Predictive wind shear warning during take-off	x	x				x	x		
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			CRZ			Wind shear encounter scenario during cruise	x		x			x	x	x	
			APP			Reactive wind shear warning during approach or go-around	x		x	x			x		
			APP			Predictive wind shear warning during approach or go-around	x	x				x	x		
			APP			Thunderstorm encounter during approach or on missed approach	x					x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Non-precision approach in cold temperature conditions, requiring altitude compensation for temperature, as applicable to type	x	x					x		
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x				x			

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT	Aircraft system management	A		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It links with the topic 'compliance' Where a system is not managed according to normal or defined procedures, this is determined as a non-compliance	See 'compliance' topic above. There are no defined scenarios, but the instructor should focus on learning opportunities when system management non-compliances manifest themselves during other scenarios. Underpinning KNO of systems and their interactions should be developed and challenged, and not merely the application of normal procedures	x								x
			CRZ APP LDG			Minimum fuel, caused by extended delays, weather...etc. where the crew would need to managed a minimum fuel situation.					x	x	x	x	
Evaluation and scenario-based training phases	Automation management	A	CLB CRZ DES APP	The purpose of this topic is to encourage and develop effective flight path management through proficient and appropriate use of the flight management system(s), guidance and automation including transitions between modes, monitoring, mode awareness, vigilance and flexibility needed to change from one mode to another. Included in this topic is the means of mitigating errors described as: mishandled auto flight systems, inappropriate mode selection, flight management system(s) and autopilot usage.	Know how and when to use the flight management system(s), guidance and automation Demonstrate correct methods for engagement and disengagement of the auto flight system(s) Demonstrate appropriate use of flight guidance, auto thrust and other automation systems Maintain mode awareness of the auto flight system(s), including engagement and automatic transitions Revert to different modes when appropriate Detect deviations from the desired aircraft state (flight path, speed, attitude, thrust, etc.) and take appropriate action. Anticipate mishandled auto flight system Recognise mishandled auto flight system. Take appropriate action if necessary Restore correct auto flight state Identify and manage consequences	ACAS warning, recovery and subsequent engagement of automation	x		x						
			ALL			FMS tactical programming issues, e.g. step climb, runway changes, late clearances, destination re-programming, executing diversion	x		x						X
			CLB CRZ DES APP			Recoveries from TAWS, management of energy state to restore automated flight	x		x	x					
			CLB CRZ DES APP			Amendments to ATC cleared levels during altitude capture modes to force mode awareness and intervention	x		x				x		
			TO			Late ATC clearance to an altitude below acceleration altitude	x		x				x		
			TO APP			Engine-out special terrain procedures	x		x				x		
			CRZ			Forcing AP disconnect followed by re-engagement, recovery from low- or high-speed events in cruise	x		x	x			x		
			CRZ			Engine failure in cruise to onset of descent using automation	x		x						
			CRZ			Emergency descent	x		x						X
			DES APP			Managing high-energy descent capturing descent path from above (correlation with unstable approach training)	x		x				x		X
			APP			No ATC clearance received prior to commencement of approach or final descent	x		x				x		
			APP			Reactive wind shear and recovery from the consequent high-energy state	x		x				x		
			APP			Non-precision or infrequently flown approaches using the maximum available level of automation	x		x						X
			APP			Gear malfunction during approach		x				x		x	
			APP			ATC clearances to waypoints beyond programmed descent point for a coded final descent point during an approach utilising a final descent that is commanded by the flight management system.	x		x				x		X

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates communication; leadership and teamwork; problem-solving and decision-making; situation awareness and management of information; workload management. Emphasis should be placed on the development of leadership, shown by EBT data sources to be a highly effective competency in mitigating risk and improving safety through pilot performance	Communication: Demonstrate effective use of language, responsiveness to feedback and that plans are stated and ambiguities resolved. Leadership and teamwork: Use appropriate authority to ensure focus on the task. Support others in completing tasks. Problem-solving and decision-making: Detect deviations from the desired state, evaluate problems, identify risk, consider alternatives and select the best course of action. Continuously review progress and adjust plans. Situation awareness and management of information: Have an awareness of the acft state in its environment; project and anticipate changes. Workload management: Prioritise, delegate and receive assistance to maximise focus on the task. Continuously monitor the flight progress	GPS failure prior to commencement of approach associated with position drift and a terrain alert				x	x	x		X
			DES			Cabin crew report of water noise below the forward galley indicating a possible toilet pipe leak, with consequent avionics failures					x	x	x		
			CRZ			Smoke removal but combined with a diversion until landing completed.		x			x	x	x	x	X
			APP			ACAS warning immediately following a go-around, with a descent manoeuvre required.		x			x	x	x	x	
	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOPs). This is not intended to list scenarios, but instructors should ensure that observed non-compliances are taken as learning opportunities throughout the programme. In all modules of the programme, the FSTD should as far as possible be treated like an aircraft, and non-compliances should not be accepted simply for expediency.	Recognise that a compliance failure has occurred Make a verbal announcement Take appropriate action if necessary Restore safe flight path if necessary Manage consequences	The following are examples of potential compliance failures, and not intended to be developed as scenarios as part of an EBT module: 1. Requesting flap beyond limit speed 2. Flaps or slats in the wrong position for phase of flight or approach 3. Omitting an action as part of a procedure 4. Failing to initiate or complete a checklist 5. Using the wrong checklist for the situation	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Go-around management	A	APP	Any threat or error that can result in circumstances that require a decision to perform go-around, in addition to the execution of the go-around. Go-around scenarios should be fully developed to encourage effective leadership and teamwork, in addition to problem-solving and decision-making, plus execution using manual aircraft control or the flight management system(s) and automation as applicable. Design should include the element of surprise and scenario-based go-arounds should not be predictable and anticipated. This topic is completely distinct from the go-around manoeuvre listed in the manoeuvres training section that is intended only to practise psychomotor skill and a simple application of the procedures		Adverse-weather scenario leading to a reactive wind shear warning during approach	x	x					x	x	
			APP			Adverse-weather scenario leading to a predictive wind shear warning during APP or G/A	x	x					x	x	
			APP			Adverse-weather scenario, e.g. thunderstorm activity, heavy precipitation or icing forcing decision at or close to DA/MDA	x					x	x	x	
			APP			DA with visual reference in heavy precipitation with doubt about runway surface braking capability	x					x	x	x	
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP			Adverse-wind scenario, strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP			Lost or difficult communications resulting in no approach clearance prior to commencement of approach or final descent	x		x				x		
			APP			Birds: large flocks of birds below DA once visual reference has been established				x		x	x		
			APP			System malfunction, landing gear malfunction during the approach									

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Manual aircraft control	A	CLB CRZ DES APP	Controls the flight path through manual control	Desired competency outcome: Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation Detects deviations through instrument scanning Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope Applies knowledge of the relationship between aircraft attitude, speed and thrust	Flight with unreliable airspeed, which may be recoverable or not recoverable	x			x			x		X
			CLB CRZ DES APP			Alternate flight control modes according to malfunction characteristics	x			x				x	X
			CLB CRZ DES APP			ACAS RA to descend or ATC immediate descent	x	x		x					
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	x			x	x				
			TO			Scenario immediately after take-off which requires an immediate and overweight landing			x	x	x	x			
			TO			Adverse wind, crosswinds with or without strong gusts on take-off	x			x					
			TO			Adverse weather, wind shear, wind shear encounter during take-off, with or without reactive warnings	x			x			x		
			TO			Engine failure during initial climb, typically 30-60 m (100-200 ft) (autopilot off)	x	x		x				x	
			CRZ			Wind shear encounter scenario during cruise, significant and rapid change in wind speed or down/updrafts, without wind shear warning	x		x			x	x	x	
			APP			Adverse weather, wind shear, wind shear encounter with or without warning during approach	x		x	x			x		
			APP			Adverse weather, deterioration in visibility or cloud base, or adverse wind, requiring a go-around from visual circling approach, during the visual segment	x	x	x	x		x	x	x	
			APP LDG			Adverse wind, crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
			APP LDG			Adverse weather, adverse wind, approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP LDG			Circling approach at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights									
			APP LDG			Runway incursion during approach, which can be triggered by ATC at various altitudes or by visual contact during the landing phase	x			x			x		
			LDG			Adverse wind, visibility, type-specific, special consideration for long-bodied aircraft, landing in minimum visibility for visual reference, with crosswind	x	x		x			x		
			LDG			System malfunction, auto flight failure at DA during a low-visibility approach requiring a go-around flown manually	x		x	x			x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Approach planned with autoland, followed by a failure below 1000 feet requiring a go-around, and an immediate landing due to fuel shortage.	x		x		x		x		
Evaluation and scenario-based training phases	Monitoring, cross checking, error management, mismanaged aircraft state	A	ALL	The scenarios should be realistic and relevant, and should be used for the purpose of demonstration and reinforcement of effective flight path monitoring. Modules in the FSTD should be treated like those in an aircraft so that trainees have the opportunity to develop competency with the practice of the right techniques and attitudes related to these topics through pilot performance, and that instructors have the opportunity to assess and train these topics in a realistic environment. As shown by the EBT data report, these topics are of key importance to improve safety in operations. In addition, the operator may also use these topics to develop scripted role-playing scenarios in the form of ISI training. These scenarios cater for the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. Demonstration scenarios may also be used. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training.	Recognise mismanaged aircraft state. Observe behaviour: how pilot is mitigating errors, how pilot is performing cross checking, how pilot is monitoring performance and dealing with a mismanaged aircraft state, so the instructors should ensure that observed deviations, errors and mistakes are taken as learning opportunities throughout the programme. Monitor flight path excursions. Detect errors and threats through proper cross checking performance. Make appropriate interventions either verbally or by taking control if applicable. Take appropriate action if necessary Restore desired aircraft state Identify and manage consequences	Deviations from the flight path, in pitch attitude, speed, altitude, bank angle		x					x		
			ALL			In-seat instruction: Simple automation errors (e.g. incorrect mode selection, attempted engagement without the necessary conditions, entering wrong altitude or speed, failure to execute the desired mode) culminating in a need for direct intervention from the PM, and where necessary taking control.		x					x		
			APP			In-seat instruction: Unstable approach or speed/path/vertical rate not congruent with required state for given flight condition	x	x					x	x	
			LDG			In-seat instruction: Demonstration exercise — recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM	x			x			x		
	Unstable approach	A	DES APP	Reinforce stabilised approach philosophy and adherence to defined parameters. Encourage go-arounds when crews are outside these parameters. Develop and sustain competencies related to the management of high-energy situations		ATC or terrain related environment creating a high-energy descent with the need to capture the optimum profile to complete the approach in a stabilised configuration	x		x				x		
			DES APP			ATC or terrain related environment creating a high-energy descent leading to unstable conditions and requiring a go-around	x		x				x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x		x	x		
			APP			Increasing tailwind on final (not reported)	x	x				x	x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
Section 3 Training topics frequency (B) per phase and in alphabetical order.															
Evaluation ,manoeuvres training, and scenario-based training phases	Upset prevention training	B	N/A	Compliance with AMC1 or 2 ORO.FC.220&230	Include upset prevention elements in Table 1 for the recurrent training programme at least every 12 calendar months, such that all the elements are covered over a period not exceeding 3 years.	See Table 1 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	ALL	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: • Immediacy • Complexity • Degradation of aircraft control • Loss of primary instrumentation • Management of consequences	Recognise system malfunction Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences Apply crew operating procedure where necessary. Respond appropriately to additional system abnormal associated with MEL dispatch Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences The operator should vary malfunctions for each characteristic over the EBT cycle.	For full details, see the Malfunction Equivalency methodology. At least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below 7 for each crew member every year. (i) System malfunctions requiring immediate and urgent crew intervention or decision, e.g. fire, smoke, loss of pressurisation at high altitude, failures during take-off, brake failure during landing. (ii) System malfunctions requiring complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures, major dual system electrical. (iii) System malfunctions resulting in significant degradation of flight controls in combination with abnormal handling characteristics, e.g. jammed flight controls, certain degradation of FBW control, Jammed horizontal stabiliser; Flaps and/or slats locked, other malfunctions resulting in degraded flight controls. (iv) System failures that require monitoring and management of the flight path using degraded or alternative displays, unreliable primary flight path information, unreliable airspeed, e.g. flight with unreliable airspeed (v) System failures that require extensive management of their consequences (independent of operation or environment), e.g. fuel leak.	Intentionally blank								
			TO			MEL items with crew operating procedures applicable during take-off						x			X
			TO			Response to an additional factor that is affected by MEL item (e.g. system failure, runway state)		x		x		x			X
			GND			Malfunction during preflight preparation and prior to departure	x					x	x		
			CLB			Malfunction after departure	x					x	x		X
			ALL			Malfunctions requiring immediate attention (e.g. bleed fault during engine start, hydraulic failure during taxi)	x				x			x	
			CLB CRZ			Fuel leak (management of consequences)	x				x		x		X
			TO			Take-off high speed below V1	x				x	x			
			TO			Take-off high speed above V1	x					x			
			TO			Initial climb	x					x			
			APP			On approach	x					x		x	
			APP			Go-around	x					x		x	
			LDG			During landing	x	x		x		x	x		

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT phases	Engine failure	B	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that impacts performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only for the practice of psychomotor skill and reinforcement of procedures in managing engine failures	Recognise engine failure Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Take-off low speed	x			x		x		x	
			TO			Take-off high speed below V1	x			x		x		x	
			TO			Take-off above V1	x					x	x	x	
			TO			Initial climb	x					x	x		
			APP			Engine malfunction	x					x		x	
			CRZ			Engine failure in cruise (with autopilot)	x		x				x		
			LDG			On landing				x					
Evaluation and scenario-based training phases	Landing	B	LDG	Pilots should have opportunities to practise LDGs in demanding situations at the defined frequency. Data indicates that LDG problems have their roots in a variety of factors, including appropriate decision-making, in addition to manual aircraft control skills if difficult environmental conditions exist. The purpose of this item is to ensure that pilots are exposed to this during the programme	Landing in demanding environmental conditions, with malfunctions as appropriate	This topic should be combined with the adverse-weather topic, aircraft system malfunctions topic or any topic that can provide exposure to a landing in demanding conditions	Intentionally blank								
	Surprise	B	ALL	The data analysed during the development of this manual and of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a surprise, or an unexpected event. The element of surprise should be distinguished from what is sometimes referred to as the 'startle factor', the latter being a physiological reaction. Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrence, so that pilots do not become overly familiar with repetitions of the same scenarios. Variations should be the focus of EBT programme design, and not left to the discretion of individual instructors, in order to preserve programme integrity and fairness	Exposure to an unexpected event or sequence of events at the defined frequency	Intentionally blank	Intentionally blank								

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL and SBT phases	Terrain	B	ALL	Alert, warning, or conflict	Anticipate terrain threats Prepare for terrain threats Recognise unsafe terrain clearance Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Restore safe flight path Manage consequences	ATC clearance giving insufficient terrain clearance	x	x			x				X
			ALL			Demonstration of terrain avoidance warning systems (this scenario element may be done in an ISI.)						x	x	x	
			TO CLB			Engine failure where performance is marginal leading to TAWS warning		x		x				x	
			DES			'Virtual mountain' meaning the surprise element of an unexpected warning. Care should be exercised in creating a level of realism, so this can best be achieved by an unusual and unexpected change of route during the descent						x	x	x	
	Workload, distraction, pressure	B		This is not considered a topic for specific attention on its own, but more as a reminder to programme developers to ensure that pilots are exposed to immersive training scenarios which expose them to manageable high workload and distractions during the course of the EBT programme, at the defined frequency	Manage available resources efficiently to prioritize and perform tasks in a timely manner under all circumstances	Intentionally blank	Intentionally blank								

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Section 3 Training topics frequency (C) per phase and in alphabetical order.															
Evaluation, manoeuvres training and scenario-based training phases	Upset recovery	C	N/A	Compliance with AMC1 or 2 ORO.FC.220&230 An aeroplane upset is defined as an undesired aeroplane state in flight characterised by unintentional divergences from parameters normally experienced during line operations or training. An aeroplane upset may involve pitch and/or bank angle divergences as well as inappropriate airspeeds for the conditions. The example scenario elements may be done in ISI, as non-ISI or a combination of both. Include the recovery exercises in Table 2 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years.	Recognise upset condition Take appropriate action Assure aircraft control Maintain or restore a safe flight path Assess consequential issues Manage outcomes	See Table 2 in AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank							
			CLB CRZ DES APP			Upset recognition: Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist			x	x			x	x	
			TO APP			Upset recognition and recovery — Severe wind shear or wake turbulence during take-off or approach			x	x		x	x		X
			CLB DES			Upset recognition and recovery — as applicable and relevant to aircraft type, demonstration at a suitable intermediate level, with turbulence as appropriate; practise steep turns and note the relationship between bank angle, pitch and stalling speed				x			x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence to trigger overspeed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)			x	x		x	x		X
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence and significant temperature rise to trigger low-speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	x			x			x		X
			CRZ			Upset recognition and recovery — demonstration at a normal cruising altitude, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			APP			Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions	x			x			x		
			CLB DES			In-seat instruction: Recovery – Demonstration: the instructor should position the aircraft within but close to the edge of the normal flight envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the normal flight envelope				x			x		X

Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Adverse wind	C	TO	Adverse wind/crosswind. This includes tailwind but not ATC mis-reporting of the actual wind	Recognise adverse-wind conditions Observe limitations Apply appropriate procedures Maintain directional control and safe flight path	Take-off with different crosswind/tailwind/gust conditions						x		x	
			TO			Take-off with unreported tailwind		x			x				
			TO			Crosswinds with or without strong gusts on take-off	x			x					
			APP			Increasing tailwind on final (not reported)	x	x				x	x		
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswind including shifting wind directions				x		x	x		
			APP			Adverse-wind scenario resulting in increasing tailwind below DA (not reported)		x		x		x			
			APP			Adverse-wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x		x			
			APP			Adverse-wind scenario, strong gusts and/or crosswind out of limits below DA (not reported)		x		x		x			
			APP LDG			Crosswind with or without strong gusts on APP, final and landing (within and beyond limits)	x			x		x			
	Approach, visibility close to minimum	c	APP	Any situation where visibility becomes a threat	Recognise actual conditions Observe aircraft and/or procedural limitations Apply appropriate procedure if applicable Maintain directional control and safe flight path	Approach in poor visibility	x		x	x				x	
			APP			Approach in poor visibility with deteriorations necessitating a decision to perform go-around	x		x	x					
			LDG			Landing in poor visibility				x		x	x		
EVAL and SBT phase	Fire and smoke management	C	GND	This includes engine, electric, pneumatic, cargo fire, smoke or fumes	Recognise fire, smoke or fumes Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	Fire in cargo or cabin/cockpit at gate	x	x				x		x	
			GND			Fire during taxi	x	x				x		x	X
			GND			Fire with no cockpit indication	x	x				x		x	X
			TO			Take-off low speed	x			x	x	x			X
			TO			Take-off high speed below V1	x			x	x	x			
			TO			Take-off high speed above V1	x				x	x			
			TO			Initial climb	x				x	x			

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			CRZ			Cargo fire						x	x	x	
			APP			Engine fire in approach (extinguishable)		x				x			
			APP			Engine fire in approach (non-extinguishable)		x			x	x			
			APP			Flight deck or cabin fire		x			x	x			X
EVAL and SBT phase	Loss of communications	C	GND	Lost or difficult communications. Either through pilot mis-selection or a failure external to the aircraft. This could be for a few seconds or a total loss.	Recognise loss of communications Take appropriate action Execute appropriate procedure as applicable Use alternative ways to communicate Manage consequences	Loss of communications during ground manoeuvring	x	x							
			TO			Loss of communications after take-off	x					x			X
			APP			Loss of communications during approach phase, including go-around	x	x				x	x		X
EVAL and SBT phase	Managing loading, fuel, performance errors	C	ALL	A calculation error by one or more pilots, or someone involved with the process, or the process itself, e.g. incorrect information on the load sheet	Anticipate the potential for errors in load/fuel/performance data Recognise inconsistencies Manage/avoid distractions Make changes to paperwork/aircraft system(s) to eliminate error Identify and manage consequences	This can be a demonstrated error, in that the crew may be instructed to deliberately insert incorrect data, for example to take off from an intersection with full-length performance information. The crew will be asked to intervene when acceleration is sensed to be lower than normal, and this may be part of the operator procedures, especially when operating mixed fleets with considerable variations in MTOM.	x	x						x	
	Navigation	C	GND	External NAV failure. Loss of GPS satellite, ANP exceeding RNP, loss of external NAV source(s)	Recognise a NAV degradation. Take appropriate action Execute appropriate procedure as applicable Use alternative NAV guidance Manage consequences	External failure or a combination of external failures degrading aircraft navigation performance	x		x			x	x		
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance		x			x	x	x		
	Operations- or type-specific	C	ALL	Intentionally blank	Intentionally blank	Intentionally blank	Intentionally blank								
	Operations of special airport approval	C	APP LDG	See equivalency of approaches relevant to operations.	The operator should comply with the national qualification requirements published in the Aeronautical Information Publication	Intentionally blank	Intentionally blank								
	Pilot incapacitation	C	TO	Consequences for the non-incapacitated pilot	Recognise incapacitation Take appropriate action including correct stop/go decision Apply appropriate procedure correctly Maintain aircraft control Manage consequences	During take-off	x	x			x	x			X
			APP			During approach	x			x				x	X

	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Guidance material (GM) Example scenario elements*	*APK*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Evaluation and scenario-based training phases	Runway or taxiway condition	C	GND TO LDG	Contamination or surface quality of the runway, taxiway, or tarmac including foreign objects	Recognise hazardous runway condition Observe limitations Take appropriate action Apply appropriate procedure correctly Assure aircraft control	Planned anticipated hazardous conditions with dispatch information provided to facilitate planning and execution of appropriate procedures						x			X
			GND TO LDG			Unanticipated hazardous conditions, e.g. unexpected heavy rain resulting in flooded runway surface		x			x	x			
			TO			Stop/go decision in hazardous conditions					x	x		x	
	Traffic	C	CLB CRZ DES	Traffic conflict. ACAS RA or TA, or visual observation of conflict, which requires evasive manoeuvring	Anticipate potential loss of separation Recognise loss of separation Take appropriate action Apply appropriate procedure correctly Maintain aircraft control Manage consequences	ACAS warning requiring crew intervention		x				x	x	x	
	Wind shear recovery	C	TO	With or without warnings including predictive. A wind shear scenario is ideally combined into an adverse-weather scenario containing other elements.	Anticipate potential for wind shear Avoid known wind shear or prepare for suspected wind shear Recognise wind shear encounter Take appropriate action Apply appropriate procedure correctly Assure aircraft control Recognise out of wind shear condition Maintain or restore a safe flight path Assess consequential issues and manage outcomes	Predictive wind shear warning during take-off					x	x			
			TO			Wind shear encounter during take-off	x				x	x			
			TO			Wind shear encounter after rotation						x		x	
			TO			Predictive wind shear after rotation					x	x			
			APP			Predictive wind shear during approach	x				x	x			
			APP			Wind shear encounter during approach	x				x	x			

Appendices 2 to 6

Summary of amendments to Appendices 2 to 6 to Doc 9995:

- The competency KNO is introduced and its competency map (34 hits for GEN4).
- The wording 'Guidance material' is introduced in the 'example scenario element column' to indicate that this column is GM.
- The 3 go-arounds in the assessment and training topic of the manoeuvres training phase are merged because it was confusing for the operators. Frequencies are also merged.
- Training topic 'adverse weather' — example scenario element 'adverse-weather scenario' e.g. thunderstorm activity, precipitation, icing, flight phase activation amend from take-off (TO) to all phases of flight (ALL).
- Training topic 'automation management' — for 3 example scenario elements, the flight phase activation has changed from ALL to CLB, CRZ, DES, APP, as those example scenario elements cannot be triggered on ground (e.g. recoveries from TAWS, ACAS warnings, recovery and subsequent engagement of automation).
- Same as above in training topic 'manual aircraft control' (e.g. ACAS RA to descend or ATC […]).
- Training topic 'competencies non-technical (CRM)' — example scenario element 'ACAS warning immediately following a go-around, with a descent manoeuvre required', the activation phase is changed from CRZ to APP.
- Training topic 'manual aircraft control' — a new example scenario element and its competency map were introduced (Approach planned with autoland, followed by a failure below 1 000 feet […]).
- Training topic 'monitoring, cross checking, error management, and mismanagement aircraft state' — the term 'in-seat instruction' is deleted. Feedback from operators implementing mixed EBT implementation has highlighted that ISI is not the only means of training this operational risk; therefore, an increase flexibility in regard to the means to deliver this training topic was introduced. Furthermore, the 'Data Report for Evidence-Based Training'[23] DOES NOT make any reference to in-seat instruction.
- Training topic 'upset prevention training' — extensive amendments are introduced. Doc 9995 was published before Doc 10011 'UPRT manual', and therefore Doc 9995 does not provide the latest training exercises for UPRT. The new provision proposed in AMC8 ORO.FC.231 point (a) requires compliance with AMC1&2 ORO.FC.220&230. The new text allows to train this topic in all phases of the modules to allow more flexibility.
- Training topic 'aircraft system malfunctions, including operations under MEL' — a new example scenario element and its competency map were introduced (fuel leak (management of consequences)).
- Training topic 'terrain' — the example scenario element of demonstration of TAWS is amended to allow operators to train this exercise with ISI in order to avoid negative training for pilots.
- A new training topic (operations of special airport approval) was introduced with a frequency of 'C'.
- Training topic 'upset recovery training' was extensively amended. Doc 9995 was published before Doc 10011 'UPRT manual', and therefore Doc 9995 does not provide the latest training exercises for UPRT. The new text requires compliance with AMC1&2 ORO.FC.220&230. The new text allows to train this topic in all phases of the modules to allow more flexibility.

[23] IATA Data Report for Evidence-Based Training August 2014 1st Edition.

Annex I (Part-FCL) to Regulation (EU) No 1178/2011

Concept of revalidation within an EBT programme

Background of licence revalidation:

— The current revalidation process has four components:

(a) the applicant

(b) the examiner

(c) the technical assessment carried out in the simulator or the aircraft

(d) the administrative procedure that includes the completion of Appendix 9, and the rest of administrative procedures in Part-FCL FCL.1030 point (b), (c) and (d) that includes the licence endorsements.

This process is carried out by the same person (examiner) who performs the technical assessment and the administrative procedure, at the same 'location' (simulator or aircraft) and at the same time (the date and time of the proficiency check).

Note: Although most of the LPCs are carried out by a single examiner, the possibility of having several examiners for the same check already exists.

— The EBT philosophy should provide a different approach, where training is maximised and therefore checks disappear (assessment is introduced) and the pilot is trained in NON-jeopardy environment. Furthermore, the continuous training evidences of the pilot (data) should provide a better assessment of the competence of the pilot. Therefore:

(a) the EBT technical assessment has several events (simulator sessions) instead of one,

(b) there are several assessors of pilot performance (EBT instructors) instead of just one (examiner); however, the nominated person for crew training who is an examiner designated to provide a final assessment of the data collected; and

(c) the administrative procedure should be maintained; however, due to the several people involved in the technical assessment, the administrative procedures involve the nominated person for crew training who carries the responsibility of the licence revalidation and a designated person who will endorse the licence.

Concept of licence revalidation in the context of an operator's approved EBT programme

The revalidation process proposed has the following components:

(a) the applicant;

(b) the people involved in the revalidation of the pilot licence:

(1) the nominated person for crew training (or the deputy(ies)) who is an examiner responsible for the operator's approved EBT programme, (ensuring that the manoeuvres assessed are of a good training value and that the applicant completed those manoeuvres). The nominated person will be mostly responsible for the completion of Appendix 10. This person (or the deputy(ies)) also has the overall picture of the pilot training data for the period of validity (as shown by the evidence provided by the EBT programme);

(2) the designated person who has the signature delegation from the nominated person to endorse the licence and complete Appendix 10; and

(3) the EBT instructors who delivered each of the technical assessments that provide data to the EBT grading system and the training system performance;

(c) the several technical assessments carried out in the simulators which provide the necessary evidence to ensure the pilot has an acceptable level of performance; and

(d) the administrative procedure which includes the completion of Appendix 10 and the rest of administrative procedures provided in FCL.1030.

FCL.625 IR — Validity, revalidation and renewal

(a) […]

(b) […]

(c) Renewal. If an IR has expired, in order to renew their privileges applicants shall:

(1) go through refresher training at an ATO to reach the level of proficiency needed to pass the instrument element of the skill test in accordance with Appendix 9 to this Part; and

(2) complete a proficiency check in accordance with Appendix 9 or Appendix 10 to this Part, in the relevant aircraft category.

(d) […]

FCL.625.A IR(A) — Revalidation

(a) Revalidation. Applicants for the revalidation of an IR(A):

(2) when combined with the revalidation of a class or type rating, shall pass a proficiency check in accordance with Appendix 9 or Appendix 10 to this Part; […]

FCL.740 — Validity and renewal of class and type ratings

(a) […]

(b) Renewal. If a class or type rating has expired, the applicant shall:

(1) take refresher training at an ATO, or an AOC approved for such refresher, when necessary to reach the level of proficiency necessary to safely operate the relevant class or type of aircraft; and

(2) pass a proficiency check in accordance with Appendix 9 or Appendix 10 to this Part. […]

AMC1 FCL.740(b)(1) Validity and renewal of class and type ratings

RENEWAL OF CLASS AND TYPE RATINGS: REFRESHER TRAINING — ATO

(a) Paragraph (b)(1) of FCL.740 determines that if a class or type rating has lapsed, the applicant shall take refresher training at an ATO. The objective of the training is to reach the level of proficiency necessary to safely operate the relevant type or class of aircraft. The amount of refresher training needed should be determined on a case-by-case basis by the ATO, taking into account the following factors: […]

AMC2 FCL.740(b)(1) Validity and renewal of class and type ratings

RENEWAL OF CLASS AND TYPE RATINGS: REFRESHER TRAINING — AOC

Point (b)(1) of FCL.740 determines that if a class or type rating has lapsed, the applicant shall take refresher training. An AOC approved for such purpose can provide such training only for their own pilots when enrolled under an approved EBT programme. The maximum amount of time elapsed since the expiry of the validity period of the rating should be no more than one year. If more than 1 year has elapsed, the training should be performed in an ATO and AMC1 FCL.740(b)(1) applies.

FCL.740.A — Revalidation of class and type ratings — aeroplanes

(b) Revalidation of multi-engine class ratings and type ratings. For revalidation of multi-engine class ratings and type ratings, the applicant shall:

(2) pass a proficiency check in accordance with Appendix 9 or Appendix 10 to this Part in the relevant class or type of aeroplane or an FSTD representing that class or type, within the 3 months immediately preceding the expiry date of the rating; […]

FCL.905.TRI TRI — Privileges and conditions

(a) The privileges of a TRI are to instruct for:

~~(a)~~ (1) the revalidation and renewal of an EIR or an IR, provided the TRI holds a valid IR;

[…]

~~(f)~~ (6) in the case of the TRI for powered-lift aircraft:

~~(1)~~ (i) the issue, revalidation and renewal of powered-lift type ratings;

~~(2)~~ (ii) MCC training.

(b) After successful completion of the operator's EBT instructor standardisation in accordance with Part ORO, the TRI has additionally the privilege to conduct practical assessment in competencies.

FCL.905.SFI SFI — Privileges and conditions

(a) The privileges of an SFI are to carry out synthetic flight instruction, within the relevant aircraft category, for:

~~(a)~~ (1) the issue, revalidation and renewal of an IR, provided that he/she holds or has held an IR in the relevant aircraft category and has completed an IRI training course; and

~~(b)~~ (2) in the case of SFI for single-pilot aeroplanes:

~~(1)~~ (i) the issue, revalidation and renewal of type ratings for single-pilot high performance complex aeroplanes, when the applicant seeks privileges to operate in single-pilot operations.

[…]

~~(d)~~ (4) in the case of SFI for helicopters:

~~(1)~~ (i) the issue, revalidation and renewal of helicopter type ratings;

~~(2)~~ (ii) MCC training, when the SFI has privileges to instruct for multi-pilot helicopters.

(b) After successful completion of the operator's EBT instructor standardisation in accordance with Part ORO, the SFI has additionally the privilege to conduct practical assessment in competencies.

FCL.1025 Validity, revalidation and renewal of examiner certificates

(a) Validity. An examiner certificate shall be valid for 3 years.

(b) Revalidation. An examiner certificate shall be revalidated when the holder has, during the validity period of the certificate:

(1) conducted at least 2 skill tests, proficiency checks or assessments of competence every year; […]

GM1 FCL.1025(b)(1) Validity, revalidation and renewal of examiner certificates

REVALIDATION OF EXAMINERS UNDER AN APPROVED EBT PROGRAMME

FCL.1025 requires for the revalidation of the examiner certificate at least two proficiency checks or assessments of competence every year. A practical assessment in competencies is equivalent to a proficiency check; however, the EBT programme uses two practical assessments in competencies to complete the proficiency check, therefore the examiner under EBT revalidates with four practical assessments of competencies, which complete two proficiency checks. The practical assessment in competencies within an approved EBT programme is equivalent to a proficiency check.

FCL.1030 Conduct of skill tests, proficiency checks and assessments of competence

AMC1 FCL.1030(b)(3) Conduct of skill tests, proficiency checks and assessments of competence

OBLIGATIONS FOR EXAMINERS APPLICATION AND REPORT FORMS

[…]

(b) For training, skill tests or proficiency checks for ATPL, MPL or class and type ratings, in AMC1 to Appendix 9 or AMC1 to Appendix 10;

GM1 FCL.1030(b)(3)(ii) Revalidation of class and type ratings — aeroplanes

REQUIRED MANOEUVRES AND EXERCISES FOR APPENDIX 10

The confirmation that all the required manoeuvres and exercises have been completed, means that during the period of validity the applicant has completed the operator's approved EBT programme corresponding to that period of validity as declared by the nominated person for crew training.

GM1 FCL.1030(b)(3)(ii)

This GM is developed to clarify the responsibility of the TRE as regards 'the required manoeuvres and exercises'. See FCL.1030 of the Aircrew Regulation below:

'FCL.1030

(…)

(ii) confirmation that all the required manoeuvres and exercises have been completed, as well as information on the verbal theoretical knowledge examination, when applicable. If an item has been failed, the examiner shall record the reasons for this assessment;'

Appendix 10 to Annex I (Part-FCL) to Regulation (EU) No 1178/2011

Appendix 10 — Proficiency check type ratings, and proficiency check for IRs when combined with type rating — Practical assessment in competencies

A — General

1. The practical assessment in competencies within an approved EBT programme is equivalent to a proficiency check.

2. Appendix 10 only applies to:

(a) an operator with an approved EBT programme that has:

(1) an experience of at least 2 years conducting an EBT programme which may include mixed EBT; and

(2) a nominated person for crew training (or the deputy(ies)) who is a current examiner in each of the type ratings for which Appendix 10 is applicable; or

(b) an ATO on behalf of the operator that complies with paragraph (2)(a) above, under ORO.GEN.205 'Contracted activities'.

3. The nominated person for crew training must verify that the applicant complies with all the qualification, training and experience requirements in this Part for the revalidation of the rating for which the proficiency check is taken.

4. Applicants using Appendix 10 shall:

(a) be enrolled flight crew members in the operator's approved EBT programme; and

(b) within the period of validity, complete the operator's approved EBT programme.

5. The revalidation or renewal in accordance with Appendix 10 shall comprise:

(a) continuous practical assessment in competencies within an approved EBT programme;

(b) demonstration of an acceptable level of performance in all competencies; and

(c) the administrative action of licence revalidation.

(1) The nominated person for crew training (or the deputy(ies)) shall endorse the applicant's licence or certificate with the new expiry date of the rating, if specifically authorised for that purpose by the competent authority responsible for the applicant's licence. Delegation of the nominated person's for crew training (or the deputy(ies)) signature in order for the applicant's licence to be signed, may be possible only if the operator has an approved procedure for such case.

(2) The nominated person for crew training (or the deputy(ies)) shall ensure that the requirements in FCL.1030 'Conduct of skill tests, proficiency checks and assessments of competence' are met.

B — CONDUCT OF PRACTICAL ASSESSMENT IN COMPETENCIES

6. The practical assessment in competencies must be conducted in accordance with the operator's approved EBT programme.

7. Applicants who fail to demonstrate an acceptable level of competence and are de-enrolled from the operator's approved EBT programme shall not exercise the privileges of that type rating.

Appendix 10

Under the existing Part-FCL Appendix 9, proficiency check has 2 components:

1. the technical assessment in the FSTD or aircraft; and
2. the administrative action

This is based on a single event taking place.

Unlike that, the EBT philosophy dictates that a candidate is continuously assessed throughout the programme. This is achieved through a practical assessment in competencies within each module. Appendix 10 is therefore created to cater for the needs (not only a single event is taking place) of licence revalidation within an EBT programme.

The completion of Appendix 10 proficiency check is based on multiple data obtained through the EBT programme regarding an enrolled flight crew member. It is therefore not based on a single event. Instead, Appendix 10 requires a continuous assessment and training of the pilot where each competency is demonstrated at or above the minimum acceptable level of performance. This may take place in a simulated environment.

Appendix 10 paragraphs 1 and 5

A practical assessment in competencies within an approved EBT programme is equivalent to a proficiency check. However, to legally complete a proficiency check and revalidate the pilot's licence, paragraph 5 details the requirements, including several practical assessments in competencies.

Appendix 10 paragraphs 4 point (b)

Safety promotion material – completion of the operator's approved EBT programme.

EASA has planned SPT.012 to support the implementation of EBT. The following material was developed:

SPT.012 — safety promotion task 012 — safety material for EBT — COMPLETION OF THE OPERATOR'S APPROVED EBT PROGRAMME WITHIN THE PERIOD OF VALIDITY (SEE FCL.1030 (b)(3)(ii) AND APPENDIX 10 PARAGRAPH 4(b).

APPLICANTS USING APPENDIX 10 SHALL, WITHIN THE PERIOD OF VALIDITY, COMPLETE THE OPERATOR'S APPROVED EBT PROGRAMME

(a) The applicant shall complete the operator's approved EBT programme applicable to the period of validity. Normally, the rating validity is 1 year; therefore, it refers to the modules and training planned for that period of time.

(b) When the applicant is enrolled part-way through the period of validity of the rating (e.g. when pilots join a new airline, or they change aircraft types), the applicant is only required to complete the elements of the operator's approved EBT programme for the remaining period of validity.

To 'complete the operator's approved EBT programme' means to complete the EBT modules and any other additional training (ground, FSTD, airplane) or evaluation in the programme (e.g. line evaluation of competence, etc.). However, only the modules will be considered for the purpose of the PRACTICAL ASSESSMENT IN COMPETENCIES to revalidate the licence in accordance with Appendix 10.

Appendix 10 paragraph 5 point (c)(1) — Delegation of signature

It should be noted that the intent of the RMG and EASA for the delegation of signature proposed in this NPA, is that the responsibility remains with the nominated person for crew training and it is not transferred to the person actually signing the licence.

EASA may provide further guidance on the procedure to delegate the signature if found necessary during the consultation of the NPA. Readers are invited to provide comments in this regard.

AMC1 to Appendix 10 — Proficiency check type ratings, and proficiency check for IRs when combined with type rating — Practical assessment in competencies

APPLICATION AND REPORT FORM

Minimum information provided in the form for Appendix 10.

<table>
<tr><td colspan="2">Applicant's last name(s):</td><td colspan="2">Applicant's first name(s):</td></tr>
<tr><td colspan="2">Signature of applicant:</td><td colspan="2">Valid medical _____yes/no</td></tr>
<tr><td colspan="2">Type of licence held:</td><td colspan="2">Licence number:</td></tr>
<tr><td colspan="2">Type rating:</td><td colspan="2">State of licence issue:</td></tr>
<tr><td colspan="4">FSTD (aircraft type):</td></tr>
<tr><td rowspan="4">EBT module 1</td><td colspan="3">Session 1……..Name of the instructor:_____,
Type and number of licence:_____
Location, date and time: _____ FSTD ID code:_____</td></tr>
<tr><td colspan="3">Session 2……..Name of the instructor:_____,
Type and number of licence:_____
Location, date and time: _____ FSTD ID code:_____</td></tr>
<tr><td colspan="3">Session X……Name of the instructor:_____,
Type and number of licence:_____
Location, date and time: _____ FSTD ID code:_____</td></tr>
<tr><td colspan="3">Completion of the module: ☐ _____date / signature (nominated person for crew training)</td></tr>
<tr><td rowspan="4">EBT module 2</td><td colspan="3">Session 1……..Name of the instructor:_____,
Type and number of licence:_____
Location, date and time: _____ FSTD ID code:_____</td></tr>
<tr><td colspan="3">Session 2……..Name of the instructor:_____,
Type and number of licence:_____
Location, date and time: _____ FSTD ID code:_____</td></tr>
<tr><td colspan="3">Session X……Name of the instructor:_____,
Type and number of licence:_____
Location, date and time: _____ FSTD ID code:_____</td></tr>
<tr><td colspan="3">Completion of the module: ☐ _____date / signature (nominated person for crew training)</td></tr>
<tr><td></td><td colspan="3">(…)</td></tr>
</table>

EBT module X	Session X…..Name of the instructor:_____, Type and number of licence:_____ **Location, date and time:** _____ FSTD ID code:_____
	Session Y……..Name of the instructor:_____, Type and number of licence:_____ **Location, date and time:** _____ FSTD ID code:_____
	Session Z……Name of the instructor:_____, Type and number of licence:_____ **Location, date and time:** _____ FSTD ID code:_____
	Completion of the module: ☐ _____date / signature (nominated person for crew training)
Completion of the operator's approved EBT programme from____(date) to ____(date) ☐	**_____date / signature (nominated person for crew training)**
Licence endorsed by_____ **Name(s) in capital letters:** Date:	**Signature of examiner _____** Examiner certificate number: Type and number of licence:
Delegation of signature for licence endorsement:	
Name: Position in the operator: Date:	**Signature**

GM1 to Appendix 10 — Proficiency check type ratings, and proficiency check for IRs when combined with type rating — Practical assessment in competencies

REVALIDATION OF LICENCES — ADMINISTRATIVE PROCEDURES

For the purpose of revalidation, the Examiner Differences Document applies to the nominated person for crew training or the deputy(ies).

GM2 to Appendix 10 — Proficiency check type ratings, and proficiency check for IRs when combined with type rating — Practical assessment in competencies

PRACTICAL ASSESSMENT IN COMPETENCIES — PROFICIENCY CHECK

Practical assessment (or **practical assessment in competencies)**: is the primary method for assessing performance and should serve to verify the integrated performance of competencies. It takes place in either a simulated or an operational environment. The practical assessment in competencies is equivalent to a proficiency check and is performed under the instructor privilege in the context of proficiency check in accordance with Appendix 10 to Part-FCL. More information can be found in ICAO Doc 9868 'PANS-TRG'.

The demonstration of skills to revalidate or renew referred to in the definition of proficiency check in FCL.010 is equivalent to the several practical assessments in competencies conducted in the EBT programme and the final review of the examiner. In fact, one single practical assessment in competencies demonstrates the necessary skills performed in legacy training; however, EBT goes one step further — to revalidate or renew, the pilot performs at least two demonstrations of skills/practical assessments in competencies, corresponding to at least two EBT modules.

GM2 to Appendix 10

The GM transposed a definition from Part-ORO into Part-FCL and explains how EBT provides a demonstration of skills equivalent to the traditional proficiency check.

The definition of proficiency check is already provided in FCL.010; therefore, it is not included in this GM.

"'Proficiency check' means the demonstration of skill to revalidate or renew ratings, and including such oral examination as may be required."

In legacy training, such demonstration is performed in a single event (following Appendix 9). Although a practical assessment in competencies is equivalent to a proficiency check and demonstrates the necessary skills to revalidate or renew ratings, EBT goes one step further and this demonstration is performed at least twice a year in each of the EBT modules, to complete the revalidation process. The demonstration of equivalency between Appendix 9 and the EBT module is performed at least once every 3 years as required under the several provisions (IR + AMC + GM) of 'verification of the accuracy of the grading system'.

To conclude this explanatory note, the definition of 'competency' in Annex I to the Air OPS Regulation is provided below where the term 'skills' is included.

'competency' means a dimension of human performance that is used to reliably predict successful performance on the job. A competency is manifested and observed through behaviours that mobilise the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions;

Rationale behind the equivalence between OPC, LPC and the EBT programme

The EBT programme is aligned with the existing approach to OPC contained in ORO.FC.130, ORO.FC.230 and AMC1 ORO.FC.230 point (b):

OPS	FCL	Authorities comments	EASA AMC2 ORO.FC.230 (a)	Doc 9995	Remarks
	1.4 (M)	Use of checklist prior to starting engines, starting procedures, radio and navigation (…).	covered by LOE and SBT under compliance frequency A	covered by LOE and SBT under compliance frequency A	Part-FCL Appendix 9 item 1.4 may be assessed as crew actions during a single preflight cockpit preparation. the expected added value of EBT is to develop and enhance the competency application of procedure versus isolated task application

	1.6 (M)	Before take-off checks	covered by LOE and SBT under compliance frequency A	covered by LOE and SBT under compliance frequency A	Part-FCL Appendix 9 item 1.6 may be assessed as crew actions during a single before take-off procedure. The expected added value of EBT is to develop and enhance the competency application of procedure versus isolated task application
B	2.5.2 (M)	Take-off with engine failure between V_1 and V_2 (take-off safety speed)	covered by the manoeuvres training phase failure of critical engine between V1 & V2 frequency B	covered by the manoeuvres training phase failure of critical engine between V1 & V2 two different frequencies are requested frequency A for initial control of the aircraft frequency B until clean configuration.	The failure should be inserted between V1 and V2 to create the need for asymmetric handling. It is possible to include additional failures in order to comply with 3.6.1, which should be added after item 2.5.2. During the manoeuvres validation phase, this item should commence from the initiation of the failure until: establishment of the final configuration or completion of the abnormal checklist if an item from 3.6.1 or 3.6.3 is combined.

A	2.6 (M)	Rejected take-off at a reasonable speed before reaching V1.	covered by the manoeuvres training phase rejected take off frequency A	covered by the manoeuvres training phase rejected take off frequency A	The rejected take-off is considered as a crew item and may be combined with the rejected take-off for operators (LVOs) In the manoeuvres validation phase, this item should commence from the initiation of the failure until: full stop and completion of the abnormal checklist initial actions; or full stop and completion of abnormal checklist where items 3.6.1, 3.6.7 or 3.6.8 are combined.
	3.4.0 to 3.4.14 (M)	Normal and abnormal operations of systems. Minimum of 3 for the crew	LOE and SBT aircraft malfunctions example scenario: 'at least one malfunction for each characteristic should be included an every 12-month period'	idem	An exercise may validate several Part-FCL items In order to facilitate the provision of simple and realistic scenarios in accordance with Doc 9995 Chapters 3.8 and 7.4, the evaluation phase is not intended to be a comprehensive assessment of all Part-FCL, Appendix 9. Pre-existing technical deviations and associated operational instructions should not be taken into account as 3.4.0 to 3.4.14 items.
	3.6.1 to 3.6.9	Abnormal and emergency procedures. Minimum of 3 for the crew	proposal to add in fire and smoke management No evacuation is clearly stated		

	(M)		when it is in FCL		
	3.9.1* (M)	Adherence to departure and arrival routes and ATC instructions.	no reference in table of assessment and training topics		The crew would be assessed when required to follow a clearance, or comply with a SID or STAR.
C	3.9.3.4 * (M)	Manually, with one engine simulated inoperative; engine failure has to be simulated during final approach before passing 1 000 ft above aerodrome level until touch down or through the complete missed approach procedure.	manoeuvres training phase engine out approach & go around frequency A		

D	3.9.4 * (M)	2D operations down to MDH/A.	manoeuvres training phase TYPE A 2D approach	no reference in Doc 9995 but equivalency of approaches applies, (refer to 3.8.4)	This item should be completed under conditions described in the relevant operations manual. RNAV/GNSS approaches validate OPS – (D) item and Part-FCL 3.9.4 item. During the manoeuvres validation phase, this item should commence when intercepting the final approach and end when reaching the prescribed DA/H.
E	4.3* (M)	Manual go-around with the critical engine simulated inoperative after an instrument approach on reaching DH MDH or MAPt.	manoeuvres training phase engine out approach & go around frequency B	manoeuvres training phase engine out approach & go around frequency A	During the manoeuvres validation phase, this item may commence approaching DA and end once the aircraft is established in a clean or defined normal manoeuvring configuration.
F	5.5 (M)	Landing with critical engine simulated inoperative.	manoeuvres training phase Engine out landing frequency B	manoeuvres training phase Engine out landing frequency A	In the manoeuvres validation phase, this item may start passing the final approach fix (FAF) and end when the aircraft reaches normal taxi speed.

Annex VI (Part-ARA) to Regulation (EU) No 1178/2011

ARA.GEN.315 Procedure for issue, revalidation, renewal or change of licences, rating or certificates — persons

AMC2 ARA.GEN.315(a) Procedure for issue, revalidation, renewal or change of licences, rating or certificates — persons

VERIFICATION OF COMPLIANCE OF THE EBT PROGRAMME

In order to verify that the applicant meets the requirements for revalidation or renewal of ratings within an approved EBT programme, the competent authority should in addition to the requirements in AMC1 ARA.GEN.315(a) verify that:

(a) the nominated person for crew training (or the deputy(ies) is a current examiner in the type rating filled in in Appendix 10;

(b) when the nominated person for crew training (or the deputy(ies)) delegates their signature to endorse the licence of the applicant:

(1) the delegation of signature should follow the operator's approved procedure for such purpose; and

(2) the person signing the licence should be nominated and indicated in Appendix 10;

(c) the nominated person for crew training of the operator in which the applicant is enrolled ensures that the applicant has completed the EBT programme;

(d) the nominated person for crew training of the operator in which the applicant is enrolled ensures that instructors that conduct the training to the applicant are standardised;

(e) the operator performs a verification of the grading system once every three years; and

(f) the nominated person for crew training ensures the integrity of the pilot training data.

AMC2 ARA.GEN.315(a)

The EBT system integrates into a single concept the provisions for revalidation of licence in Part-FCL and those for recurrent training and checking in Part-ORO. Most of the requirements for the oversight in this NPA are proposed in Part-ARO and then refer back to Part-FCL. See below.

AMC1 ARO.OPS.226(d) Approval and oversight of evidence-based training programmes
OVERSIGHT PLAN — PERIODIC ASSESSMENT TO VERIFY COMPLIANCE OF THE APPROVED EBT PROGRAMME

(a) Audits and inspections, on a scale and frequency appropriate to the operation, should cover at least

(…)

(9) administration of programme enrolment and compliance with the requirements of Annex I (Part-FCL) for licence revalidation and renewal;

AMC2 ARA.GEN.315(a) further explains that the licensing competent authority should verify that the relevant requirements of Part-FCL are met. The intent of the RMG was that the verification could be completed by looking at the records.

AMC2 ARA.GEN.315(a) point (c)

The intent of this provision is that the competent authority verifies the training records to ensure that the applicant has completed the approved EBT programme.

Appendix 10 covers this item:

'Completion of the operator's approved EBT programme ☐ _____signature/date (nominated person for crew training)'

AMC2 ARA.GEN.315(a) point (d)

This provision refers to AMC1 ORO.FC.145(a)(3) and AMC2 ORO.FC.145(a)(3).

Oversight of this provision falls under the jurisdiction of the competent authority issuing EBT approval; however, the licensing authority may at its own discretion inspect the training records of the instructors, pertaining to revalidation of licences.

AMC1.ORO.FC.145(a)(3) Provision of training
EBT INSTRUCTOR — INITIAL STANDARDISATION

[…]

(c) Before delivering the operator's approved EBT programme, the instructor should successfully complete an EBT instructor initial standardisation composed of:

(1) EBT instructor training; and

(2) EBT assessment of competence.

[…]

AMC2.ORO.FC.145(a)(3) Provision of training
EBT INSTRUCTOR — RECURRENT STANDARDISATION

(a) The EBT instructor should receive an annual recurrent standardisation. It includes:

(1) refresher EBT training; and

(2) concordance training.

(b) The EBT instructor should conduct a complete EBT module within the last 12 months preceding the expiry date.

(c) If the requirement of point (b) has not been fulfilled, before conducting training within an EBT programme, the EBT instructor should undergo an EBT assessment of competence.

(d) The EBT instructor should undergo an EBT assessment of competence every 3 years.

ARA.FCL.200 Procedure for issue, revalidation or renewal of a licence, rating or certificate

(e) Issue of licences and ratings. The competent authority shall issue a pilot licence and associated ratings, using the form as established in Appendix I to this Part.

(f) Issue of instructor and examiner certificates. The competent authority shall issue an instructor or examiner certificate as:

(1) an endorsement of the relevant privileges in the pilot licence as established in Appendix I to this Part; or

(2) a separate document, in a form and manner specified by the competent authority.

(g) Endorsement of licence by examiners.

(1) ~~b~~Before specifically authorising certain examiners to revalidate or renew ratings or certificates, the competent authority shall develop appropriate procedures.

(2) These appropriate procedures may include endorsement of licence under an approved EBT programme in accordance with Appendix 10. In such case, signature delegation to endorsement of licence may be allowed.

(h) Endorsement of licence by instructors. Before specifically authorising certain instructors to revalidate a single-engine piston or TMG class rating, the competent authority shall develop appropriate procedures.

ARA.FCL.205 Monitoring of examiners

AMC2 ARA.FCL.205 Monitoring of examiners

EBT PROGRAMME

(a) Where a competent authority has granted examiners certified by other competent authorities the right to exercise their privilege within an EBT programme, the monitoring of examiners includes the nominated person for crew training and the deputy(ies).

(b) At the discretion of the competent authority, this may also include an inspection of training delivery by the EBT instructor within an approved EBT programme.

GM1 to AMC2 ARA.FCL.205(b) Monitoring of examiners

EBT PROGRAMME — INSPECTION OF TRAINING DELIVERY

Where the inspection of training delivery is to be conducted, the inspector of the competent authority should ideally meet the requirements laid down in AMC1 ARO.OPS.226 (a). This inspection may be combined with the oversight required in ARO.OPS.226.

AMC2 ARA.FCL.205

The purpose of this AMC is to clarify how a competent authority may conduct oversight of examiners where those examiners are revalidating licences as part of an operator's approved EBT programme. This is because the delivery of an EBT module is performed by instructors on behalf of the nominated person for crew training who maintains ultimate responsibility for the programme and who is an examiner.

Member States provide a briefing within the Examiners Differences Document (https://www.easa.europa.eu/sites/default/files/dfu/Examiner%20Differences%20Document_version_09_2017_ORA_Final_0.pdf for use by examiners with a Part-FCL examiner certificate conducting a proficiency check licence holder whose licence was issued by a competent authority (CA) other than their own.

As an assessment in competencies is equivalent to a proficiency check (see Appendix 10), then the procedures for the proficiency check for the purpose of the Examiner Differences Document should be followed.

GM1 to AMC2 ARA.FCL.205(b)

The vehicle to allow the licensing competent authority to inspect the training also had to be provided to be in line with existing oversight responsibilities. The principle described in the GM1 to AMC2, 'Where this inspection of training delivery is to be conducted, the inspector of the competent authority should ideally meet the requirements', is transposed and adapted from the existing AMC1 ARA.FCL.205, to ensure that any oversight is preferably done by appropriately trained and qualified inspectors.