Appendix to Opinion No 08/2019 (A) (RMT.0599)

‘Rationale behind the proposed amendments to the implementing rules

Draft AMC & GM as well as safety promotion actions that are associated with the implementing rules

Rationale behind the draft AMC & GM’

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1. Rationale behind the proposed amendments to the implementing rules presented in Annexes Ib and IIb

This chapter contains the rationale behind the proposed amendments to the implementing rules (IRs) presented in Annexes Ib and IIb to Opinion No 08/2019. To differentiate them from the proposed rules, the font colour used for the explanatory notes is blue.

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

Definitions for terms used in Annexes II to VIII

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

Explanatory note to Annex I (Definitions) to Regulation (EU) No965/2012

competency

The definition proposed is transposed from ICAO Doc 9868 'PANS-TRG' TRG Amendment 5.

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, who 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 acquire 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[1] plus 'Application of Knowledge'). These competencies are also called 'core competencies'.

'unforeseen threats and errors' is used to link it to resilience, as the concept of resilience is very important to aviation safety.

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

[1] 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 a competency by meeting the associated competency standard.

The definition proposed in the Opinion 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)'.

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.

evaluation phase

The evaluation phase is the 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.

evidence-based training

The definition is transposed from Doc 9995.

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; 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 loss of control – in flight (LOC-I) events regularly indicate a cognitive impairment of the pilot flying (PF) with the pilot monitoring (PM) often demonstrating a higher level of situation awareness (SA). When the PF does not immediately respond to 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.

instructor 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.

line-orientated flight scenario

The definition is transposed from the ICAO Doc 9995 definition of line-orientated flight scenario.

'Line-oriented flight scenario. Training and assessment involving a realistic, "real time", full mission simulation of scenarios that are representative of line operations.'

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.

mixed EBT programme

The definition proposed is inspired by ICAO Doc 9995 Chapter 4.2, paragraph 4.2.1, point (b).

'(b) Mixed implementation. Implementation of a mixed EBT programme means that some portion of a recurrent assessment and training is dedicated to the application of EBT. This is a means of achieving a phased implementation where, for example, the CAA regulations or rules permit such a programme as part of the operator's specific training and assessment, but preclude such a programme for the revalidation or renewal of pilot licences. This phased implementation recognizes the potential for such an EBT programme to be developed and implemented in advance of any future enabling regulatory changes, which may then permit total implementation.'

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'.

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

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

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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

Explanatory note to ARO.OPS.226

This IR contains the approval and 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;

— 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)) concerning inspector qualification for CAT operations.

The requirements on training in ARO.OPS.226 are further developed in AMC1 ARO.OPS.226(a);

As regards the general structure of the rule, ARO.OPS.226 is based on the new proposed rule ARO.OPS.225 as proposed in NPA 2016-06 (A) on fuel schemes.

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

Due to the complexity of the EBT programme and the necessary maturity that the operator needs to demonstrate to ensure a good implementation of EBT, EASA decided to require the resolution of level 1 findings before approving full EBT. This is in line with the proposal of the RMG which agreed with the text 'resolution of significant findings'.

ARO.GEN.350 provides a definition of level 1 finding.

'ARO.GEN.350

(a) (…)

(b) A level 1 finding shall be issued by the competent authority when any significant non-compliance is detected with the applicable requirements of Regulation (EC) No 216/2008 and its Implementing Rules, with the organisation's procedures and manuals or with the terms of

an approval, certificate, specialised operation authorisation or with the content of a declaration which lowers safety or seriously hazards flight safety. The level 1 findings shall include:

(1) failure to give the competent authority access to the facilities of the organisation in accordance with point ORO.GEN.140 of Annex III (Part-ORO) to this Regulation, or for balloons operators in accordance with points BOP.ADD.015 and BOP.ADD.035 of Annex II (Part-BOP) to Regulation (EU) 2018/395, during normal operating hours and after two written requests;

(2) obtaining or maintaining the validity of the organisation certificate or specialised operations authorisation by falsification of submitted documentary evidence;

(3) evidence of malpractice or fraudulent use of the organisation certificate or specialised operations authorisation; and

(4) the lack of an accountable manager.(…)'

ARO.OPS.226 point (c)(2)(ii) wording 'EBT programme suitability'

The wording refers to ORO.FC.231:

'The operator may substitute the requirements of ORO.FC.230 by establishing, implementing and maintaining a suitable EBT programme approved by the competent authority.'

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

The words 'suitability' and 'suitable', as well as words similar to them, are used across the Air OPS Regulation (and the associated AMC and GM) more than 300 times. Furthermore, the word 'suitability' is used more than 50 times including the implementing rule. For instance, in CAT.GEN.MPA.175 we read the phrases 'suitability of the flight crew in respect of the work environment' and 'psychological attributes and suitability of the flight crew'.

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

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

The wording used 'the adequacy of the operator's record-keeping system, in particular with regard to flight crew training, checking and qualifications records' refers to ORO.MLR.115 points (c) and (d) and the related AMC1 ORO.MLR.115, GM1 ORO.MLR.115(c), and GM1 ORO.MLR.115(d).

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

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 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 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 a 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 'EBT programme'**

The term 'EBT programme' referred to in the rule is also contained in ORO.FC.231 point (a) 'EBT programme'. While the table of assessment and training topics is a generic programme for an aircraft generation, the 'EBT programme' is specific to a particular operator and it encompasses all the requirements contained in ORO.FC.231 from point (a) to point (i).

The 'EBT programme' is an approved programme for CAT aircraft. The reason for this approval is the existing provision ORO.FC.145 point (c); thus, 'EBT programme' encompasses an approved process by the competent authority.

ARO.OPS.226 point (e)

The intention behind the requirement in point (e) is to offer the support and expertise of EASA in regard to EBT to the competent authority when approving and implementing an AltMoC related to EBT. The intention is NOT to replace the authority in the evaluation and approval of an AltMoC.

Recurrent training of pilots is a critical safety element.

ICAO, IATA and EASA envisage the EBT requirements as a risk-based and data-driven regulation, having the roots of such regulation in the EBT DATA REPORT.

The EBT DATA REPORT is a +700-page document published by IATA in 2012. To fully understand the document, advanced knowledge in data management, statistics and other skills may be required. Normally, a researcher or an accident investigation officer possesses such knowledge — not an OPS inspector. Therefore, the information contained in the DATA REPORT is not always easy to find for a regular inspector.

As, the majority of the provisions are linked to a reason, finding or conclusion in the DATA REPORT, it may be necessary the review of the DATA REPORT, in order to understand the implications of the proposed deviation (AltMoC).

EASA and IATA are currently involved in a revision of the DATA REPORT that should be published in 2021. Furthermore, EASA foresees a continues process of reviewing the operational risks, identifying findings, publishing a DATA REPORT to then update the table of assessment and training topics (amongst others). This process puts additional pressure on the authorities because the knowledge of the DATA REPORT is dynamic and has to be updated. This challenge is especially relevant for those authorities that do NOT participate in the development of the DATA REPORT, that is the majority of the authorities in Europe.

Knowledge of the DATA REPORT may only be necessary to:

1- develop the regulatory material for EBT, or
2- help in understanding the impacts of a deviation (AltMoC).

From an efficient point of view, it may be more efficient to transfer the necessary knowledge of the DATA REPORT on a case-by-case basis (AltMoC), from EASA to the authority. EASA already has the

required knowledge because it was necessary to develop the EBT regulation. Requiring the authorities of Europe to acquire the same expertise would be NEITHER efficient NOR effective.

There may be an additional benefit in this provision, which is to ensure a level playing field in the implementation of EBT.

The only burden for the authority is to send a notification to EASA, which can be done with a simple email.

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

ORO.FC.146 Personnel providing training, checking and assessment

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

Explanatory note to ORO.FC.146

ORO.FC.146(c)

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.146(c) wording 'for an EBT programme'

This wording 'for an 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.146(c) wording 'hold an Annex I (Part-FCL) instructor or examiner certificate'

The proposed rule is restricting the possibility of instructors that hold 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 that hold a certificate issued in accordance with the EU regulatory framework can deliver EBT. The reasons for such a provision according to the RMG are 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 instructor qualification is anchored in Part-FCL and additional training is provided in Part-ORO. Therefore, the EBT system relies on the prerequisite of instructor qualification and standardisation in Part-FCL. Foreign certificates may or may not provide the same level of qualification and standardisation provided in Part-FCL; therefore, EU instructor certificates were required.

— The level of complexity of the oversight will increase due to the different standards for instructor certificates in the non-EU countries. Furthermore, the national authority performs the oversight of the EBT programme, while EASA performs the oversight of the third-country ATOs. Allowing third-country instructors will overcomplicate the oversight for the national authority.

— Furthermore, the situation where an instructor that holds a pilot licence issued by a third country provides training, only occurs when the operator has subcontracted its training to an 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 implications in the results 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 the operator or ATO staff members. This is allowed under ORO.FC.205 on contracted activities.

ORO.FC.146(c) wording 'the operator's EBT instructor standardisation'

The wording in point (a) of AMC1 ORO.FC.146(c) for the instructor's standardisation is using 'EBT' for each of the two 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 'Revalidation and renewal' 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 AMC1 ORO.FC.146(c) when an instructor has experience in EBT, allowing for a shorter training course.

ORO.FC.146(c)

The sentence 'Completion of the operator's EBT standardisation will qualify the instructor to perform EBT practical assessment' was introduced because in the Aircrew Regulation the instructors do not have the privilege to perform EBT practical assessment. 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 (EBT practical assessment), and the wording 'EBT practical assessment' provides the link to Appendix 10 point 6 'The EBT practical assessment must be conducted in accordance with the operator's EBT programme'.

The use of 'completion' means also that the instructor successfully passed the instructor standardisation. In ORO.FC.231 (a)(3), this concept is already covered for the module; completion of an EBT module means to complete the programme (syllabi) and reach an acceptable level of performance. The same concept should be used for the instructor standardisation course: 1- the instructor has completed the syllabi for the EBT course, 2- an acceptable level of performance is reached (assessment of competence).

For info, ORO.FC.231(a)(3)(i)

(i) completes a minimum of two modules within the validity period of the type rating, separated by a period of not less than 3 months. The module is completed when: (…)

ORO.FC.146(c)(2) wording 'EBT practical assessment'

This wording is a transposition of the ICAO wording 'practical assessment' contained in Doc 9868 'PANS-TRG' paragraph 4.4.1.2.2.

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

ORO.FC.146(c)(2)

The use of a suitably qualified commander, as in AMC1 ORO.FC.230 (3)(v), has been retained under EBT.

ORO.FC.231 Evidence-based training

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

Explanatory note to 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 focuses much more on 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 observable behaviours (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)(1) wording 'a suitable EBT programme'

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

The term 'suitable' is used in the Air OPS Regulation more than 200 times (IR, AMC and GM). In fact, there are many implementing rules using 'suitable' such us ARO.RAMP.120 '… instructional requirement suitable for the type of training provided', ORO.AOC.100 '… management are suitable and properly matched to the scale and scope of the operation', CAT.GEN.MPA.180 '… suitable aeronautical charts for the route of the proposed flight', CAT.OP.MPA.151 'suitable precautionary landing sites', CAT.POL.A.245 '… a suitable glide path reference system', etc.

The term 'EBT programme' referred to in the AMC is contained in ORO.FC.231 'EBT programme'. While the table of assessment and training topics is a generic programme in an aircraft generation, the 'EBT programme' is specific to a particular operator and it encompasses all the requirements contained in ORO.FC.231 from point (a) to point (i).

The 'EBT programme' is an approved programme for CAT aircraft. The reason for this approval is the existing provision ORO.FC.145 point (c), thus 'EBT programme' encompasses an approved process by the competent authority.

ORO.FC.231 point (a)(1) wording 'demonstrate its capability to support the implementation'

The EBT training programme is intended to be implemented by phases, from a legacy training or other alternate training programmes such as the alternative training and qualification programme (ATQP) to a full EBT programme in accordance with ORO.FC.231.

Mixed EBT or ATQPs are intended to provide (or have provided) enough experience for an operator to be ready to implement an EBT programme in accordance with ORO.FC.231.

Also, this period should provide the competent authority with enough information on the resources needed to perform oversight of operators implementing an EBT programme in accordance with ORO.FC.231.

This assures a robust and standardised EBT implementation in accordance with ORO.FC.231 across the spectrum of airlines with different levels of experience in and resources for this kind of programmes.

ORO.FC.231 point (a)(1) wording 'equivalent level of safety'

The wording was transposed from the IR on ATQP (ORO.FC.A.245). The wording 'equivalent level of safety' is also used in other provisions across the Air OPS Regulation (e.g. minimum cabin crew, alternative means of compliance, etc.).

ORO.FC.231point (a)(2) wording '3 year programme'

'3-year programme' instead of '3-year *cycle*', as provided in Doc 9995. It is used because:

(a) the European rules generally use *'programme'* instead of cycle (see Part-ORO); and

(b) this Appendix to the Opinion proposes the definition of 'cycle' that expresses the notion of a 1-year period. Therefore, if '3-year cycle' is used, it may be confusing.

ORO.FC.231 point (a)(2)(iv) '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 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)(iv) 'training'

The intent of the regulator is to complete the training phase after the evaluation phase, while the phases included in the training phase (MT and SBT) can be performed in any order.

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

(B) A training phase, comprising:

- manoeuvres training phase, comprising training to proficiency in certain defined manoeuvres; and
- scenario-based training phase, comprising line-orientated flight scenario(s) to develop competencies and address individual training needs.

ORO.FC.231.1 point (a)(2)(v)

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

ORO.FC.231 point (a)(2)(vii)

'The training phase should be conducted timely after the evaluation phase'

The intent of this provision is to clarify the need to perform the training phase after the evaluation phase. In addition, the word 'timely' is introduced to stress the need to define a period in which the training will be provided.

ORO.FC.231 point (a)(3)(i) wording 'type rating'

The use of the term 'type rating' clarifies the expiry date, as the validity of the type rating is up to the end of the month. Therefore, the intention of the RMG is to ensure two modules a year (each module composed of two simulator sessions).

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

The RMG discussed ICAO Annex 6 Part I Chapter 9 SARP 9.4.4 'Pilot proficiency checks' where two 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 1 year. Any two such checks which are similar and which occur within a period of 4 consecutive months shall not alone satisfy this requirement.'

The RMG considered 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 ICAO Doc 9995, this document is a means of compliance with the Annex 6 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)(i)(B) wording 'acceptable level of performance'

The wording acceptable level of performance has to be defined following the requirements laid down in point (d).

'The operator shall use a grading system to assess the pilot competencies. The grading system shall ensure:

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

(ii) a performance criterion and a 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. The operator shall develop procedures to address low performance of the pilot;'

The reason for not including the word 'minimum' is that the operator may require a level of performance higher than the minimum. The fact that the operator can impose higher requirements to its pilots is accepted today, through the operator proficiency check where the operator defines its own level of pilot performance.

Furthermore 'acceptable level' is used already in the Air OPS regulation both in the IR and AMC & GM (e.g. SPA.SET-IMC.105 'an acceptable level of turbine engine reliability is achieved in service by the world fleet').

Note: EASA uses 'acceptable level of competence' when speaking about the EBT programme and uses 'acceptable level of performance' in the context of assessment of the EBT competencies.

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 drift in instructor quality over time, especially in the non-technical competencies.

ORO.FC.231 point (a)(5) 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, assuming the minimum performance for line operations was achieved, for example, when a pilot obtains a grade two in application of procedures (PRO). 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.

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

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(b)

Why is there a need to require a competency framework?

Mastering a defined number of competencies should allow a pilot to manage most of the 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. This approach is supported by the study of MAN4GEN.

Legacy training and checking, and ATQP v EBT

The major difference between ATQP and EBT lies in the approach taken to identify the KSA for the successful performance in the job. ATQP and traditional training (Appendix 9) focus on a task-based approach of the pilot role by identifying the job-related tasks (and subtasks), which are then used to identify a list of KSA required for successful pilot performance. On the other side, the EBT approach starts with the performance indicators/observable behaviours of exemplary pilots to define an official list of observable behaviours (see list of OBs in the EBT competency framework) to then group them in competencies (see list of the EASA EBT competency framework — 9 competencies). Through this process, the 9 EBT competencies are related to effective or superior performance. Therefore, the question is not which KSA are required to perform the tasks of an airline pilot (ATQP approach) but which KSA do superior performers airline pilots possess and use (EBT approach).

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.

— The assessment of competencies is based on multiple observations across multiple contexts.

— A 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.

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)'.

ORO.FC.231(c) point (1)(ii)

The requirement is transposed from ICAO Doc 9995 paragraph 3.6.6 '… should monitor alignment with the EBT assessment and training guidelines recommended in this manual. …'. The interpretation of this paragraph was the following: as one of the main objectives of the EBT programme is to develop pilot competencies, the sentence in 3.6.6 was transformed to 'develops pilot competencies'.

ORO.FC.231(c) point (2)

'ORO.GEN.200 Management system

(a) The operator shall establish, implement and maintain a management system that includes:

(1) (…)

(4) maintaining personnel trained and competent to perform their tasks;'

ORO.FC.231(d)

The paradigm shift from legacy training and checking programmes is a move away from checking 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, the assessment should be completed at key points during the module, and the performance should be 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'

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 of 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.

The elements of the development of a CRT (e.g. to unambiguously ascertain) 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 has been met' explained by Glasser (1963). These criteria could be: at least 20 seconds of eye contact along with a body movement of three 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 licences 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 Part-FCL of 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 (one of the aims of the Basic Regulation — see Article 1). EBT proposes a norm-referenced system. In order to combine both methods, a feedback process 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 for the verification of the grading system in EBT. The book proposed a yearly verification of the grading system; however, the RMG opposed this proposal and instead EASA proposed a one-time feedback every 3 years.

'Feedback process:

There is no need to choose between norm referencing and criterion referencing. They are both present.

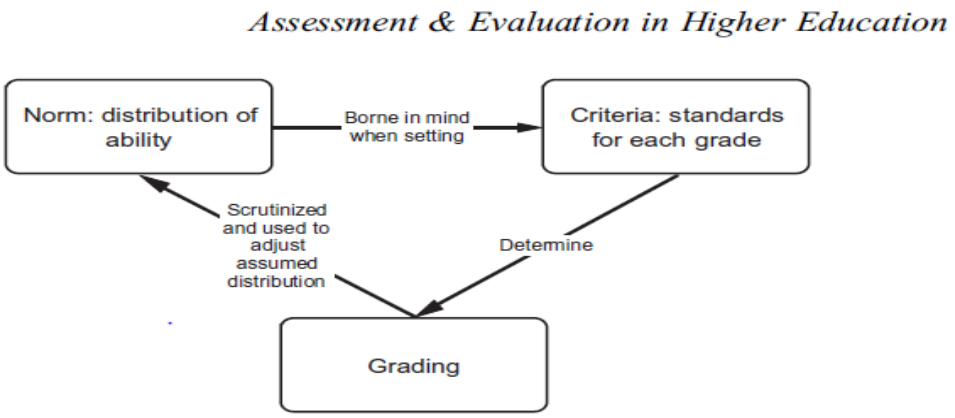
— Not only are they both present, but with the caveat about minor adjustments from year to year, they are consistent. Thus, it is possible both to define rubrics (criterion referencing) and to prescribe grade-distribution guidelines (norm referencing), provided the latter contains a degree of flexibility.

— 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.

ORO.FC.231(e) point (1)

This approach allows to match the detailed provisions with regard to the FSTD required to deliver the EBT programme with the requirements to certify the FSTD which are contained in the CS-FSTD - see https://www.easa.europa.eu/regulations.

Therefore, the IR is providing the safety objective and remains technology agnostic to allow a proper evaluation of the regulatory framework.

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 demonstrate the 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'

'Normal line operations' is used because ORO.FC.230 point (c)(1) uses the same wording: '(1) Each flight crew member shall complete a line check on the aircraft to demonstrate competence in carrying out normal line operations described in the operations manual.' The provision of the line evaluation of competence intends to have the same scope as the line check currently has. Obviously, this implies successful demonstration of competence in the management of any abnormal or emergency situations that may occur during the flight. Therefore, the use of 'normal operation' is not referring to the malfunctions; it is referring to a normal flight (not test flight, not maintenance flight, etc.).

ORO.FC.231(h)(1) wording 'in an aircraft'

The wording 'in an aircraft' 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)(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.

Under this IR, it is left to the discretion of the competent authority whether it will grant a 24-month validity period for line checks to those operators who had not previously conducted an ATQP. However, the competent authority shall ensure that the operator is fully conversant with a competency-based evaluation system prior to applying this rule.

The reason behind allowing extensions of validity periods in the line evaluation of competence (line check) is the following:

— Legacy training requires one line check per year.

— ATQP provides an alleviation of one line check every 2 years because it requires a line-orientated evaluation per year. That means that two line orientated evaluations (LOEs) substitute one line check.

— EBT provides more opportunities than the 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 two modules a year).

ORO.FC.231(h)(3)(i)

The 3 years extension of the 'line evaluation of competence' is subject to a line-orientated safety audit programme. The wording that described the intend of such programme is transposed from ICAO Doc 9803 Line operations safety audit (LOSA) *'It is an organizational tool used to identify threats to aviation safety, minimize the risks such threats may generate and implement measures to manage human error in operational contexts'*.

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 the industry's practice; and

(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 appropriate. The alleviation is consistent with the existing alleviation provided for the ATQP.

ORO.FC.232 EBT programme assessment and training topics

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

ORO.FC.232(b)(1)

The provision follows the principles of ICAO Doc 9995. In fact, the definition of EBT in Doc 9995 highlights this principle.

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

EASA has additionally introduced the wording 'scientific principles' because the wording used in Doc 9995 is not covered in Regulation (EU) No 965/2012. Scientific principles are already introduced in ORO.FTL and therefore EASA decided to align the wording.

The table defines also the frequency of training those topics. The programme is described at AMC level. This means that an alternative means of compliance 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.

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; and

(d) the administrative procedure that includes the completion of Appendix 9, and the rest of administrative procedures in Part-FCL FCL.1030 points (b), (c) and (d) that include 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 licence proficiency checks (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 a NON-jeopardy environment. Furthermore, the continuous training evidence 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 EBT manager 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 being involved in the technical assessment, the administrative procedures involve the EBT manager 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 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 EBT manager who is an examiner responsible for the operator's EBT programme, (ensuring that the manoeuvres assessed are of a good training value and that the applicant completed those manoeuvres). The EBT manager will be 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 EBT manager 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 that 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.

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

FCL.010 — Definitions

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.010

The new definitions of 'EBT operator' and 'EBT programme' are introduced as new terms in order to allow simpler wording in Part-FCL. These terms are not needed in Part-ORO of Regulation (EU) No 965/2012 because they are self-evident in Subpart ORO.FC.

The new definition of 'mixed EBT programme' is aligned with the definition contained in Annex I to Regulation (EU) No 965/2012.

FCL.015 Application and issue, revalidation and renewal of licences, ratings and certificates

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.035(a) – Crediting of flight time and theoretical knowledge

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.035

In the context of Article 21(6) of the Basic Regulation, the new point (a)(4) in point FCL.035 clarifies the conditions and possibilities of crediting flight experience in aircraft that fall within the scope of Annex I to the Basic Regulation or that are subject to a decision of a Member State taken in accordance with Article 2(8) of that Regulation. The content of this new requirement follows the content of AMC1 FCL.140.A; FCL.140.S; FCL.740.A(b)(1)(ii) (as introduced with ED Decision 2020/005/R). It was now decided, for legal reasons, to clarify this subject matter on the implementing rule level. However, the new point (a)(4) refers only to aeroplanes and TMGs, as since the introduction of Part-SFCL sailplanes are no longer within the scope of Part-FCL.

FCL.235(a) – Skill test (for PPL)

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.235

Point (a) of point FCL.235 is revised to correct an editorial error that occurred when amending this point with Regulation (EU) 2020/359.

FCL.625 — Validity, revalidation and renewal

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.625 point (b)(4)

The provision is introduced to establish the desired credits between the EBT pilots and the conventional proficiency check.

Explanatory note to FCL.625 point (c)

The whole point (c) of point FCL.625 is restructured for clarity and easier reading when introducing the additional elements necessary for the implementation of EBT. In point (c)(3), it is clarified that the EBT practical assessment may be combined with the refresher training specified in point (c)(2) as under EBT the refresher training can be part of the overall EBT approach. Otherwise, it would not make sense to require an applicant to complete refresher training followed by the EBT practical assessment (= two EBT modules).

FCL.625.A IR(A) — Revalidation

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.625.A point (a)(4)

This point is revised in order to correct an editorial error that occurred when amending this point with Regulation (EU) 2019/1747.

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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.740

The provision is completely restructured and revised to reflect the recent updates introduced by Regulation (EU) 2019/1747 and for clarity and easier reading when introducing the additional elements necessary for the implementation of EBT.

Explanatory note to FCL.740 point (a)(2)

The new point establishes the desired credits between the EBT practical assessment in accordance with Appendix 10 and the conventional proficiency check.

Explanatory note to FCL.740 point (b)(3) wording 'EBT practical assessment may be combined with the refresher training specified in point (2)'

The sentence reflects the same approach used in FCL.625 and the intent is to clarify that under EBT the refresher training can be part of the overall EBT approach. Otherwise, it would not make sense to require an applicant to complete refresher training, followed by the EBT practical assessment (= two EBT modules).

Explanatory note to FCL.740 point (b)(5)

The content of this point was introduced with Regulation (EU) 2019/1747. The provision is moved to a new separate point (b)(5) to allow clarity and easier reading for the introduction of the new amendments required for EBT.

Explanatory note to FCL.740 point (c)

This new point outlines the requirements that needs to be followed in cases where pilots fail to demonstrate an acceptable level of competence during an EBT programme. Initially, this scenario was meant to be addressed in the new Appendix 10 to Part-FCL, where the related text was now removed.

FCL.720.A — Revalidation of class and type ratings — aeroplanes

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.720.A

This point is updated for clarification, consistency and proportionality purposes as follows:

Points (a)(i), (a)(3)(ii) and (b) are amended to clarify that advanced UPRT needs to be completed before the applicant's first relevant class or type rating training course commences. Also, in all these three points additional text is inserted to allow applicants to receive a full credit for the advanced UPRT prerequisite if they recently operated an aeroplane in accordance with operator training requirements

(credits for 'grandfathered' class and type ratings obtained prior to the introduction of advanced UPRT).

Additionally, point (a)(i) is updated in order to clarify the applicability of this requirement to the following two scenarios:

1. Pilots applying for initial CR/TR issue with MPO privileges

2. Pilots already holding the CR/TR in SPO and wish to extend to MPO

Finally, point (b)(5) is amended to allow applicants to receive a full credit for the advanced UPRT prerequisite if they have completed advanced UPRT instructor training in accordance with point FCL.915(e)(1).

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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.905.TRI TRI — Privileges and conditions

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.905.TRI TRI

The text is updated as per Regulation (EU) 2019/1747. The replacement (listing points renumbering) is necessary due to insertion of a new provision required for EBT in point (b).

Point (b) clarifies that EBT privileges are automatically included in the TRI privileges, once the TRIs have done the EBT standardisation. No need for additional licence endorsement. Records for EBT authorisations for individual TRIs to be kept by the operator.

FCL.905.SFI SFI — Privileges and conditions

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.905.SFI SFI

Point (e) clarifies that EBT privileges are automatically included in the TRI privileges, once the TRIs have done the EBT standardisation. No need for additional licence endorsement. Records for EBT authorisations for individual TRIs to be kept by the operator.

FCL.930.SFI Training course

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.930.SFI

Point (a)(1) is revised in order to correct an editorial error that occurred when amending this point with Regulation (EU) 2019/1747.

FCL.1015 Examiner standardisation

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.1015

Point (a) is revised to remove the content related to balloons and sailplanes, after such a revision had been missed with Regulation (EU) 2020/359.

FCL.1025 Validity, revalidation and renewal of examiner certificates

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to point FCL.1025

Point (b)(2) is revised to remove the content related to balloons and sailplanes, after such a revision had been missed with Regulation (EU) 2020/359.

FCL.1010.SFE SFE — Prerequisites

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to FCL.1010.SFE

Points (a)(1)(ii) and (a)(2)(ii) are revised to correct editorial errors that occurred when amending FCL.1010.SFE with Regulation (EU) 2019/1747 and Regulation (EU) 2020/359.

Appendix 3 to Annex I (Part-FCL) to Regulation (EU) No 1178/2011

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

In Part A of Appendix 3, point 9(b) is revised to correct an editorial error that occurred when amending this point with Regulation (EU) 2019/1747.

Appendix 6 to Annex I (Part-FCL) to Regulation (EU) No 1178/2011

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

In Chapter A of Appendix 6, point 2 is revised in order to correct an editorial error that occurred when amending this point with Regulation (EU) 2020/359 (the second paragraph of this point 2 was accidently deleted).

Appendix 9 to Annex I (Part-FCL) to Regulation (EU) No 1178/2011

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Appendix 9 is revised in order to correct an editorial error that occurred when amending that Appendix with Regulation (EU) 2019/1747 and in order to improve the clarity of the table in point (k) of point (5) in Section B of Appendix 9 (training, testing and checking for single-pilot and multi-pilot privileges in single-pilot aeroplanes).

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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

Explanatory note to Appendix 10

Under the existing Part-FCL Appendix 9, proficiency check has two 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 an EBT practical assessment within each module. Appendix 10 is therefore created to cater for the needs (multiple events are taking place) of licence revalidation within an EBT programme.

With the completion of Appendix 10, the old proficiency check is replaced by an assessment based on multiple data obtained through the EBT programme. 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 wording 'EBT practical assessment'

This wording is a transposition of the ICAO wording 'practical assessment' contained in Doc 9868 'PANS-TRG' paragraph 4.4.1.2.2.

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

The wording was different in the NPA, and EASA finally decided to propose a wording closer to the one used in ICAO.

Appendix 10 paragraphs 1 and 5

An EBT practical assessment within an EBT programme is equivalent to a proficiency check, as outlined now in point FCL.625(b)(4) and point FCL.740(a)(2) of Part-FCL. However, to legally complete a proficiency check and revalidate the pilot's licence, paragraph 4 details the requirements.

The additional sentence to address ATOs that work on behalf of an operator in accordance with point ORO.GEN.205 was deleted, since point ORO.GEN.205 already contains the legal basis for such a scenario, with no need for an additional requirement in this new Appendix 10 to Part-FCL.

Appendix 10 paragraph 2 point (a)(2)

This provision intends to ensure that for each type where the EBT programme is applied, there is a EBT manager that ensures the relevance of the EBT system. For airlines with several types, it is intended that there is a deputy for each fleet (type) that is responsible for the correct delivery of the EBT programme and for ensuring that the EBT system is properly working.

Appendix 10 paragraph 4 point (b)

Safety promotion material — completion of the operator's EBT programme

EASA has planned safety promotion task (SPT).012 to support the implementation of EBT. The following material has been developed:

SPT.012 — safety promotion task 012 — safety material for EBT — COMPLETION OF THE OPERATOR'S 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 EBT PROGRAMME

(a) The applicant completes the operator's 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 EBT programme for the remaining period of validity.

To 'complete the operator's EBT programme' means to complete the EBT modules and any other additional training (ground, FSTD, aeroplane) or evaluation in the programme (e.g. line evaluation of competence, etc.). However, only the modules will be considered for the purpose of the EBT PRACTICAL ASSESSMENT to revalidate the licence in accordance with Appendix 10.

Appendix 10 paragraph 4 point (c)(2) — Licence endorsement and delegation of signature

It should be noted that the intent of the RMG and EASA for the delegation of signature proposed in this Opinion, is that the delegation of the signature should not render the person actually signing the licence accountable. The accountability remains with the EBT manager.

The reference to point (b)(2) of point FCL.1030 clarifies that the EBT manager needs to be authorised to endorse a pilot licence with new expiry dates in accordance with that point.

Appendix 10 paragraph 5

The final sentence addressing cases of pilots who fail to demonstrate an acceptable level of competence has been deleted, as this scenario is now covered by the new point (c) of point FCL.740.

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

In addition to the draft rule amendments as initially published with Opinion No 08/2019, the draft text for revisions to Part-ARA in some places was revised in order to update references to the new Basic Regulation.

In the draft amendments for point (c) of ARA.FCL.200, the second sentence referring to signature delegation in the context of the EBT practical assessment was deleted, since this topic is now fully addressed in the new Appendix 10 to Part-FCL. Additionally, point (e)(1) is amended to correct a reference to Part-BFCL.

The form for DTO training programme approvals in Appendix VIII to Part-ARA was initially introduced with Regulation 2018/1119 and, at that time, accidentally named 'EASA Form XXX'. With this amendment, an EASA Form number is now assigned to this form.

2. Proposed amendments to AMC & GM and rationale in detail

This chapter contains the associated AMC & GM (including also the associated safety promotion actions) 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.

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

— deleted text is marked with ~~strike through~~;

— new or amended text is highlighted in grey;

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

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

GM2 Annex I Definitions

ABBREVIATIONS AND ACRONYMS
[…]

APP	approach
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 control (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)
MT	manoeuvres training phase
OB	observable behaviour
PRO	application of procedures (EBT competency)
PSD	problem-solving & decision-making (EBT competency)
SAW	situation awareness (EBT competency)

SBT	scenario-based training
TO	take-off
UPRT	upset prevention and recovery training
WLM	workload management (EBT competency)

GM1X Annex I Definitions

EVIDENCE-BASED TRAINING

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

'Instructor concordance' is also called 'inter-rater reliability'.

'Conditions' refers to anything that may qualify a specific environment in which performance will be demonstrated.

'Cycle' refers to 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)' refers to 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' refers to 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 in developing insight and their own solutions, resulting in better understanding, retention and commitment.

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

'Line-oriented safety audit (LOSA)': is one of the tools used to help evaluate the performance of the operations. It consist of line flights that are observed by appropriately qualified operator personnel to provide feedback to validate the EBT programme. LOSA may be one of the tools used to look at those elements of the operation that are unable to be monitored by FDM or Advanced FDM programmes.

'Monitoring' refers to 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)' refers to a single role-related behaviour that can be observed. The instructor may or may not be able to measure it.

'Performance criteria' refers to 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 (or conditions) and a competency standard.

'Practical assessment (or EBT practical assessment)' refers to 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. An EBT assessment 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'.

'Scenario-based training phase (SBT)' refers to 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' refers to approved training designed to achieve end-state performance objectives, providing sufficient assurance that the trained individual is capable of consistently carrying out specific tasks safely and effectively.

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

Behaviour

This term appears in the definition of performance criteria. It is transposed from Doc 9995.

It is important to highlight the wording of 'capable of being measured'; this does not mean that the observer may be able to measure it, as the observer has obvious limitations (technical or human limitations) that may prevent the measurement of the behaviour.

Conditions

This definition was introduced because it is frequently used in the context of competencies and observable behaviours. The definition is transposed from the working paper to ICAO Doc 9868 'PANS-TRG', AN-WP/9237 Appendix A page A3 'preliminary review of proposed amendments to Annex 1 and the Doc 9868 'PANS-TRG' consequential to amendment 5 to the Doc 9868 'PANS-TRG' with additional proposals developed by the 'competency-based training and assessment task force''.

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 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. However, it has been slightly amended to express the idea that although the observable behaviour is 'capable of being measured' as per the definition of 'behaviour', the instructor may be unable to measure it. This limitation (being unable to measure a behaviour) occurs due to the obvious technical or human limitations of the instructor. In

other words, it is very difficult to observe and measure 'all' and 'every single' behaviour that occur in an aircraft or in a simulator of aircraft for a long period of time (e.g. 8 hours of a module).

'Performance criteria'

The definition is transposed from ICAO working papers for Doc 9868 'PANS-TRG'.

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 draft ICAO Doc 9868 'PANS-TRG' to be soon published contains paragraph 4.4.1.2.2 which is moving the summative assessment, that otherwise would be made in the evaluation phase, to the end of the module. This is ensuring that no pilot is allowed to fly if found NOT competent.

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.'

Train-to-proficiency

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

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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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

QUALIFICATION AND TRAINING — INSPECTORS

(a) For the initial approval and oversight of an operator's EBT programme, the inspector of the competent authority should undertake EBT training 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 facilitated 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 EBT programme suitability.

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).

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

QUALIFICATION AND TRAINING — PRINCIPLES OF EBT — DATA-DRIVEN TRAINING

EBT is a data-driven programme and proper oversight requires the inspector to have a good understanding of all features where data plays an important role in the EBT programme:

(a) Flight crew training data:

(1) data related to grading of competencies (level 1), data related to OBs (level 2) and how it can be used to drive the design of the operator's EBT programme. Other training data (level 3) and how it is used in the contextualisation of an example scenario element.

(2) individual flight crew training data: understand how it is used:

(i) in regard to licence revalidation and renewal; and

(ii) to provide tailored training and additional FSTD training.

(b) Data from the management system: understand how it may be used for the selection of the example scenario element and the contextualisation of the example scenario element.

(c) Instructor standardisation and concordance data:

(1) how the EBT data is used to standardise the instructor and how, at the same time, the operator ensures the necessary just culture and a non-jeopardy environment for the instructors (referred to in the instructor concordance assurance programme).

(2) understand the importance of quality in the data – the feedback loop of the EBT programme.

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

QUALIFICATION AND TRAINING — OPERATOR'S EBT PROGRAMME SUITABILITY

To recognise and evaluate the suitability of an operator's EBT programme, the inspector's training programme may include those features as training objectives. AMC1 ORO.FC.231(a) provides the list of features of a suitable 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 EBT programme suitability' contained in AMC1 ARO.OPS.226(a).

AMC1 ARO.OPS.226(c) Approval and oversight of evidence-based training 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 suitability of the operator's EBT programme (AMC1 ORO.FC.231(a)).

AMC1 ARO.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.

AMC2 ARO.OPS.226(c) Approval and oversight of evidence-based training programmes

EBT PROGRAMME SUITABILITY

As regards the suitability of the EBT programme, please refer to AMC1 ORO.FC.231(a).

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

OVERSIGHT PLAN — PERIODIC ASSESSMENT TO VERIFY COMPLIANCE OF THE 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 (or inspectors) assigned to it who is (are) 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 EBT programme;

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

(4) effectiveness of the operator's 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.146(c), 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; and

(11) inspection of the training delivery.

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.

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 items that should be reviewed in the periodic oversight plan so appropriate resources are planned.

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

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 meetings 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 EBT programme'

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

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 ARO.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.

SPT.012 ARO.OPS.226(d) — safety promotion task 012 — safety material for EBT — EBT INSTRUCTOR STANDARDISATION

CONTINUING STANDARDISATION OF EBT INSTRUCTORS

Generally speaking, a good standardisation of the EBT instructors is normally based on three main areas:

(a) Training

(b) Concordance assurance programme. The programme should be functional. In practical terms, this may include the identification from a data point of view of the four types of instructors that may require standardisation: the instructors that grade very high, the instructors that grade very low, the instructors that grade always the standard (e.g. 3), and the instructors whose grading is either very high or very low and with hardly any standard grades.

(c) Guidance of the operator on how to grade

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

EFFECTIVENESS OF THE OPERATOR'S EBT PROGRAMME

(a) The effectiveness of the operator's EBT programme can be determined by periodically reviewing pilot competencies across several domains, such as role, fleet (e.g. CPT/FO, A320, B737) and airline so that the continuing improvement of the EBT programme is linked to an improvement of the pilot competencies.

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

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 in the grading results of some competencies and vice versa.

GM2 to AMC1 ARO.OPS.226(d) Approval and oversight of evidence-based training programmes

STANDARDISATION OF EBT INSTRUCTORS — ACCEPTABLE INSTRUCTOR CONCORDANCE

The authority may require a minimum acceptable level of concordance. This may be a non-exaustive list:

(a) Set a minimum acceptable level of concordance per aircraft fleet or by group of instructors.

(b) Set a minimum acceptable level of concordance per competency.

(c) Set a minimum acceptable level of concordance for all operators under its overisight, or a minimum acceptable level of concordance per operator (or type of operator) based on the risk of the operator.

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

GM1 ORO.GEN.130(b) Changes related to an AOC holder

CHANGES REQUIRING PRIOR APPROVAL

The following list ~~GM~~ is a non-exhaustive checklist of items that require prior approval from the competent authority as specified in the applicable Implementing Rules:

(a) alternative means of compliance;

(b) procedures regarding items to be notified to the competent authority; (…)

AMC1 ORO.FC.115 Crew resource management (CRM) training

CRM TRAINING — MULTI-PILOT OPERATIONS

(a) General

(1) Training environment

CRM training should be conducted in the non-operational environment (classroom and computer-based) and in the operational environment (flight simulation training device (FSTD) including other training devices (OTDs) described in CS-FSTD when available and aircraft). Tools such as group discussions, team task analysis, team task simulation and feedback should be used.

(2) Classroom training

Whenever possible, classroom training should be conducted in a group session away from the pressures of the usual working environment, so that the opportunity is provided for flight crew members to interact and communicate in an environment conducive to learning.

(3) Computer-based training (CBT)

Computer-based training should not be conducted as a stand-alone training method, but may be conducted as a complementary training method.

Complementary training method in the context of EBT: advanced CBT following the aviation blended learning environment, such as virtual reality, chatbots, interactive scenario trainers, etc. may serve as the principal method to deliver training in the non-operational environment. In such case, the classroom training may be the complementary method.

(…)

GM2 ORO.FC.115 Crew resource management (CRM) training

TRAINING ENVIRONMENT, TRAINERS AND INSTRUCTORS

(a) Flight crew CRM training can be separated as follows:

(1) training in the non-operational environment includes both:

(i) classroom; and

(ii) computer-based;

(2) training in the operational environment includes:

(i) flight simulation training device (FSTD) when available; and

(ii) aircraft.

(b) In general, CRM training is provided as follows:

(1) classroom training by a flight crew CRM trainer;

(2) training in the operational environment by an instructor holding a certificate in accordance with Commission Regulation (EU) No 1178/2011;

(3) computer-based training as a self-study training method. If needed, directions concerning CRM-related issues are provided by a flight crew CRM trainer or by an instructor holding a certificate in accordance with Commission Regulation (EU) No 1178/2011.

GM1 ORO.FC.231 point (a)

This point is amended to clarify that the training in the non-operational environment should include both classroom training and computer-based training, while the one in the operational environment includes both FSTD and aircraft when both are available. When the FSTD is not available, then it may only be aircraft.

ORO.FC.146 Personnel providing training, checking and assessment

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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

EBT INSTRUCTOR — INITIAL STANDARDISATION PROGRAMME

(a) Before delivering the operator's EBT programme, the instructor should complete an EBT instructor initial standardisation programme 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 at least one pilot who is or has been an EBT instructor, and who has demonstrated proficiency to train the elements specified in point (c) 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 for parts 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 counted from the end of the month the assessment of competence was conducted.

(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 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.146(c) Personnel providing training, checking and assessment

EBT INSTRUCTOR — RECURRENT STANDARDISATION PROGRAMME

The EBT instructor should:

(a) conduct six EVAL or SBT phases of an EBT module (or a combination of both) every 36 months. One of the EVAL or SBT should take place in the period of 12 months immediately preceding the expiry date. The 36-month period should be counted from the end of the month the module was taken. If this has not been fulfilled, the EBT instructor should complete an EBT assessment of competence. When the module is undertaken within the last 12 months of the validity period, the new period should be counted from the original expiry date;

(b) receive annual recurrent standardisation. The recurrent standardisation should include:

(1) refresher EBT training; and

(2) concordance training; and

(c) complete an assessment of competence every 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 of competence.

AMC1 ORO.FC.146(c) point (a)

The review group decided to introduce this provision for the following reasons:

The requirement proposed in point (a) is similar to the existing requirement that must be fulfilled by the examiners. As the EBT instructor is performing 'assessments', there was a consensus in the group to align both requirements due to the social implications.

According to FCL.1025, the examiner must conduct six proficiency checks every 3 years. As a module is equivalent to a proficiency check, the EBT instructor is required to follow the same approach.

Although legacy instructors are required to revalidate only one session in the preceding the 12 months, the review group believes that this approach is incorrect due to the challenges associated with EBT. Additionally, the review group believes that more training of the instructors should improve safety.

Finally, the EBT instructor is required to perform a refresher training every year. Therefore, it is reasonable to complete six EBT phases (EVAL or SBT) every 3 years to ensure practical training (on-the-job training).

AMC1 ORO.FC.146(c) point (c)

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

The volume of training of the EBT instructor initial standardisation course is addressed in the new GM1 ORO.FC.146(c).

AMC1 ORO.FC.146(c) 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.146(c) point (g)). The person who delivers the assessment of competence needs to receive an EBT instructor training and be a qualified examiner in accordance with Part-FCL of the Aircrew Regulation.

AMC1 ORO.FC.146(c) 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 FCL.935.

AMC1 ORO.FC.146 (c) point (e) wording 'complete an EBT assessment of competence' versus 'passed an EBT assessment of competence'

The word 'passed' is usually used in Part-FCL — for example, in FCL.905.FI.FI, FCL.915 and FCL.940.SFI.SFI. On the contrary, in Part-ORO, 'complete' is the one usually used — for example in

ORO.FC.105, ORO.FC.120, and ORO.FC.130. As the rules on EBT are contained in Part-ORO, EASA decided to use 'complete'.

The assessment of competence was introduced as an AMC to be consistent with the CRM provision, for which also the assessment of competence is at AMC level. Furthermore, in order to ensure an equivalent level of safety in the case of an application of an alternative means of compliance (AltMoC), ORO.GEN.200 ensures the competence of the personnel.

AMC1 ORO.FC.146(c) point (f) 'validity period of 3 years'

This provision is transposed from the Aircrew Regulation as regards what applies in relation to 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.146(c) point (g)(1)

The requirement proposed was originally transposed from the existing Doc 9995 and the Explanatory Note to ED Decision 2015/027/R on 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.146(c), a further clarification was introduced as the ICAO provision does not provide details. Therefore, the Opinion requires 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 operators. The only exception to such statement (no extra burden to the operators) 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 operator will roster the instructor/examiner revalidation in combination with an EBT assessment of competence when required.

AMC1 ORO.FC.146(c) 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, thus this provision should not add any further requirement or cost.

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 in order to be consistent between Part-FCL and Part-ORO, EASA decided that only current examiners will conduct the EBT assessment of competence.

AMC2 ORO.FC.146(c)

The wording used is based on the requirements pertaining to the revalidation for instructors and examiners in accordance with Subparts J and K of Part-FCL of the Aircrew Regulation.

Following the concept above, the revalidation for EBT instructor will be based on the completion of one full simulator session of EBT every 12 months; for that reason the AMC requires an EVAL or SBT. EASA is aware that this would mean in reality the combination of evaluation plus manoeuvres training/validation (mixed EBT) and a scenario-based training. Additionally, an assessment of competence every 3 years is required.

Point (b) of AMC2 ORO.FC.146(c)) 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.146(c) Personnel providing training, checking and assessment

EBT INSTRUCTOR — INITIAL STANDARDISATION

(a) The intent of the practical training is to ensure that EBT instructors have exposure to assessment of performance and root 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 pilot delivering the training may be supported by a subject matter expert (or experts). 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 to:

(1) different levels of pilot performance. This enables EBT instructors to distinguish between pilots performing lower 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); and

(2) 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 alone) and the recommended length is between 21 to 24 hours (EBT instructor training plus assessment of competence).

GM1 ORO.FC.146(c) 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 a 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.146(c) 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; instead, the information is provided in point (e) of this GM.

However, the RMG acknowledged the novelty of the EBT programme where the 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.146(c) point (c)

The consultation of the NPA showed that the GM needed further amendment to clarify the additional personnel that can deliver the EBT instructor training. Other subject matter experts (SMEs) (e.g. aviation experts, psychologists, teachers, other industries experts, etc.) can provide valuable resources to enrich the instructor training.

GM1 ORO.FC.146(c) 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 on a figure, the RMG reviewed the rules relating to qualification of instructors (e.g. FCL.930 TRI.TRI was consulted). The 14 hours were commensurate with those required for initial qualification of instructors.

Furthermore, the IATA Evidence-Based Training 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.

GM2 ORO.FC.146(c) Personnel providing training, checking and assessment

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. Further guidance can be found in the EASA EBT manual.

(b) Concordance training

This training is one of the elements to ensure concordance within the EBT instructor community. Those EBT instructors who do not demonstrate concordance may require further training. The operator's instructor standardisation and concordance assurance programme provides insight in the areas that an instructor (or instructor population) requires concordance training. As such, concordance training varies in content and scale depending on the need for concordance improvement.

Instructor concordance training may include candidates grading the same controlled content (e.g. a video or paper case) followed by:

(1) a subsequent comparison of intra-group variance; and

(2) alignment of root-cause analyses between instructors.

GM2 ORO.FC.146(c)

This GM for the annual EBT instructor standardisation has been developed to clarify the intent of the provision provided in the AMC. The GM proposed provides certain criteria on how to perform the annual instructor standardisation; however, the criteria that may be provided by the competent authority are fundamental, as training is subject to approval under OM part D and revalidations and renewal of licences are performed within an 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.146(c) point (b)

This provision was introduced following the IATA Evidence-Based Training Implementation Guide[2] Chapter 4.1 'The EBT instructor'.

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

'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.'

GM3 ORO.FC.146(c) Personnel providing training, checking and assessment

EBT INSTRUCTOR COMPETENCY FRAMEWORK

Pilot competencies[1]	
Description:	See pilot competency framework
Instructor observable behaviour (iOB)	See pilot competency framework

[1]For ground instructors, some competencies may not apply.

Management of the learning environment	
Description:	Ensures that the instruction, assessment and evaluation are conducted in a suitable and safe environment
iOB 2.1	Applies TEM in the context of instruction/evaluation
iOB 2.2	Briefs on safety procedures for situations that are likely to develop during instruction/evaluation
iOB 2.3	Intervenes appropriately, at the correct time and level (e.g. progresses from verbal assistance to taking over control)
iOB 2.4	Resumes instruction/evaluation as practicable after any intervention
iOB 2.5	Plans and prepares training media, equipment and resources
iOB 2.6	Briefs on training devices or aircraft limitations that may influence training, when applicable
iOB 2.7	Creates and manages conditions (e.g. airspace, ATC, weather, time, etc.) to be suitable for the training objectives
iOB 2.8	Adapts to changes in the environment whilst minimising training disruptions
iOB 2.9	Manages time, training media and equipment to ensure that training objectives are met

Instruction	
Description:	Conducts training to develop the trainee's competencies
iOB 3.1	References approved sources (operations, technical and training manuals, standards and regulations)
iOB 3.2	States clearly the objectives and clarifies roles for the training
iOB 3.3	Follows the approved training programme
iOB 3.4	Applies instructional methods as appropriate (e.g. explanation, demonstration, learning by discovery, facilitation, in-seat instruction)
iOB 3.5	Sustains operational relevance and realism
iOB 3.6	Adapts the amount of instructor inputs to ensure that the training objectives are met
iOB 3.7	Adapts to situations that might disrupt a planned sequence of events
iOB 3.8	Continuously assesses the trainee's competencies
iOB 3.9	Encourages the trainee to self-assess
iOB 3.10	Allows the trainee to self-correct in a timely manner
iOB 3.11	Applies trainee-centred feedback techniques (e.g. facilitation, etc.)
iOB 3.12	Provides positive reinforcement

Interaction with the trainees	
Description:	Supports the trainees' learning and development and demonstrates exemplary behaviour (role model)
iOB 4.1	Shows patience and empathy (e.g. by actively listening, reading non-verbal messages and encouraging dialogue)
iOB 4.2	Manages trainees' barriers to learning
iOB 4.3	Follows the approved training programme
iOB 4.4	Encourages engagement and mutual support
iOB 4.5	Coaches the trainees
iOB 4.6	Supports the goal and training policies of the operator/ATO and authority
iOB 4.7	Shows integrity (e.g. honesty and professional principles)
iOB 4.8	Demonstrates acceptable personal conduct, acceptable social practices, content expertise, a model for professional and interpersonal behaviour
iOB 4.9	Actively seeks and accepts feedback to improve own performance

Assessment and evaluation	
Description:	Assesses the competencies of the trainee and contributes to continuous training system improvement
iOB 5.1	Complies with operator/ATO and authority requirements
iOB 5.2	Ensures that the trainee understands the assessment process
iOB 5.3	Applies the competency standards and conditions
iOB 5.4	Performs grading
iOB 5.5	Provides recommendations based on the outcome of the assessment
iOB 5.6	Makes decisions based on the outcome of the summative assessment
iOB 5.7	Provides clear feedback to the trainee
iOB 5.8	Reports strengths and weaknesses of the training system (e.g. training environment, curriculum, assessment/evaluation) including feedback from trainees
iOB 5.9	Suggests improvements for the training system
iOB 5.10	Produces reports using appropriate forms and media

Competency assessment	
Final competency standard	Operators and ATOs define in their OMs the level of performance to be achieved by the instructor and evaluator
Condition	**Ground training** (including CRM) and **flight training** in aircraft and in FSTDs: — licensing; — type rating; — conversion; — line training; and — recurrent training.

GM3 ORO.FC.146(c)

This GM introduces the ICAO Pilot Instructor and Evaluator competency Framework, which is based on the work led by IATA to promote the first competency-based approach for instructors and evaluators.

The original idea to design an instructor evaluator competency set is based on the same philosophy that served as the genesis for the pilot competency set: Mastering a defined set of pilot competencies

should enable a pilot to perform the routine duties and manage unforeseen situations, which cannot be trained in advance.

Similarly, mastering a set of instructor and evaluator competencies (IECs) should enable an instructor and evaluator (IE) to perform instruction and evaluation duties and manage the full spectrum of assignments, from ground instruction to evaluations in dynamic flight situations.

The competency framework for instructors and evaluators has been developed based on the latest ICAO standards, EU and FAA regulations, and guidance material and best practices from the industry.

The defined set of IE competencies should be applied across all types of training, from licensing to operator recurrent training, and by both operators and ATOs.

Developing both pilot and instructor competencies through a globally harmonised system of competencies will contribute to improved quality of training, enhanced safety and will also increase training efficiency.

This GM defines the IE competencies, their descriptions and their observable behaviours.

The competency framework may be used for instructor selection, initial standardisation, recurrent standardisation and assessment of competence for EBT instructors.

Additional information can be found through the following link: https://www.iata.org/whatwedo/ops-infra/training-licensing/Documents/guidance_material_for_instructor_and_evaluator_training.pdf

SPT.012 ORO.FC.146(c) — safety promotion task 012 — safety material for EBT — EBT INSTRUCTOR COMPETENCY FRAMEWORK

EBT INSTRUCTORS STANDARDISATION PROGRAMME DESIGN

This safety promotion material describes a competency-based approach to the EBT instructors training using the five instructor and evaluator competencies (IECs).

A development program for IEs should use a building block approach. The aim is to progress in a structured way, step-by-step, from the initial assignment through the complete spectrum of IE duties.

For any IE assignment, an IE needs to be trained and assessed in all competencies to a solid foundational level of performance. However, specific assignments require special emphasis on specific competencies during training; the final competency standard for theses competencies should be higher than foundational.

As a consequence, given that the EBT instructor is already qualified in accordance with Annex I (Part-FCL), the operator EBT standardisation should put special emphasis on the competencies ‘Instruction’, ‘Interaction with the trainees’ and ‘Assessment and evaluation’.

Training objectives for EBT instructor standardisation will consequently refer to the descriptions of the relevant IECs and their OBs.

The table below show a simplified matrix to train and assess (‘TA’) IEs. Depending on the IE’s assignment, the competencies requiring special emphasis during training are additionally identified with ‘SE’.

CBTA matrix for EBT instructor

EBT instructor competencies				
IEC1	IEC2	IEC3	IEC4	IEC5
Pilot competencies	Management of the learning environment	Instruction	Interaction with the trainees	Assessment and evaluation
TA	TA	TA-SE	TA-SE	TA-SE

Note: TA: competencies trained and assessed
SE: competencies requiring special emphasis during training

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)

ICAO developed Doc 9995 'Manual of Evidence-based Training', followed by the EASA EBT manual, which is intended to provide guidance to the competent ~~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 the EASA tables of applicable aeroplane/helicopter types by generation.

Mixed EBT programme

~~Within the current regulatory framework~~ tThe operator may undertake an ~~mixed~~ implementation of the mixed EBT programme according to this GM. The ICAO table of assessment and training topics 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 to ORO.FC.231(a).

The ~~baseline~~ mixed 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 to ORO.FC.146(c), ~~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 malfunctions 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 described in ORO.FC.231 and the ICAO EBT programme described in ICAO Doc 9995 contain~~s~~ 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, in the mixed EBT programme the 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 the 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~~ approved mixed 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 or 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 3.8.1*	*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.*
HELI		Part-FCL Appendix 9 Paragraph 2 of section C	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.

COPTERS	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 the 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 the 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.

Conduct of CRM assessment

The operator is advised to use the EBT grading system and the EBT competencies for the non-technical skills assessment.

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

ORO.FC.231 Evidence-based training

(a) EBT PROGRAMME

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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

EBT PROGRAMME SUITABILITY

An operator's 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;

(2) a manoeuvres training phase (skill retention): to trained skill-based manoeuvres (body memory actions); and

(3) 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) there is a customisation of syllabi:

(1) The operator should describe in the operations manual the procedure to customise syllabi. It should include how to:

(i) select the example scenario elements within a training topic that should be included in the EBT programme; and

(ii) contextualise the example scenario elements based on the operator's operational data (e.g. input from SMS, FDM programme, etc.) and training data.

(2) This customisation should be based on evidence both internal and external to the operator;

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

(h) instructors grade competencies based on observable behaviours (OBs);

(i) instructors grade the pilot using a defined methodology — observe, record, classify and assess/evaluate (ORCA) is recommended;

(j) instructors have completed the EBT instructor standardisation;

(k) instructors have sufficient concordance based on defined criteria (instructor concordance assurance programme);

(l) the analysis of the pilot's performance is used to determine competency-based training needs;

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

(n) facilitation techniques in debriefing are incorporated.

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

General background about the wording 'customisation'

The regulation usually uses 'customised', 'customisation' in the context of the operator's EBT syllabi. The term expresses the necessity for the adaptation of the 'table of assessment and training topics' that must be performed at operator level. Amongst others, the EBT programme is adapted to the operational risks of the airline, the different type ratings of the operator, the pilot work force, etc.

'Tailored': It is referring to the further 'customisation' of syllabi that is performed at the level of an individual pilot. In order to make a difference between the customisation at operator level (syllabi) and the customisation at individual pilot (individual syllabus), the regulation uses the word 'tailored', using mainly the wording 'tailored training'. Tailored training is required in ORO.FC.231(d) (see the the related AMC) and further described in GM3 ORO.FC.231(a) customisation of the EBT programme (Syllabi).

'Contextualise': The verb 'contextualise' is used for the example scenario elements, where the operator should provide the 'context' of the example scenario elements provided in the 'table of assessment and training topics'. Amongst others, weather of the example scenario element, area, route or aerodrome,, procedures at the aerodrome (e.g. low-visibility procedures (LVP)), etc.

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

EBT instructor standardisation refers to AMC1 ORO.FC.146(c).

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

The wording refers back to AMC3 ORO.FC.231(d)(1) 'CONDUCT OF THE GRADING — ORCA', which is the preferred methodology proposed in this Appendix to the Opinion.

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

Good concordance depends on the number of rating levels used, concordance measures and complexity/ambiguity of scenarios and behaviours.

The acceptance level of concordance can be defined in coordination with experts and the NAA. It can be based on earlier results.

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

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

AMC2 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'. These provisions should be included in the tables of assessment and training topics detailed in ORO.FC.232.

AMC2 ORO.FC.231(a)

Although this Opinion proposes to exempt operators implementing the EBT programme from ORO.FC.230 and its AMC, the UPRT provisions were reintroduced through this AMC2 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, AMC2 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 AMC1 ORO.FC.220&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.232 – AMC ORO.FC232**	**Rationale**
(a) 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.	
(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 DEVELOPED UPSETS**, should not take place during the evaluation phase and it is recommended that they should be done during the manoeuvres TRAINING.	
(2) be completed from each seat in which a pilot's duties require him or her to operate; and		
(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.		

AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'		**Ground training**	**FSTD training**	**Rationale**	**ORO.FC.232 – AMC.ORO.FC.232 - Example – suggested relevant EBT 'training topic and description'**
Table 1: Elements and respective components of upset prevention training					
A.	**Aerodynamics**				
1.	General aerodynamic characteristics	•			
2.	Aeroplane certification and limitations	•			
3.	Aerodynamics (high and low altitudes)	•	•	Element A is basically fully covered by the mentioned EBT training topics and the exercises required by AMC1 ORO.FC.220&230 in the UPRT part. Aircraft handling at degraded control modes is covered by the malfunction category 'degraded aircraft control' and furthermore covered by component H.6. (Fly-by-wire protection degradations) and should be performed in manual and automatic flight. If aircraft and/or operator-related evidence (e.g. incidents, FDM data) indicates the need to further train a component, aircraft and/or operator-specific exercises should be added in the upset prevention training.	**Automation management** **Manual aircraft control** **Upset recovery** (recoveries at low and high altitude)
4.	Aeroplane performance (high and low altitudes)	•	•		
5.	Angle of attack (AOA) and stall awareness	•	•		
6.	Stick shaker or other stall-warning device activation (as applicable)	•	•		
7.	Stick pusher (as applicable)	•	•		
8.	Mach effects (if applicable to the aeroplane type)	•	•		
9.	Aeroplane stability	•	•		
10.	Control surface fundamentals	•	•		
11.	Use of trims	•	•		
12.	Icing and contamination effects	•	•		**Adverse weather**
13.	Propeller slipstream (as applicable)	•	•		**same as elements A 1-11**
B.	**Causes of and contributing factors to upsets**				
1.	Environmental	•		deleted from FSTD training with Annex IV to ED Decision 2019/005/R	
2.	Pilot-induced	•			
3.	Mechanical (aeroplane systems)	•			
C.	**Safety review of accidents and incidents relating to aeroplane upsets**				
1.	Safety review of accidents and incidents relating to aeroplane upsets	•		deleted from FSTD training with Annex IV to ED Decision 2019/005/R	
D.	**G-load awareness and management**				
1.	Positive/negative/increasing/decreasing g-loads	•	•	Specific exercises related to this element are required in the Upset Prevention part and have to be performed as PF, as they are not fully covered by the EBT training topic Manual aircraft control	**Manual aircraft control** **Upset prevention/recovery** (recoveries according to OEM recommendations at low
2.	Lateral g-awareness (sideslip)	•	•		
3.	g-load management	•	•		

AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'		Ground training	FSTD training	Rationale	ORO.FC.232 – AMC.ORO.FC.232 - Example – suggested relevant EBT 'training topic and description'
					and high altitudes — where there are indications of g-load, they can be included)
E.	**Energy management**				
1.	Kinetic energy v potential energy v chemical energy (power)	•	•	Aircraft-specific UPT exercises during conversion course only, as energy management is trained during several EBT training topics	**Manual aircraft control** **Automation management**
F.	**Flight path management**				
1.	Relationship between pitch, power and performance	•	•	Components are fully covered by the mentioned EBT training topics. Components 5 and 6 are represented by identical EBT training topics. If aircraft and/or operator-related evidence (e.g. incidents, FDM data) indicates the need to further train an element, aircraft and/or operator-specific exercises should be added in the upset prevention training.	**Automation management** **Manual aircraft control**
2.	Performance and effects of differing power plants (if applicable)	•	•		**Automation management** **Manual aircraft control**
3.	Manual and automation inputs for guidance and control	•	•		**Automation management** **Manual aircraft control**
4.	Type-specific characteristics	•	•		**Automation management** **Manual aircraft control**
5.	Management of go-arounds from various stages during the approach	•	•		**Go-around management** **Automation management** **Manual aircraft control**
6.	Automation management	•	•		**Automation management** **Manual aircraft control**
7.	Proper use of rudder	•	•		**Failure of the critical engine between V1 & V2** **Engine-out approach & go-around** **Engine failure** **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	•	•	See example scenario elements in respective AMC for aircraft generation	**Upset prevention/recovery** This training can be combined with the Table 2 exercises
2.	Pitch/power/roll/yaw	•	•		

AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'		**Ground training**	**FSTD training**	**Rationale**	**ORO.FC.232 – AMC.ORO.FC.232 - Example – suggested relevant EBT 'training topic and description'**
3.	Effective scanning (effective monitoring)	•	•		
4.	Type-specific stall protection systems and cues	•	•		
5.	Criteria for identifying stalls and upsets	•	•		
H.	**System malfunction (including immediate handling and subsequent operational considerations, as applicable)**				
1.	Flight control defects	•	•	System malfunction with characteristic 'immediacy' and/or 'management of consequences'	**Automation management** **Manual aircraft control** **Knowledge**
2.	Engine failure (partial or full)	•	•	Identical EBT training topic	**Engine failure**
3.	Instrument failures	•	•	System malfunction combining characteristic 'loss of instrumentation' with 'immediacy' and/or 'management of consequences'	**Automation management** **Manual aircraft control**
4.	Loss of reliable airspeed	•	•	Same as component H.1.	**Automation management** **Manual aircraft control**
5.	Automation failures	•	•	Same as component H.1.	**Automation management** **Manual aircraft control**
6.	Fly-by-wire protection degradations	•	•	Same as component H.1.	**Automation management** **Manual aircraft control** **Knowledge**
7.	Stall protection system failures including icing alerting systems	•	•	Same as component H.1.	**Automation management** **Manual aircraft control** **Upset prevention/recovery** This training can be combined with the Table 2 exercises
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	-	•	Except for components 3 and 5, components are fully covered by EBT training topics, if exercises are flown without autopilot, autothrust/autothrottle and, where possible, without flight directors.	**Automation management** **Manual aircraft control**
2.	Procedural instrument flying and manoeuvring including instrument departure and arrival	-	•		**Automation management** **Manual aircraft control**
3.	Visual approach	-	•		**Manual aircraft control**

AMC1 ORO.FC.220&230 'Operator conversion training and checking & recurrent training and checking'		**Ground training**	**FSTD training**	**Rationale**	**ORO.FC.232 – AMC.ORO.FC.232 - Example – suggested relevant EBT 'training topic and description'**
4.	Go-arounds from various stages during the approach	-	•		**Go-around management** **Automation management** **Manual aircraft control** **Go-around, all engines operative** **Engine-out approach & go around**
5.	Steep turns	-	•		**Manual aircraft control**

Table 2: Exercises for upset recovery training					
A.	**Recovery from developed upsets**				
1.	Timely and appropriate intervention	•	•	Strongly recommended in Manoeuvres training / ISI phase. Flight crew must be trained as PF and PM.	**Upset prevention/recovery**
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.	•	•		**Upset recovery** 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	•	•		**Upset recovery**
4.	Recovery from nose low at various bank angles	•	•		**Upset recovery**
5.	Consolidated summary of aeroplane recovery techniques	•	•		**Upset recovery**

AMC3 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 that there can be no negative training when 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.

AMC3 ORO.FC.231(a) and GM2 ORO.FC.231(a)

The purpose of AMC3 ORO.FC.231(a) 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'[3] (AMC2 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 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 three competencies may be selected.

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

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

Note 1. This is 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..

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).

AMC3 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.

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

PERSONNEL CONDUCTING ASSESSMENT AND PROVIDING TRAINING

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

(b) For non-EBT assessment and training: 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). The FI, TRI, CRI or SFI should satisfy the operator's standardisation, experience and knowledge requirements.

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

(d) CRM training should be provided by an EBT instructor or, for the classroom CRM training, a CRM trainer.

(e) Additional personnel requirements are described in ORO.FC.146 and ORO.FC.231 and in the associated AMC and GM.

AMC4 ORO.FC.231(a)

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 if they have completed the EBT instructors' standardisation.

This provision must be read in conjunction with ORO.FC.146; 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.146). 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) 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. 'EASA EBT manual´).

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. 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.

GM3 ORO.FC.231(a) Evidence-based training

EBT PROGRAMME — CUSTOMISATION OF THE EBT PROGRAMME (SYLLABI)

(a) Syllabi can be customised at three different steps:

(1) The first step would be a syllabus for the whole pilots' population (customisation only at type rating level and/or aircraft generation level). At this step, the operator customises the example scenario elements based on relevant operational data (safety management system, state safety plan, OSD, occurrences, manufacturer data, etc.), and the training topics within the module are the same (same syllabus). At this level, it may be necessary to have a different example scenario element for the different crews within the same module to ensure that pilots are exposed to surprise and unexpected events and thus avoid pilots knowing all the details of the simulator beforehand.

(2) The second step would be a different syllabus or part of it for the different populations of pilots. For example, some parts of the syllabus are different for the first officers and the captain, or it is different for the B747 pilots, or for all pilots flying an Airbus model, etc. creating therefore different syllabi). At this step, the module or part of the module is different for each population; this may include a different example scenario element for each population (or a different training topic; however, the customisation at training topic level is more difficult to control).

(3) The third step would be syllabi tailored to the individual pilot (pilot customisation — individual syllabus). This step is linked to the procures established for the tailored training and the additional training of the pilots following the VENN model.

(b) The procedure to describe the customisation of syllabi must be described in the OM. Customisation is based on evidence that can be gathered on three different levels, two from the inner loop, one from the outer loop.

(1) Inner loop

(i) Individual evidence based on training data (e.g. grading metrics, training reports, questionnaires, etc.), analysed either for an individual pilot or a group of pilots (for example, all first officers, all B747 pilots, all pilots flying an Airbus model, etc.).

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

(2) Outer loop

Evidence gathered from external sources such as authorities (e.g. state safety plan, etc.), OEMs (e.g. OEBs, OSD, safety documentation such as getting to grip, etc.), etc.

GM4 ORO.FC.231(a) Evidence-based training

EBT PROGRAMME

Further guidance on the EBT programme can be found in the EASA EBT manual.

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

EXPERIENCE IN MIXED EBT TO SUBSTITUTE ORO.FC.230

(a) The operator should have a minimum experience of 3 years of a mixed EBT programme. 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) The operator should demonstrate 2 years of an instructor concordance assurance programme.

(c) The operator should demonstrate 1 year of a valid equivalency of malfunctions.

(d) The operator should demonstrate 1 year of integration of the training data in the customisation of the EBT programme and SMS data for the contextualisation of the example scenario elements.

(e) The operator should demonstrate that there is a verification of the grading system and feedback is provided to the training system performance and to the instructor standardisation concordance assurance.

SUBSTITUTION OF THE REQUIREMENTS OF ORO.FC.230

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

(g) The line evaluation of competence substitutes the line check.

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 observe changes in the operator processes that support EBT. This requires time.

AMC1 ORO.FC.231(a)(1) point (f) and (g)

These provisions are introduced to ensure equivalency between traditional training and EBT. There is documentation from the regulator, manufacturers and industry that may not be updated until a later stage due to the novelty of the EBT. This issue may be especially relevant when using the operational suitability data, where credits are defined for a number of checks and training (e.g. credits are defined for line check but not yet for the line evaluation of competence). With this provision, the EBT operator is allowed to make use of such credits.

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

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 AND ASSSESMENT AND TRAINING TOPICS — RESILIENCE

(a) Compliance with the table of assessment and training topics ensures that crews are presented with an array of realistic changing events that allow for resilience development purposes.

(b) The EBT programme should be designed observing the following principles for resilience development:

(1) Resilience, surprise, and unexpected events

The EBT programme should be designed in such a way that in every cycle the simulator session (or part of it) allows variations so that the pilots are not familiar with the scenarios presented in the simulator session. 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.

(2) Resilience and decision-making (dilemma)

The EBT programme should be designed in such a way that in every cycle the crews are exposed to a scenario where more than one possible and less than ideal solutions exist, with some unfavourable conditions attached to each solution.

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

EBT PROGRAMME AND ASSSESMENT AND TRAINING TOPICS — RESILIENCE

(a) For resilience-development, crews should be exposed to an array of realistic changing scenarios. The strategies developed by the crews whilst coping with different causes of action will create opportunities for resilience development.

(b) Resilience and surprise

The operator may create a comprehensive list of scenarios to ensure that each crew is trained in different scenarios avoiding the same scenarios for all crews. This relates to training topic 'surprise' and to the customisation of the EBT programme.

(c) Resilience and unexpected events

Exposing crews to rear, fortuitous, events may prepare crews to deal with other unexpected events. For instance, the table of assessment and training topics offers infrequent example scenario elements such as flying over 'no fly zone', etc. The operator may also take infrequent examples from occurrence reporting, or SMS, or manufacturer reports, etc.). This relates to decision-making (PSD) see OB6.9 'Demonstrates resilience when encountering an unexpected event'.

(d) Dilemma

The operator may create scenarios suitable for training of threat assessment, threat management processes and option generation, leading to an optimum decision-making process. At programme design, as in real life, one 'correct answer' should be avoided; instead, the EBT programme should offer the crews a number of less than ideal cause of actions; some with unfavourable conditions attached. This relates to decision-making (PSD) and to the contextualisation of the example scenario element.

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

The AMC has been developed taking into account the existing GM5 ORO.FC.115 Crew resource management (CRM) training, RESILIENCE DEVELOPMENT.

Resilience is the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events as defined by the US National Academies of science, engineering and medicine.

Surprised: (adjective) caused to feel surprise, amazement or wonder, or showing an emotion due to an unexpected event.

Unexpected: (adjective) not expected, anticipated or foreseen. Considered unlikely to happen, not to occur soon. Is used for events and behaviours that occur without warning.

Unpredictable: Unforeseeable; cannot say ahead of time. Is used for events and behaviours that are difficult or impossible to predict or foresee.

Expect the Unexpected

The operator can train its pilots for the unexpected so their skills of resilience are there when they need them. Resilience can be practised by starting small and growing into a more difficult situation.

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

The experts consulted by EASA did not reach a consensus on where to include the training of the 'dilemma'; include it together with resilience or include it as a separate item related to decision-making.

The fact is that there are numerous studies and articles related to:

— resilience and decision-making; and
— resilience and ambiguity (dilemma).

Furthermore, ambiguity and decision-making are clearly related and there are many studies and research that also relate decision-making with resilience. While some experts believe that EASA should allocate ambiguity with 'decision-making' other experts believe it should be included in 'resilience'. EASA took the decision to include it in resilience.

GM2 ORO.FC.231(a)(2) Evidence-based training

EBT PROGRAMME —TRAINING PHASE — 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 the training objectives of some of the training topics, such as skills of monitoring, cross-checking, error management, and recognition of mismanaged aircraft state.

GM2 ORO.FC.231(a)(2)

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'.

GM2 ORO.FC.231(a)(2) Evidence-based training

EBT PROGRAMME —ORDER OF THE PHASES

The order of the phases is intended as follows:

(1) First the evaluation phase; and

(2) Second, and in a timely manner after the evaluation phase, the training phases. The training phases are the manoeuvres training and the scenario-based training phase and may be delivered in any order.

AMC2 ORO.FC.231(a)(2) Evidence-based training

VALIDITY OF THE EBT MODULE

The validity period should be counted from the end of the month when the module was undertaken. When the module is undertaken within the last 6 months of the validity period, the new validity period should be counted from the original expiry date provided a minimum of 2 modules are completed within the validity period of the type rating.

AMC1 ORO.FC.231(a)(3) 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 leave the operator's EBT programme (de-enrolled) when the operator is no longer responsible for the administrative action for the flight crew's licence revalidation under an EBT programme.

(c) The operator should inform the flight crew members who fail to demonstrate an acceptable level of competence and leave the operator's EBT programme (de-enrolled) that they should not exercise the privileges of that type rating.

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

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)(3) point (c)

Due to the novelty of the EBT concept, EASA found necessary to inform the pilots in the event they fail to demonstrate an acceptable level of competence. The provision was transposed from FCL with the necessary amendments to fit Part-ORO:

FCL.740.A point (c)

'(c) Applicants who fail to achieve a pass in all sections of a proficiency check before the expiry date of a class or type rating shall not exercise the privileges of that rating until a pass in the proficiency check has been achieved.'

The provision was moved to AMC because the same requirement was transposed in FCL Appendix 10 into an implementing rule.

'FCL.1030 Conduct of skill tests, proficiency checks and assessments of competence

(..)

(b) After completion of the skill test or proficiency check, the examiner shall:

(1) inform the applicant of the result of the test. In the event of a partial pass or fail, the examiner shall inform the applicant that he/she may not exercise the privileges of the rating until a full pass has been obtained. The examiner shall detail any further training requirement and explain the applicant's right of appeal; (…)'

AMC1 ORO.FC.231(a)(3) point (c) wording 'acceptable level of competence'

The intent of EASA was to use acceptable level of competence when it relates to the overall EBT programme and use the wording 'acceptable level of performance' when it relates to the assessment of the competencies. In other words, to demonstrate an acceptable level of competence in the EBT programme, the pilot shall demonstrate an acceptable level of performance in the EBT competencies.

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

INSTRUCTOR CONCORDANCE ASSURANCE PROGRAMME (ICAP)

(a) The ICAP should be able to identify areas of weak concordance to drive improvement in the quality and validity of the grading system.

(b) The ICAP should be adapted to the size and complexity of the instructors' group and the complexity of the operator's EBT programme.

(c) Complex operators must include an ICAP-specific data analysis, demonstrating:

(1) instructor-group assessment homogeneity (agreement);

(2) instructor assessment accuracy (alignment).

(d) The operator should verify the concordance of the instructors:

(1) once every cycle;

(2) for a sufficient number of competency-grade combinations.

(e) The operator should establish procedures to address those instructors who do not meet the standards required.

(f) The operator should maintain a list with the EBT instructors qualified to deliver the EBT programme.

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

The instructor concordance is a tool for continuous improvement of the EBT programme.

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' or 'application of procedures' where instructors identify all the time 'knowledge' or 'PRO' as the root cause for all pilot being deficient when they should not, leading thus to a low grading in 'knowledge' or 'PRO'.

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

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

INSTRUCTOR CONCORDANCE ASSURANCE PROGRAMME (ICAP)

(a) Instructor concordance is a tool for continuous improvement of the EBT programme as data reliability results in a more accurate and effective training.

(b) The operator may have a more frequent, or even a continuous, assessment of concordance as it provides more opportunities to improve.

(c) Concordance standards are normally set by the operator; however, the competent authority may recommend criteria, as licences revalidation is performed under EBT.

(d) Individual instructor concordance may be verified:

(1) through uniform standardisation material where at least three different levels of performance are included and for all the competencies at a frequency of 72 months;

(2) by reference to the analysis of the data produced by the instructor every 12 months; normalisation may be necessary as there is no homogeneity of all EBT modules and the pilots that the instructor assessed; and

(e) Instructor-group assessment homogeneity (agreement) may be inferred from instructors, which have observed the same content.

(f) Instructor assessment accuracy (alignment) may be inferred from comparing instructor assessments with an 'assessment standard' consisting of correctly identified competency(ies) and correctly identified grade levels. Neither the competency(ies) nor the grade level(s) may be communicated in advance to the instructors. The assessment standards may be set by consensus of a standards group, in order to guard against individual biases.

(g) When the operator uses a small group of instructors (e.g. 10), data-driven concordance assurance programme may be directly integrated into annual refresher training, removing the need for the above guidance.

(h) Operators with complex group of instructors (e.g. a big rotation of instructors, subcontracted instructors, big number of instructors, many different fleets, etc.), may need to implement a more extensive concordance assessment system.

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

Safety promotion material — appropriate metrics

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 'appropriate methods and metrics', and other concepts used in this regulatory proposal:

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

APPROPRIATE METRICS

Concordance must be assessed 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.

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 providing 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 given that the background and environment of each group is different. Same principles may be necessary to be applied in other groups (e.g. mature instructors v 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

Instructor concordance may be verified by controlling the content to be assessed (standardisation reference material) such as flight recordings, scripted videos and/or case studies. This material should be of comparable complexity, ambiguity and variation to situations that the operator encounters in their EBT programme.

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 material 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 standard operating procedures (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 full EBT.

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 cross-checking complicated criteria.

INSTRUCTOR CONCORDANCE SCHEME:

(1) This is an example of a concordance scheme:

		Competencies								
		PRO	FPM	FPA	SAW	WLM	LTW	COM	PSD	KNO
Grades	1	Year 1	Year 2	Year 3	Year 1		Year 1	Year 2		Year 3
	2		Year 1	Year 2		Year 3		Year 1	Year 2	
	3	Year 3			Year 3		Year 2		Year 1	Year 2
	4		Year 3		Year 2	Year 2	Year 3			Year 1
	5	Year 2		Year 1		Year 1		Year 3	Year 3	

* It is possible to combine several competencies in a single assessment event.

(2) An unacceptable example of a concordance scheme:

	PRO	FPM	FPA	SAW	WLM	LTW	COM	PSD	KNO
1	Year 1/ Year 2/ Year 3	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 3
2	Year 1/ Year 2/ Year 3	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 3
3	Year 1/ Year 2/ Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3
4	Year 1/ Year 2/ Year 3	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 3
5	Year 1/ Year 2/ Year 3	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 3

The following table provides an overview of the usability of different data sources:

	Uniform reference material (e.g. videos)	**EBT Assessment and training Data**	**EBT-I dual-observations (e.g. assessments of competence)**
Useable for agreement?	**Yes:** all instructors can observe the same content.	**Yes** if data normalisation is possible otherwise **No:** as not all instructors have observed the same content.	**Partially:** although the examiner should be highly standardised, not all instructors have observed the same content.
Useable for alignment?	**Yes:** with assessment standard attached to the material.	**Yes** if data normalisation is possible otherwise **No:** as there are no assessment standards to compare to.	**Yes:** a crosscheck is possible.
Useable for other analysis?	**Yes:** outliers (both individuals and groups) may be identified.	**Partially:** outliers may be *suspected* by their rating behaviour.	**Yes:** this allows addressing other instructor competencies beyond ability to assess.

Notes	*Videos should ideally be of both a sim/flight event as well as the facilitated debriefing.*	*If training data is used to identify outliers, then outlier-generated data may be valued as unreliable data for concordance purposes. The gradings are still valid for licence revalidation and the grading system (e.g. tailored training).*	*It is difficult/time consuming to ensure covering exposing instructors to enough competency-grade combinations.*

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

CONTINGENCY PROCEDURES FOR UNFORESEEN CIRCUMSTANCES THAT MAY AFFECT THE DELIVERY OF THE MODULE

(a) The operator should detail in the EBT programme the contingency procedures in the event of unforeseen circumstances that may affect the delivery of the module (e.g. long-term sick pilot).

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

(1) The pilot 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 does not meet the requirements of recent experience (FCL.060):

(1) when the pilot misses one module and has not completed two modules in the preceding 12 months, the evaluation phase of the missing module should be rescheduled before the pilot can resume line operations. The manoeuvres and scenario-based training phases of the missing module 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. The evaluation should be delivered by an EBT instructor (or instructors) with examiner privileges before the pilot can resume line operations;

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

(i) one module should be rescheduled before the pilot can resume line operations using an EBT instructor (or instructors) with examiner privileges; and

(ii) training topics B and C of the other 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 an EBT instructor (or instructors) with examiner privileges; and

(ii) training topics B and C of the other module should be rescheduled before the pilot can resume line operations.

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

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

(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

CONTINGENCY PROCEDURES — RATINGS RENEWAL

(a) The renewal of ratings (e.g. type rating or instrument rating) in EBT follows the Annex I (Part-FCL) to the Aircrew Regulation provisions (IRs and AMC) and is complemented with the provisions covered in AMC1 ORO.FC.231(a)(5). 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 EBT manager for the type rating may renew the licence without extra training, as the EBT programme is now completed (at least two 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 two cases:

(i) One module is missing: the pilot must complete the missing module (two simulator sessions) before resuming line operations. Following that, the EBT manager for the type rating may renew the licence in accordance with Appendix 10 as the EBT programme is now completed (two modules in the last 12 months).

(ii) Two modules are missing: the pilot must complete one module (two simulator sessions) and training topics B and C of the other missing module (an extra simulator session) with a total of three 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 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 pilot should undergo the training for the initial issue of the type rating.

(3) Expiry longer than 7 years: the pilot should undergo the training for the initial issue of the instrument rating.

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

The GM was drafted following AMC1 ORO.FC.231(a)(5) as proposed in this Appendix to the Opinion 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 FRAMEWORK

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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

RECOMMENDED EBT COMPETENCIES (EASA COMPETENCY FRAMEWORK)

(a) The operator should include in its EBT programme at least the following competencies:

Application of knowledge (KNO)	
Description:	Demonstrates knowledge and understanding of relevant information, operating instructions, aircraft systems and the operating environment
OB 0.1	Demonstrates practical and applicable knowledge of limitations and systems and their interaction
OB 0.2	Demonstrates required knowledge of published operating instructions
OB 0.3	Demonstrates knowledge of the physical environment, the air traffic environment including routings, weather, airports and the operational infrastructure
OB 0.4	Demonstrates appropriate knowledge of applicable legislation.
OB 0.5	Knows where to source required information
OB 0.6	Demonstrates a positive interest in acquiring knowledge
OB 0.7	Is able to apply knowledge effectively

Application of procedures and compliance with regulations (PRO)	
Description:	Identifies and applies appropriate procedures in accordance with published operating instructions and applicable regulations
OB 1.1	Identifies where to find procedures and regulations
OB 1.2	Applies relevant operating instructions, procedures and techniques in a timely manner
OB 1.3	Follows SOPs unless a higher degree of safety dictates an appropriate deviation
OB 1.4	Operates aircraft systems and associated equipment correctly
OB 1.5	Monitors aircraft systems status
OB 1.6	Complies with applicable regulations
OB 1.7	Applies relevant procedural knowledge

Communication (COM)	
Description:	Communicates through appropriate means in the operational environment, in both normal and non-normal situations
OB 2.1	Determines that the recipient is ready and able to receive information
OB 2.2	Selects appropriately what, when, how and with whom to communicate
OB 2.3	Conveys messages clearly, accurately and concisely
OB 2.4	Confirms that the recipient demonstrates understanding of important information
OB 2.5	Listens actively and demonstrates understanding when receiving information
OB 2.6	Asks relevant and effective questions
OB 2.7	Uses appropriate escalation in communication to resolve identified deviations
OB 2.8	Uses and interprets non-verbal communication in a manner appropriate to the organisational and social culture
OB 2.9	Adheres to standard radiotelephone phraseology and procedures
OB 2.10	Accurately reads, interprets, constructs and responds to datalink messages in English

Aeroplane flight path management — automation (FPA)	
Description:	Controls the flight path through automation

OB 3.1	Uses appropriate flight management, guidance systems and automation, as installed and applicable to the conditions
OB 3.2	Monitors and detects deviations from the intended flight path and takes appropriate action
OB 3.3	Manages the flight path to achieve optimum operational performance
OB 3.4	Maintains the intended flight path during flight using automation whilst managing other tasks and distractions
OB 3.5	Selects appropriate level and mode of automation in a timely manner considering phase of flight and workload
OB 3.6	Effectively monitors automation, including engagement and automatic mode transitions

Aeroplane flight path management — manual control (FPM)	
Description:	Controls the flight path through manual control
OB 4.1	Controls the aircraft manually with accuracy and smoothness as appropriate to the situation
OB 4.2	Monitors and detects deviations from the intended flight path and takes appropriate action
OB 4.3	Manually controls the aeroplane using the relationship between aeroplane attitude, speed and thrust, and navigation signals or visual information
OB 4.4	Manages the flight path to achieve optimum operational performance
OB 4.5	Maintains the intended flight path during manual flight whilst managing other tasks and distractions
OB 4.6	Uses appropriate flight management and guidance systems, as installed and applicable to the conditions
OB 4.7	Effectively monitors flight guidance systems including engagement and automatic mode transitions

Leadership & teamwork (LTW)	
Description:	Influences others to contribute to a shared purpose. Collaborates to accomplish the goals of the team
OB 5.1	Encourages team participation and open communication
OB 5.2	Demonstrates initiative and provides direction when required
OB 5.3	Engages others in planning
OB 5.4	Considers inputs from others

OB 5.5	Gives and receives feedback constructively
OB 5.6	Addresses and resolves conflicts and disagreements in a constructive manner
OB 5.7	Exercises decisive leadership when required
OB 5.8	Accepts responsibility for decisions and actions
OB 5.9	Carries out instructions when directed
OB 5.10	Applies effective intervention strategies to resolve identified deviations
OB 5.11	Manages cultural and language challenges, as applicable

Problem-solving — decision-making (PSD)	
Description:	Identifies precursors, mitigates problems, and makes decisions
OB 6.1	Identifies, assesses and manages threats and errors in a timely manner
OB 6.2	Seeks accurate and adequate information from appropriate sources
OB 6.3	Identifies and verifies what and why things have gone wrong, if appropriate
OB 6.4	Perseveres in working through problems whilst prioritising safety
OB 6.5	Identifies and considers appropriate options
OB 6.6	Applies appropriate and timely decision-making techniques
OB 6.7	Monitors, reviews and adapts decisions as required
OB 6.8	Adapts when faced with situations where no guidance or procedure exists
OB 6.9	Demonstrates resilience when encountering an unexpected event

Situation awareness and management of information (SAW)	
Description:	Perceives, comprehends and manages information and anticipates its effect on the operation
OB 7.1	Monitors and assesses the state of the aeroplane and its systems
OB 7.2	Monitors and assesses the aeroplane’s energy state, and its anticipated flight path
OB 7.3	Monitors and assesses the general environment as it may affect the operation
OB 7.4	Validates the accuracy of information and checks for gross errors
OB 7.5	Maintains awareness of the people involved in or affected by the operation and their capacity to perform as expected

OB 7.6	Develops effective contingency plans based upon potential risks associated with threats and errors
OB 7.7	Responds to indications of reduced situation awareness

Workload management (WLM)	
Description:	Maintains available workload capacity by prioritising and distributing tasks using appropriate resources
OB 8.1	Exercises self-control in all situations
OB 8.2	Plans, prioritises and schedules appropriate tasks effectively
OB 8.3	Manages time efficiently when carrying out tasks
OB 8.4	Offers and gives assistance
OB 8.5	Delegates tasks
OB 8.6	Seeks and accepts assistance, when appropriate
OB 8.7	Monitors, reviews and cross-checks actions conscientiously
OB 8.8	Verifies that tasks are completed to the expected outcome
OB 8.9	Manages and recovers from interruptions, distractions, variations and failures effectively while performing tasks

AMC1 ORO.FC.231(b) and AMC2 ORO.FC.231(b) Competency framework

ICAO will implement a new competency model in late 2020 (see State letter 18-77 - Annex 1 and the Doc 9868 'PANS-TRG' consequential to Amendment 5 to the Doc 9868 'PANS-TRG'). The new competency model of ICAO is based on the original competency framework published in ICAO Doc 9995ö however, it is not the same.

Background of the competency framework

The original competency framework has been developed by a large industry experts working group and was based upon systems tested and validated in operational use.

The availability of a worldwide-harmonised framework of competencies is of great value. This 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 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.

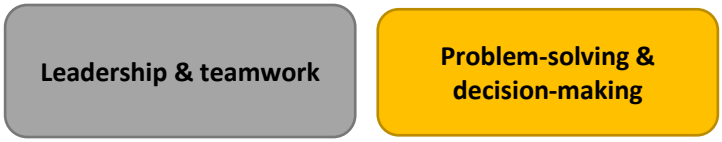
A number of 'behavioural marker' systems were considered, and the group chose the most relevant and appropriate ones, and developed them further to include technical competencies and associated performance indicators.

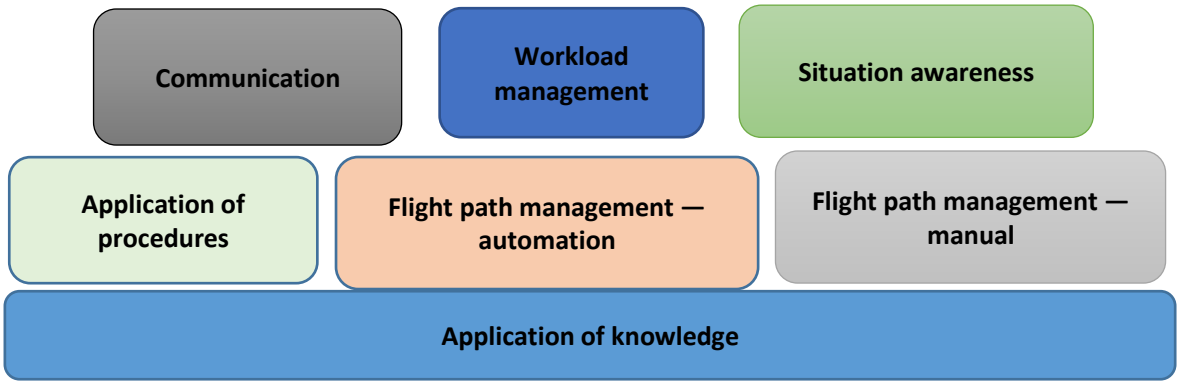
The behavioural marker system was the one published by the UK CAA in CAP 737 in 2005, in service across a wide range of cultures since 2002. The system has been validated through operational use.

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 control', depending on the scenario, is as well necessary.

An example of a possible root cause analysis is shown below.





This approach to competencies and the interaction/relationship between them is supported by MAN4GEN (Manual Operation for 4th Generation Airliners). An extract of the 'Final Report Summary' is provided below:

'(…) Results show that high-performing crews in this scenario were highly rated in Communication, Leadership and Teamwork, Problem Solving and Decision Making, Situation Awareness, and Workload Management. These competencies need to be paired together since some of them are a consequence of good performance in the others. For example, Communication by itself is not indicative of good performance since this competency is only a medium to propagate good behaviour in the other competencies identified here. In fact, as noticed with poor-performing crews, communication needs to be effective and clear to guarantee that the recipients understand and acknowledge what is being said. If that is not the case, it can lead to a performance decrease in the other core competencies (e.g. loss of Situation Awareness).

Reflecting on the results from this analysis, poor-performing crews showed difficulties in the competencies where high-performing crews were strong, especially during high-workload situations. These poor-performing crews completely skipped the planning flight phase which had a high impact during the execution flight phase, shown by the several below average and poor performance comments. Also, the heat-map shows that these crews already have difficulties in application of procedures (PRO) during low-workload situations (flight phases 1 and 2) and in manual flight throughout the scenario. High-performing crews, on the other hand, do not show negative comments for these competencies during these flight phases, yet positive comments were not present since conducting the required procedures here is not considered as above average performance. Despite the predictive asymmetry preventing the prediction of positive performance, it can at least be premised that poor performance for the overall flight can be predicted from low workload situations. All in all the collection of observed competencies are able to draw a clear picture of the differences between high and poor performing crews.

This analysis has identified the competencies that are most helpful in managing unexpected and challenging events, in addition to those competencies whose absence is most likely to lead to poor performance and unsafe outcomes. The desirable competencies identified by the analysis of crew responses to this scenario are: Leadership & teamwork, communication and problem solving & decision making.'

AMC1 ORO.FC.231(b) Competency framework - recommended EBT competencies (EASA competency framework)

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 Doc 9868 'PANS-TRG' (it may be applicable in November 2020). For this reason, EASA already proposes in the Appendix to this Opinion the core competency model of ICAO with the addition of 'application of knowledge'.

AMC1 ORO.FC.231(b) — application of knowledge

EASA decided to introduce 'application of knowledge' as an additional competency to the ICAO core competency framework. The reason behind presenting knowledge as the first one and therefore numbering this competency with the 'zero' (0) is that all competencies are built on the basis of knowledge. The competency however has been named 'application of knowledge' to indicate that it is about what the instructor is observing — observable behaviours related to knowledge; therefore, the 'application of knowledge'.

KNO is a new competency not covered in Doc 9995. There is more information about this competency in 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(b) — Application of procedures and compliance with regulations (PRO)

EASA introduced a change in the abbreviation of 'application of procedures and compliance with the regulations' because of a comment received to the NPA. Additionally, the old abbreviation (PRO) refers to application of procedures and knowledge. This is not appropriate for EASA due to the introduction of application of knowledge as a competency.

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

ADAPTED COMPETENCY MODEL

(a) An operator seeking to develop an adapted competency model under ORO.GEN.120 should:

(1) identify positive behaviours and use language that avoids ambiguity; and

(2) demonstrate equivalence to the recommended EBT competencies in AMC1 ORO.FC.231(b).

(b) In order to demonstrate equivalence, the operator should map the competencies and observable behaviours to the recommended EBT competencies.

(c) When the operator is translating AMC1 ORO.FC.231(b) into its common language, the application of ORO.GEN.120 may not be necessary. The translation may not be literal.

AMC1 ORO.FC.231(b) Evidence-based training Adapted competency model

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 needs and the local environment should answer the following questions:

— What is to be trained?

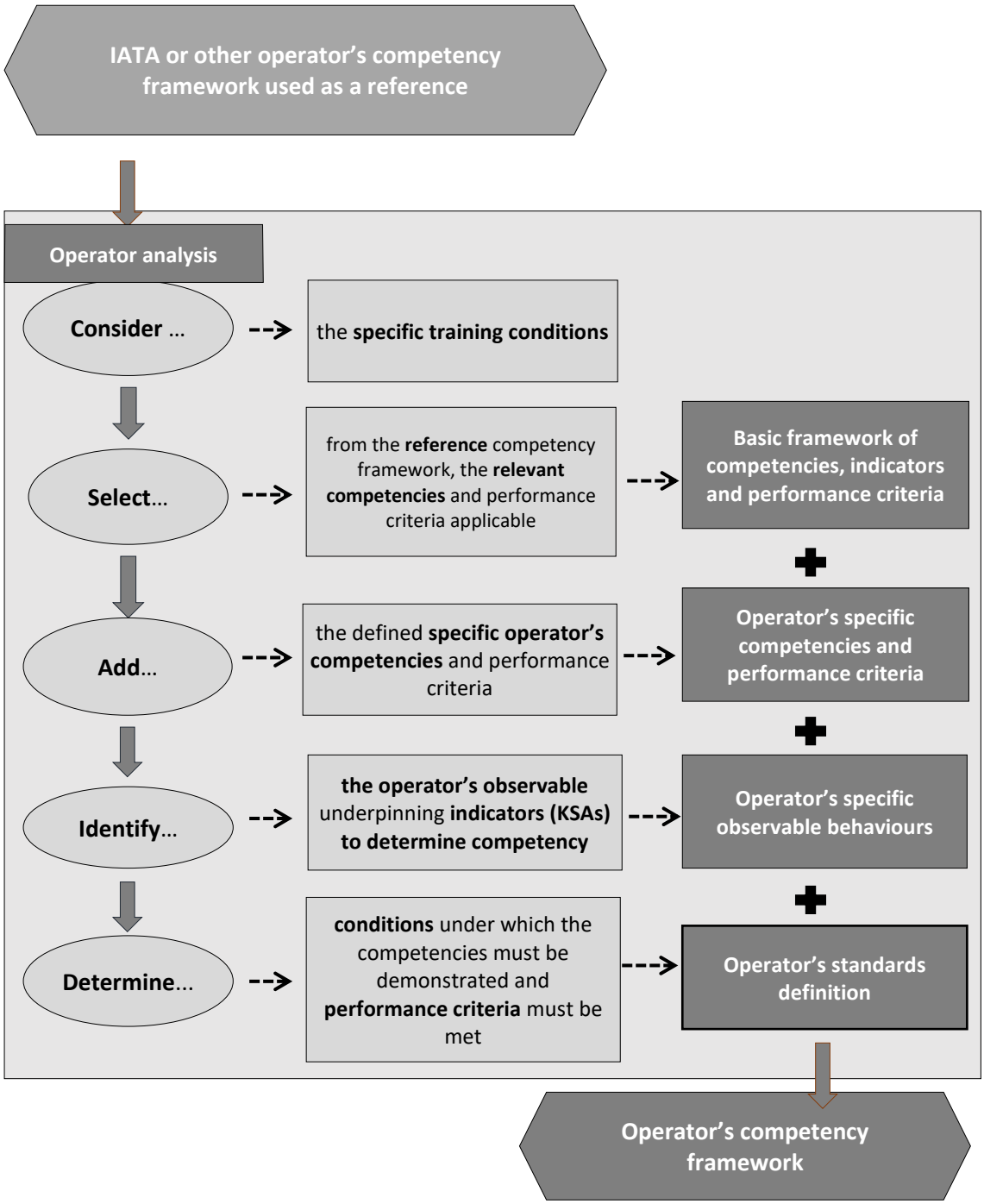
— What tasks does the trainee need to be able to perform by the end of the training?

— 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)?



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

ADAPTED COMPETENCY MODEL/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) If the operator makes small adjustments in the wording used to describe the OBs of the EASA competency framework in order to improve the understanding of the pilots while maintaining the same meaning, it may not be considered as an adapted competency model.

(c) TRAINING SYSTEM PERFORMANCE

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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

TRAINING SYSTEM PERFORMANCE — FEEDBACK PROCESS

(a) Feedback process is the continuous process of collecting and analysing assessment and training data from an EBT programme.

(b) The feedback process 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 (when the standardisation and concordance assurance programme is integrated into the training system performance).

(c) The following defined metrics should be collected as a minimum:

(1) level 0 grading metrics (competent metrics): data metrics providing the information whether the pilot(s) is (are) competent or not;

(2) level 1 grading metrics (competency metrics): quantifiable data from the grading system — numeric grade of the competencies (e.g. 1 to 5);

(3) level 2 grading metrics (observable behaviour metrics): the instructors record predetermined OBs during the session;

(4) level 3 grading metrics (other metrics): the instructors may record other predetermined data (e.g. specific tasks, actions, questions, etc.).

(d) 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.

AMC1 ORO.FC.231(c)

This requirement is transposed from Doc 9995 paragraphs 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.'

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

The definition is transposed from ICAO Doc 9995 Chapter 3.6.

'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'

However, the ICAO text has been modified to accommodate the wording to the EU regulatory system.

AMC1 ORO.FC.231(c) point (a) wording 'continuous'

Using the word 'continuous' ensures that there is data collection throughout the year and not at a certain single point in time.

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

FEEDBACK PROCESS — DATA PROTECTION – GRADING SYSTEM

(a) The objective of protecting the EBT data is to avoid inappropriate use of it in order to ensure the continued availability of such data, to maintain and improve pilot competencies.

(b) The data access and security policy should restrict information access to authorised persons.

(c) The data access and security policy should include the measures to ensure the security of the data (e.g. information security standard).

(d) The data access and security policy (including the procedure to prevent disclosure of crew identity) should be agreed by all parties involved (airline management and flight crew member representatives nominated either by the union or the flight crew themselves).

(e) The data access and security policy should be in line with the organisation safety policy in order to not make available or to not make use of the EBT data to attribute blame or liability.

(f) The operator may integrate the security policy within other management systems already in place (e.g. information security management).

AMC2 ORO.FC.231(c)

The volume of training data will increase through EBT and some provision must be made for individual data protection. However, the Main-group RMT.0599 maintained that data protection in excess of what the GDPR offers is undesirable in a safety-critical industry as the protection of the public is of higher interest than the protection of an individual pilot. On the other hand, the representative of the pilots in the EBT subgroup RMT.0599 requested more stringent data protection requirements due to the increased volume of training data.

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 are provided in AMC1 ORO.AOC.130 points (g) and (k).

Point (a) of this AMC is transposed from AMC1 ORO.AOC.130 point (b) and from ICAO Doc 9859 AN/474 Safety Management Manual (SMM):

'the sole purpose of protecting safety information from inappropriate use is to ensure its continued availability so that proper and timely preventive actions can be taken and aviation safety improved;'

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).

Point (c) of this AMC is transposed from AMC1 ORO.FC.130 point (k)(6).

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: (…)'

Point (d) of this AMC was inspired by Regulation (EU) No 376/2014 Article 15 point 2(a).

For **point (e)**, the chapter 3 appendix 3 ICAO Annex 19 was used as the principles to draft this provision.

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

TRAINING SYSTEM PERFORMANCE — FEEDBACK PROCESS — METRICS

(a) Training metrics within the feedback process are a valuable source of data. Typical metrics may include but are not limited to:

(1) differences in success rates between training topics;

(2) the trainees' feedback (e.g. surveys), which provides a different perspective as to the quality and effectiveness of the training;

(3) instructor concordance assurance: this system is important to measure the effectiveness of the instructor calibration process. It is important to remind that the purpose of this system is not to spy on instructors or to pressure individuals to change their grading;

(4) level 0 grading metrics (competent metrics): Metrics examples: distribution of pilots not competent after the SBT, distribution of pilots not competent in the EVAL and competent after the SBT;

(5) level 1 grading metrics (competency metrics): Metrics examples:

(i) distribution of level of performance within the range of competencies;

(ii) differences in grades between aircraft types;

(6) level 2 grading metrics (observable behaviour metrics): e.g. in specific example scenario elements. Metrics example: differences in displaying OBs between ranks of pilots;

(7) level 3 grading metrics (other metrics such as data based on tasks): for instance, did the pilot calculate the landing distance? Or, did the pilots make a call-out in a specific manoeuvre? This level is usually linked to data collection of the SMS or EBT feedback loop (e.g. was the call-out of the TCAS manoeuvre correct? 'TCAS I have control'). Metrics example: distribution of errors for various training scenarios and aircraft types.

(8) during the simulator session, the operator may consider the level of grading metrics that the instructor needs to collect, taking into consideration the workload of the instructor.

(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 specific training. For this purpose, data from the line evaluation of competence is important to measure the effectiveness of the EBT programme in operations. It may include data from the process for the monitoring of line operations.

(c) Complex operators may, in the context of their safety management system, establish a safety action group dedicated to training: 'training safety action group'. This may be a best practice to meet the implementing rule.

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

FEEDBACK PROCESS — DATA PROTECTION – GRADING SYSTEM

The data access and security policy may, as a minimum, define:

(a) a policy for access to information only to specifically authorised persons identified by their position in order to performed their duties. The required authorised person(s) does (do) not need to be the EBT manager, but could be the EBT programme manager or a third party mutually acceptable to unions or staff and management. The third party may also be in charge of ensuring the correct application of the data access and security policy (e.g. the third party is the one activating the system to allow access to the authorised persons);

(b) the identified data retention policy and accountability;

(c) the measures to ensure that the security of the data includes the information security standard (e.g. information security management systems standard e.g. ISO 2700x-ISO 27001, NIST SP 800-53, etc.);

(d) the method to obtain de-identified crew feedback on those occasions that require specific follow-up; and

(e) When there is a need for data protection, it is preferable to de-identify the data rather than anonymise it.

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.'

GM2 ORO.FC.231(c) – de-identified data VS anonymised data

SPT.012 — Safety promotion to ORO.FC.231(c) Data protection

DE-IDENTIFIED DATA

Anonymised data should be avoided in EBT, as in order to achieve the ultimate goal of the EBT system, which is a fully individual and personalised training programme for the pilot, the system needs to know the training history of the pilot. De-identification offers the possibility that NO human being would be able to ever have access to the identified data (or only the pilot themselves as the data belong to them), while at the same time the system is able to offer a personalised training programme.

For information, please see below general definitions of anonymization and de-identification.

'Anonymisation means the act of permanently and completely removing personal identifiers from data, such as converting personally identifiable information into aggregated data. Anonymised data is data that can no longer be associated with an individual in any manner.'

'De-identification: de-identification involves the removal of personally identifying information in order to protect personal privacy. In some definitions, de-identified data may not necessarily be anonymised data and in such cases, anonymised data is a particularised subset of de-identified data.'

(d) GRADING SYSTEM

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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) Grade 1 — NOT COMPETENT — determines that the minimum acceptable level of performance was not achieved for the conduct of line operations. An outcome of ADDITIONAL TRAINING REQUIRED and level 2 grading metrics should be recorded.

(2) Grade 2 to 5 determine an outcome of COMPETENT for the conduct of line operations.

(3) Grade 2 (below the average) determines that the minimum acceptable level was achieved for the conduct of line operations. Additionally, level 2 grading metrics should be recorded.

Minimum performance indicates a need for training (e.g. tailored or additional) to elevate performance. It includes:

(i) continuous grades 2 in a competency in multiple modules, or

(ii) the majority of competencies graded with 2 in a module.

(4) Grade 3 is the average.

(5) Grade 4 determines that the pilot is above the average.

(6) Grade 5 (exemplary) determines that the pilot is above the average and the outcome is enhanced safety, effectiveness and efficiency.

(c) The operator should develop further grading guidance to the above points to help the instructors determine the grade of the pilots they assess.

AMC2 ORO.FC.231(d)(1) Evidence-based training

GRADING SYSTEM — ALTERNATIVE SYSTEM

(a) An operator seeking to develop an alternative grading system under ORO.GEN.120 should:

(1) provide quantifiable data for the measurement of the training system performance; and

(2) demonstrate equivalence to the recommended grading system in AMC1 ORO.FC.231(d)(1).

(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 and level 2 grading metrics 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 more training (e.g. tailored or 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 average (it can be one or more grades e.g. above the average and exemplary).

(c) The operator should develop further guidance to the above points to help the instructors determine the grade of the pilots they assess.

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 that 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 that all pilots are assessed in the same way. Some of the arguments for such prescriptive approach are:

- As this Opinion 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 graded 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 this Appendix to the Opinion.
- 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[4]. 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 (de-identification 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. Note: The initiatives described above are planned on a voluntary basis and in full compliance with the GDPR.

[4] 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).

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.

Note: As mentioned, data exchange will be done in accordance with the data protection regulations (European and national).

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 needed every year (maintenance). 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 criteria presented in the IATA Evidence-Based Training 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: identifies evaluator divergence, facilitates instructor concordance, is not repressive, is not open to abuse, avoids positive/negative bias

— Usability: is acceptable to evaluators, avoids unintentional mistakes, is familiar and is not complicated

— Safety improvement: is 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.

AMC1 ORO.FC.231(d)(1) point (b)(2)

The wording 'competent for the conduct of line operations' means that the pilot is competent at an industry level, in order to ensure a level playing field. It is therefore NOT intended to be at an airline level. This does not mean that the airline may require more than a grade 2 to allow the pilot to operate in their aircraft.

AMC1 ORO.FC.231(d)(1) point (b) grade 5

The preferred scale of grading is 1 to 5. The reason is to have a good granularity on the pilot performance and allow the instructor to grade the norm. Although EASA allows alternative grading systems in AMC2 ORO.FC.231(d)(1) and therefore allows 1 to 4 grading, the initial intention was to measure competence performance (grade) in the same way, meaning 1 and 2 should mean the same in both grading systems as this is a key element for level playing field. Following the discussion with the RMG, EASA decided to merge grades 4 and 5 in the alternative grading system and have only one grade: grade 4. Additionally, the equivalency of grades was extended to grade 3, and therefore in the

final proposal of EASA, grades 1 to 3 mean the same in both grading systems, while grade 4 in the alternative grading scale includes 4 and 5 in the standard EASA grading scale.

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

This provision intends to ensure that the operator develops guidance for its instructors.

AMC3 ORO.FC.231(d)(1) Evidence-based training

CONDUCT OF THE GRADING — ORCA

(a) Grading the performance of flight crew members during an EBT module should include the following steps:

(1) Observe performance (behaviours) during the simulator session.

(2) Record details of effective and ineffective performance (behaviours) observed during the simulator session ('record' in this context refers to instructors taking notes).

(3) Classify observations against the OBs and allocate the OBs to each competency (or competencies), using amongst others the facilitation technique.

(4) Assess and evaluate (grade): assess the performance by determining the root cause(s) according to the competency framework. Low performance would normally indicate the area of performance to be remediated in subsequent phases or modules. Evaluate (grade) the performance by determining a grade for each competency using a methodology defined by the operator.

(b) As a minimum, the instructor should grade all the observed competencies at:

(1) the end of the evaluation phase (de-briefing) by providing at least level 1 grading metrics;

(2) the end of the manoeuvres training phase (de-briefing) by providing at least level 0 grading metrics; and

(3) at the end of the EBT module (de-briefing) by providing at least level 0 grading metrics (level 1 grading metrics are recommended).

GM1 ORO.FC.231(d)(1) Evidence-based training

CONDUCT OF THE GRADING — ORCA

(a) At the end of the evaluation phase, after the facilitated de-briefing, the instructor may, as a minimum, record level 1 grading metrics.

(b) The instructor may conduct the simulator session of the EVAL following the principles of a summative assessment and the facilitated de-briefing following the principles of a formative assessment. The MT and SBT simulator session may be conducted as a formative assessment.

(c) At the end of each training phase, it is recommended to record level 1 grading metrics unless just culture and the necessary non-jeopardy environment during training may be compromised. In that case, level 0 grading metrics for all competencies may be recorded (exceptionally 'not observed' or 'left in blank' may be recorded) and level 1 grading metrics may be recorded and de-identified for the data collection and analysis purposes.

AMC3 ORO.FC.231(d)(1)

This provision was inspired by the IATA Evidence-Based Training Implementation Guide, Chapter 6.6.

'6.6 TECHNIQUES TO BE APPLIED IN GRADING

Assessment is a continuous process throughout all training phases. It is the process of observing, recording, analyzing and determining crew performance against defined expectations in the context of overall performance. It includes the concept of self-critique and feedback, which can be given during training, or in summary thereafter.'

Furthermore, this technique (observe, record, classify and assess/evaluate) is widely used in the competency-based interview in the domain of human resources. An example can be found in the book 'assessment methods in recruitment, selection and performance' by Robert Edenborough (2005). In this context and according to the author, the process is necessary in a competency-based assessment as 'It identifies a stepwise process that prevents a too-rapid arrival at conclusions, which is the case if such a structure is not followed.'

AMC3 ORO.FC.231(d)(1) point (b)

There is a need to ensure a level playing field. Therefore, EASA decided to have a standard approach to grading. This is supported in the original idea of EBT as evidenced in the IATA Implementation Guide Appendix D where the crew is graded on both days.

The fact that the EBT instructor is grading the performance of the pilot in the EVAL and SBT does not mean that this grading is accessible to everybody:

— From a 'training system performance' point of view, this information is needed to demographically assess the level of performance of the pilot community before the module.

— From a 'nominated person flight OPS' point of view, the information needed is whether the pilot is competent or not competent to conduct line operations. This applies to both days; otherwise, the pilot shall not fly.

The decision to recommend grading at level 1 grading at the end of the EVAL, MT and SBT was supported by the IATA Implementation Guide Chapter 6.5 Figure 6.2 – 'the 8 grading systems evaluated with scores' where it described that grading 'each competency on the session' and grading 'each competency on the session and on the scenario/manoeuvres training with the deviation below the norm' was the system that received the highest scores.

AMC4 ORO.FC.231(d)(1) Evidence-based training

RECOMMENDED GRADING SYSTEM METHODOLOGY — VENN MODEL

(a) To grade a competency, the instructor should assess the associated OBs of each competency against the following dimensions by determining:

(1) what was the outcome of the threat management, error management and undesired aircraft state management relating specifically to the competency being assessed;

(2) how well the flight crew member demonstrated the OB(s) when they were required. Which includes:

(i) how many OBs the flight crew member demonstrated over the EBT phase (e.g.

EVAL, MT, SBT) when they were required; and

(ii) how often the flight crew member demonstrated the OB(s) when they were required;

Abbreviated word picture VENN model				
	TEM	Observable behaviours		
Grading	OUTCOME (1)	HOW WELL(2)=	HOW MANY (i)+	HOW OFTEN (ii)
1	unsafe situation	ineffectively	few, hardly any	rarely
2	not an unsafe situation	minimally acceptable	some	occasionally
3	safe situation	adequately	many	regularly
4	safe situation	effectively	most, almost all	regularly
5	enhanced safety, effectiveness and efficiency	In an exemplary manner	all	always

(b) Grades should be determined during each EBT module as follows:

(1) Evaluation phase (EVAL) — overall performance of the phase at level 1 grading metrics.

(2) Manoeuvres training (MT) — overall performance of the phase at level 0 grading metrics. When the phase is graded 'not competent', it requires a level 2 grading metrics.

Note: Only a limited number of competencies may be observed and graded in this phase (e.g. PRO, FPA, FPM); the others are 'to be left in blank'.

(3) Scenario-based training phase (SBT) — overall performance of the phase at level 1 grading metrics. Unless just culture and the necessary non-jeopardy environment during training may be compromised. In that case, level 0 grading metrics.

Note: In-seat instruction (ISI) should not be included in any assessment.

(c) Where any competency is graded below the minimum acceptable level of performance (grade 1 on a 5-point scale), an outcome of additional FSTD training is required.

(1) Additional level 2 grading metrics must be recorded.

(2) 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.

(d) Where all competencies are determined at or above the minimum acceptable level of performance, (grade 2 on a 5-point scale) the outcome should be COMPETENT. Consistent grading below the average (2 on a 5-point scale) may indicate a need for training to elevate the performance to the average (grade 3 on a 5-point scale) as follows:

(1) Any competency graded with 2 requires level 2 grading metrics.

(2) Any competency graded with 2 in two consecutive simulator sessions of different recurrent modules requires individual tailored training in the SBT of the second module. (e.g. 1st Module SBT graded with 2, 2nd Module EVAL graded with 2, thus the 2nd SBT should be an individual tailored training, or 1st Module MT graded with 2 in FPA, in the 2nd MT Module the same competency is graded with 2, the SBT should be an individual tailored training focusing on FPA).

(3) Any competency graded with 2 in three consecutive modules requires individual tailored training. If at the end of the tailored training (3rd SBT) the competency continues being

graded with 2, additional FSTD training is required within the next 3 months. For instance, following the example above, the SBT in the 2nd Module was an individual tailored training. In the 3rd Module during the EVAL the same competency is graded with 2 and individual tailored training is applied. The SBT is graded with 2 again. The pilot may continue line operations but should receive additional FSTD training within the next 3 months.

(4) The operator should not release a flight crew member to unsupervised line operations when more than four competencies (the majority of the competencies — five competencies or above) are graded with 2 in the module.

(5) Any EVAL graded with 2 in more than three competencies requires individual tailored training in the SBT. If at the end of the module more than three competencies continue being graded with 2, the pilot may continue line operations but should receive additional FSTD training within the next 3 months.

(e) 'Individual tailored training' refers to a simulator session tailored to the pilot's individual training needs, which may require a different programme or syllabus. Normally, it may be done during the SBT and normally there is not an increase of FSTD volume (no extra simulator session). It may require an increased volume of training such as CBT, additional briefings, etc.

(f) 'Additional FSTD training' refers to the fact that in addition to the requirements of tailored training, there is an increase of FSTD volume (extra simulator session). It normally happens after tailored training.

AMC4 ORO.FC.231(d)(1)

Most of the provisions included in this AMC were transposed from the GM that referred to VENN as proposed in the NPA. The upgrade from GM to AMC was suggested in some comments and decided by the review group in June 2019.

For the column related to 'how many' (i), there was a consensus to understand:

1- 'few, hardly any' as few steps above 0 %,
2- 'many' as a majority but closer to 50 %,
3- 'some' in between many and most,
4- 'most, almost all' as a large majority closed to 100 % but not quite, and
5- 'all' as a 100 %.

AMC4 ORO.FC.231(d)(1) point (d)

The provisions of EBT regarding grading are more detailed than those provided for legacy training in ORO.FC.230 where there is no definition of what training may be required after LPC failure or OPC failure. Remediation may include FSTD training, line flying under supervision (LIFUS), or something else depending on the circumstances (e.g. virtual-reality training).

GM2 ORO.FC.231(d)(1) Evidence-based training

RECOMMENDED GRADING SYSTEM METHODOLOGY — VENN MODEL

(a) Grades may be determined during each EBT module as follows:

(1) For each assigned grade:

(i) the observed performance should be identified with one or more OBs; and

(ii) the OB(s) should simply link the observed performance to the competency; they are not to be used as a checklist.

(2) At the completion of the EVAL, the grade should be assigned for each competency, based on the overall assessment of the performance during the EVAL.

(3) At the completion of the MT, only a limited number of competencies can be graded. The others are to be left in blank. Note: The grade of a competency as 'not observed' is a relevant set of data to be used in the EBT programme (e.g. may be used for instructor concordance assurance programme, programme design, etc.), while 'competency left in blank' is stating the obvious, which is that MT is an skill retention phase and therefore it focuses on only some of the competencies which may provide NO opportunity to observe all the competencies.

(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) In exceptional occasions, the instructor may have been unable to assess one or two competencies in the EVAL or SBT. A 'not observed' may be graded. The training system performance and concordance assurance system may use these metrics to improve instructors' standardisation and the EBT programme design. When the operator grades the MT alone (instead of grading the MT and EVAL together), a 'not observed' grading may be frequent. It also occurs when the instructor grades each one of the manoeuvres.

(b) The word pictures are standardised according to the VENN model but may be simplified once instructors become familiar with the system.

Word picture VENN model	
Application of procedures (PRO)	
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 control (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 to a high standard when required, which significantly safety, effectiveness and efficiency

4	The pilot showed adequate knowledge, by regularly 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 resulted in a safe operation
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 enhanced 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

Safety promotion material — Grading system

EASA has planned a safety promotion task (SPT.012) to support the implementation of EBT. The following material has been developed:

'SPT.012 — Safety promotion to ORO.FC.231(d) Grading system

GUIDANCE TO THE GRADING SYSTEM FOR THE INSTRUCTORS TO DETERMINE THE GRADE OF THE PILOTS

Although the regulation may provide enough material to develop a grading system, the operator is required to provide the instructors with further guidance 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 (instructors) 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. The instructor may run this model first and then proceed with the grading following the word picture. The model focuses on the determination of grading 1, 2 and what is above 2. It may not help to determine what is the actual grading of 3, 4, or 5:

— 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, the 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 the 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 will not probably be graded with 5. It should be noted that this does not prevent that other competencies could be graded with 5 based on the evidence of this particular scenario element. PRO may not be graded with 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 with 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 (undesired aircraft state associated with a reduction in margins of safety[5]) but managed by the flight crew successfully (flight crew timely switched from error management to undesired aircraft state management). Therefore, 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 the root cause, the grade should not be 1 or 5. The most probably grading reference is 2 because:

  — The outcome of the situation was not unsafe (therefore, it cannot be 1). Additionally, the instructor should also ask themselves if the crew managed all the situations successfully in all of the events during the simulator session (to look for the big picture). If this was the case, then the instructor knows that grading with 1 is not possible (the outcome was NOT unsafe) and therefore the instructor is restricted to 4 possible gradings (2, 3, 4 or 5). Then the instructor will mentally move to the next step below.

  — Was there a reduction in margins of safety? Yes, as in this example the pilots reach an undesirable aircraft state (therefore, it cannot be 5). At this moment in the process, the instructor knows the grading can be neither 1 nor 5 and will move to the next step below.

  — How big was the reduction of the safety margin? Normally, grading 4 is unlikely. At this stage in the process, it will depend on the context of the situation (how dangerous was the situation?). Normally, entering in a dangerous undesired aircraft state means that some of the OBs were not demonstrated effectively; therefore, grading 4 may not be possible as grade 4 requires 'almost all' OBs to be demonstrated effectively (see VENN table). Therefore, at this point in the process,

[5] See ICAO Doc 9868 'PANS-TRG'Chapter 6.7 Undesired aircraft states, point 6.7.1 *'Undesired aircraft state are characterized by divergences from parameters normally experienced during operations (e.g. aircraft position or speed deviations, misapplications of flight controls, or incorrect systems configurations) associated with a reduction in margins of safety'* 'undesired aircraft states must be managed by flight crews'

the instructor also knows that the grading cannot be 4. Then, the instructor will mentally move on to the next step below.

— In this step, the instructor will ask themselves how well the flight crew managed the situation (and the other situations in the simulator sessions). Once more, the grading should look for the global picture — that is why it is relevant to assess how well the flight crew resolved the situation of the example but also other situations in the simulator session.

How well was the situation resolved? Did the crew timely switch from error management to undesired aircraft state management? Did the crew perform the best possible escape manoeuvre and to a good standard? Depending on the rest of the simulator session, the instructor could grade 3 if the pilot/crew managed the other events in the simulator session in the best possible way and to a good standard. Otherwise, the grading will be 2.

— 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). The instructor should go through the mental process described above. A summary is provided below:

For the competency identified as root cause, the probable grading (reference grading) for the simulator session will be 2 and the maximum grading 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) — meaning the reduction in the safety margins was big. Obviously, the situation cannot be considered safe because the pilot should execute the go-around no later than the stabilised gate (1 000 feet or about 500 feet as per the operator's policy). It should never be 4 or 5. It may trigger grade 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. In addition to the standard examples, there may be other examples for which the operator may need to decide if a higher degree of safety dictates otherwise. For example, the captain decides to take 15 seconds to refresh quickly the go-around actions and warn the first officer to be ready below 500 feet. Another example is when the crew miss the touch down zone for a bit in a long runway and decide to land instead of going around due to weather in the go around area).

— Intentional non-compliance not corrected and continued to the end state (e.g. unestablished approach and maintained until landing)

In this example, the competency identified as the root cause should be graded 1 (failed), and the probable root cause is PRO. Furthermore, no other competency of the pilot can be graded with 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.'

According to ICAO Doc 9868 'PANS-TRG' (State letter 18-77e) point 6.7.3 'undesired states can be managed effectively, restoring margins of safety, or can induce an additional error, leading to an incident, or accident.'

Undesired aircraft states and outcomes. 'Undesired aircraft states are transitional states between a normal operational state (i.e., a stabilised approach) and an outcome. Outcomes, on the other hand, are end states, most notably, reportable safety occurrences.' (source: skybrary.aero)

'SPT.012 — Safety promotion to ORO.FC.231(d) Grading system and ORO.FC.146

EASA identified that during the early implementation of mixed EBT, the competencies 'application of procedures' (PRO) and/or 'application of knowledge' (KNO) have normally the lowest grading in the airline. The EBT manager should determine whether this information is genuine or not. For that purpose, Line Operations Safety Audit (LOSA), consultancy and other tools available in the industry could guide the EBT manager in determining the accuracy (veracity) of the grading results (PRO and/or KNO lowest grading). If the airline determines its pilots have high standards in PRO and/or KNO, then there may be two possibilities to explain the lower grading in PRO and/or KNO:

— The instructors have a wrong understanding of the OBs and grading provisions. Normally, this is not the case, as the instructors have recently received the EBT instructor course (this text pertains to new implementations of mixed EBT). The EBT manager should verify whether the instructors clearly understand the guidelines for grading provided by the airline.

— The instructors are identifying the 'training needs' wrongly. This mistake is common in some of the airlines starting mixed EBT. Why do the instructors tend to grade PRO or KNO lower than the rest of competencies?

  — Every competency is constructed with knowledge, skills and attitudes. Knowledge is, therefore, an element of every competency; this confuses instructors, and if they instructor are not careful, they will grade KNO or PRO lower than they should. Example: due to distractions, a captain forgets to put the anti-ice system several times. The instructor should normally identify the root cause as 'workload management' (WLM), or if the pilot was flying manually, it might be a problem of 'flight path management — manual control' (FPM) or both competencies (see 'distraction' in the OBs). However, when the instructor is new to EBT, they may give a lower grade to PRO instead. Why? Because in the traditional system, the instructor should probably give a lower grade to PRO. This is usually not correct in EBT (that is why the facilitation debriefing is so important: to understand why the pilot forgot the anti-ice system). Note: If the pilot did not know the procedure, giving a lower grade to PRO is correct.

  — As explained in NPA 2018-07(B) and Opinion No 08/2019, the competencies are linked. For instance, a pilot should first have FPA and/or FPM to build the competency of WLM. Then the pilot can have 'thinking time' and construct 'problem-solving and decision-making' (PSD). Therefore, the instructor always has in mind the argument of referring back to KNO or PRO as they usually are at the basis of the competency pyramid. The instructor should know where to stop the root cause analysis; otherwise, all problems would be attributed to KNO.'

AMC4 ORO.FC.231(d)(2) and GM2 ORO.FC.231(d)(1)

Assessment and grading form an integral part of the learning process. As part of the development 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 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 the attention to the underlying areas of flight crew member performance to determine training needs 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, clarity, usability, ease of compliance, continuous improvement, motivation, data management, adaptability, implementation risk

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, it 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 average): a 5-point scale is commonly used with grade 1 indicating unacceptable performance, the average being grade 3; grade 2 indicates the minimum acceptable performance, and 4 and 5 indicate performance above average. 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 model described in

this GM is based on the following measurements at predetermined points during an EBT module:

A = HOW WELL (e.g. The pilot communicated 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 to be below the minimum acceptable level, which in the example system is 1 on a 5-point scale.

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

VERIFICATION OF THE ACCURACY OF THE GRADING SYSTEM

(a) The purpose is to provide data to assess the accuracy of the grading system.

(b) The items defined below are based on Part-FCL Appendix 9. They should be included in the evaluation and manoeuvres training phase of the applicable module. The minimum items to be included are: rejected take-off, failure of critical engine between V1 & V2, adherence to departure and arrival, 3D approaches down to a decision height (DH) not less than 60 m (200 ft), engine-out approach & go-around, 2D approach down to the MDH/A, engine-out approach & go-around, engine-out landing.

(c) Instructors should record if the exercises are flown to proficiency using Appendix 9 references (define criteria). Note: Individual pilots' grading and assessment remains according to the EBT grading system and Appendix 10.

(d) This verification should be performed once every 3 years.

GM1 ORO.FC.231(d)(2) Evidence-based training

VERIFICATION OF THE ACCURACY OF THE GRADING SYSTEM

Items that may be included in a verification of the accuracy of the grading system:

Assessment and training topic	*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*	PRO	COM	FPA	FPM	LTW	PSD	SAW	WLM	KNO
Use of checklist prior to starting engines (1.4 AP9)	GND	Use of checklist prior to starting engines, starting procedures, radio and navigation equipment check, selection and setting of navigation and communication frequencies	This element is not required	Intentionally left in blank	Intentionally left in blank								
Before take-off checks (1.6 AP9)	GND		This element is not required	Intentionally left in blank	Intentionally left in blank								
Rejected take-off (2.6 AP9)	TO	Engine failure after the application of take-off thrust and before reaching V1	PRO - demonstrate adequate knowledge of the technique and procedure for accomplishing a rejected take-off after power-plant/system(s) failure/warnings, including related safety factors; - take into account, prior to beginning the take-off, operational factors which could affect the manoeuvre, such as take-off warning inhibit systems or other aeroplane characteristics, runway length, surface conditions, wind, obstructions that could affect take-off performance and could adversely affect safety; - perform all required pre-take-off checks as required by the appropriate checklist items; FPM - align the aeroplane on the runway centreline; - reduce the power smoothly and promptly, if appropriate to the aeroplane, when power-plant failure is recognised. Maintain the aeroplane under control close to the runway centreline; - use spoilers, prop reverse, thrust reverse, wheel brakes, and other drag/braking devices, as appropriate, maintaining positive control in such a manner as to bring the aeroplane to a safe stop. Accomplish the appropriate power-plant failure or other procedures and/or checklists as set forth in the POH or AFM or SOP	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
3.8.1* Adherence to departure and arrival routes and ATC instructions	CLB APP		This element is not required	Intentionally left in blank									

Failure of the critical engine between V1 & V2 (2.5.2 AP9))	TO	Failure of the critical engine from V1 and before reaching V2 in the lowest CAT I visibility conditions	FPM - establish a bank of approximately 5°, if required, or as recommended by the manufacturer, to maintain coordinated flight, and properly trim for that condition; maintain the operating engine within acceptable operating limits; - establish the best engine inoperative airspeed as appropriate to the aircraft and condition of flight; - establish and maintain the recommended flight attitude and configuration for the best performance for all manoeuvring necessary for the phase of flight; - maintain desired altitude within given limits, when a constant altitude is specified and is within the capability of the aeroplane; - maintain the desired airspeed and heading within given limits; PRO - recognise an engine failure or the need to shut down an engine as simulated by the examiner; - complete engine failure vital action checks from memory; - follow the prescribed aeroplane checklist, and verify the procedures for securing the inoperative engine; - demonstrate proper engine restart or shutdown procedures (whatever appropriate) in accordance with approved procedure/checklist or the manufacturer's recommended procedures and pertinent checklist items; and monitor all functions of the operating engine and make necessary adjustments.	The manoeuvre is considered to be complete at a point when the 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					
				The manoeuvre is considered to be complete at a point when the aircraft is stabilised in a clean configuration with engine-out procedures completed	x			x					

3.8.3* 3D operations to DH/A of 200ft (60 m) or to higher minima if required by the approach procedure	APP	Manually, with one engine simulated inoperative; engine failure has to be simulated during final approach before passing 1 000 ft above aerodrome level until touchdown or through the complete missed approach procedure. or Manually, with one engine simulated inoperative; engine failure has to be simulated during final approach after passing the outer marker (OM) within a distance of not more than 4 NM until touchdown or through the complete missed approach procedure.	PRO - select and comply with the ILS or LPV instrument approach procedure to be performed; - prior to final approach course, maintain declared or assigned altitudes within given limits without descending below applicable minimum altitudes and maintain headings within given limits; - select, tune, identify and confirm the operational status of ground and aircraft navigation equipment to be used for the approach procedure; COM - establish two-way communications with ATC using the proper communications phraseology and techniques, either personally, or, if appropriate, direct co-pilot/safety pilot to do so, as required for the phase of flight or approach segment; - comply in a timely manner with all clearances, instructions, and procedures issued by ATC and advise accordingly if unable to comply; FPA/FPM: - establish the appropriate aircraft configuration and airspeed/V-speed considering turbulence, wind shear or other meteorological and operating conditions; - complete the aircraft check list items appropriate to the phase of flight or approach segment, including engine out approach and landing checklist, as appropriate; - apply necessary adjustment to the published DH and visibility criteria for the aeroplane approach category when required, such as NOTAMs, inoperative aeroplane and ground navigation equipment, inoperative visual aids associated with the landing environment; - on final approach course, allow no more than ½ scale deflection of the localiser and/or glideslope indications; - maintain declared approach airspeeds within given limits; - maintain a stabilised descent to the DH to permit completion of the visual portion of the approach and landing with minimal manoeuvring; and - initiate the missed approach procedure, upon reaching the DH, when the required visual references for the intended runway are not obtained. 3D linear vertical deviations (e.g. RNP APCH (LNAV/VNAV) using BaroVNAV): not more than – 75 ft below the vertical profile at any time, and not more than + 75 ft above the vertical profile at or below 1 000 ft above aerodrome level. 3D (LNAV/VNAV) 'linear' lateral deviations: cross-track error/deviation should normally be limited to ± ½ the RNP value associated with the procedure. Brief deviations from this standard up to a maximum of 1 time the RNP value are allowable.	Intentionally left in blank	Intentionally left in blank

2D operations down to the MDH/A (3.8.4 AP9)	APP	Non-precision approach down to the MDH/A	PRO: - select and comply with the PBN, VOR/ LOC/ LOC BC or NDB instrument approach procedure to be performed; - complete the aircraft check list items appropriate to the phase of flight or approach segment, including engine out approach and landing checklist, as appropriate; - prior to final approach course, maintain declared altitudes in given limits without descending below applicable minimum altitudes, and maintain headings as given; - select, tune, identify, confirm and monitor the operational status of ground and aircraft navigation equipment to be used for the approach procedure; COM: - establish two-way communications with ATC using the proper communications phraseology and techniques, either personally, or, if appropriate, directs co-pilot/safety pilot to do so, as required for the phase of flight or approach segment; comply in a timely manner with all clearances, instructions, and procedures issued by ATC and advise accordingly if unable to comply; FPA/FPM: - apply necessary adjustment to the published minimum descent altitude (MDA) and visibility criteria for the aeroplane approach category when required, such as NOTAMs, inoperative aeroplane and ground navigation equipment, inoperative visual aids associated with the landing environment; - on the intermediate and final segments of the final approach course: a. maintain PBN, VOR/ LOC/ LOC BC tracking within ½ scale deflection of the course deviation indicator or within 5 degrees of the desired track in the case of an NDB approach; b. fly the approach in a stabilised manner without descending below the applicable minimum altitudes depicted on the approach chart (+as required/–0 feet); 2D (LNAV) 'linear' lateral deviations: cross-track error/deviation should normally be limited to ± ½ the RNP value associated with the procedure. Brief deviations from this standard up to a maximum of 1 time the RNP value are allowable. c. descend to and accurately maintain the MDA and track to the missed approach point (MAPt) or to the recommended minimum visibility that would permit completion of the visual portion of the approach with a normal rate of descent and minimal manoeuvring; d. maintain declared approach airspeeds (+10/-5 knots); e. initiate the missed approach procedure, if the required visual references for the intended runway are not obtained at the MAP ; f. execute a normal landing from a straight-in or circling approach as required.	Intentionally left in blank	Intentionally left in blank

Engine-out approach & go-around (4.4* AP9)	APP	Manual go-around with the critical engine simulated inoperative after an instrument approach on reaching DH, MDH or MAPt	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	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 the 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					
Engine-out landing (5.5 AP9)	LDG	With the critical engine inoperative		Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					

GM2 ORO.FC.231(d)(2) Evidence-based training

VERIFICATION OF THE ACCURACY OF THE GRADING SYSTEM — FEEDBACK PROCESS

(a) The verification of the accuracy of the grading system provides valuable data for the training system performance and concordance assurance. Therefore, the verification is necessary from a systemic point of view and the intention is not to measure individual pilot against Appendix 9 criteria.

Concordance agreement between instructors may be high; however, the whole community of instructors may be grading too low or too high (accuracy).

The statistical result of the verification against Appendix 9 criteria can provide the operator with a criterion-referenced system to adjust the accuracy of the grading system. The verification does not require an examiner, and EBT instructors may provide the necessary data.

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 rate of 3 % of the pilots scoring 1 is maintained across all the technical competencies. When the operator performs a verification, the rate of failure would have been only 0,5 %. This may indicate that instructors are rating too low in EBT and therefore some of the pilots scoring 1 should have been graded with a score higher than 1. This may be economically negative for the operator. On the other hand, it could be that the operators has decided to implement higher standards.

Example 2: The operator has an EBT programme with a negligible rate of pilots scoring 1 and a 1 % of pilots scoring 2 in two consecutive recurrent modules. The verification of the technical competencies against Appendix 9 criteria provides a rate of 5 % failure. The EBT manager should further investigate the reason behind this mismatch between EBT and Appendix 9 in the technical competencies. There may be factors influencing this mismatch (e.g. statistical issues, the events in the EBT modules are too benign compared to the Appendix 9), 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 grading too high in the technical competencies (they are grading with 2 when they should have graded 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 licence proficiency check is carried out every year. The authority may not allow full EBT unless the accuracy of the grading system is demonstrated.

Further guidance can be found in the EASA EBT manual.

AMC1 ORO.FC.231(d)(2) and ORO.FC.231(d)(2)

This Appendix to the Opinion 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-referenced system is set by the operator.

A criterion-referenced system is set up by the regulator in the LPC. 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 point (a)(6) of AMC1 ORO.FC.A.245 below).

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 Appendix to the Opinion. 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 a criterion-referenced system

For many decades, the industry has used 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) as a performance measurement 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. 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 the 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. In the context of the traditional training and checking, pilots are checked; EBT instead assesses pilots. 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, using such a system 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 yields 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 Opinion provides a set of rules to revalidate pilot licence under the EBT programme.

A norm-referenced system is subject to a defined population; it is thus 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[6] 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 GM2 ORO.FC.231(d)(2)).

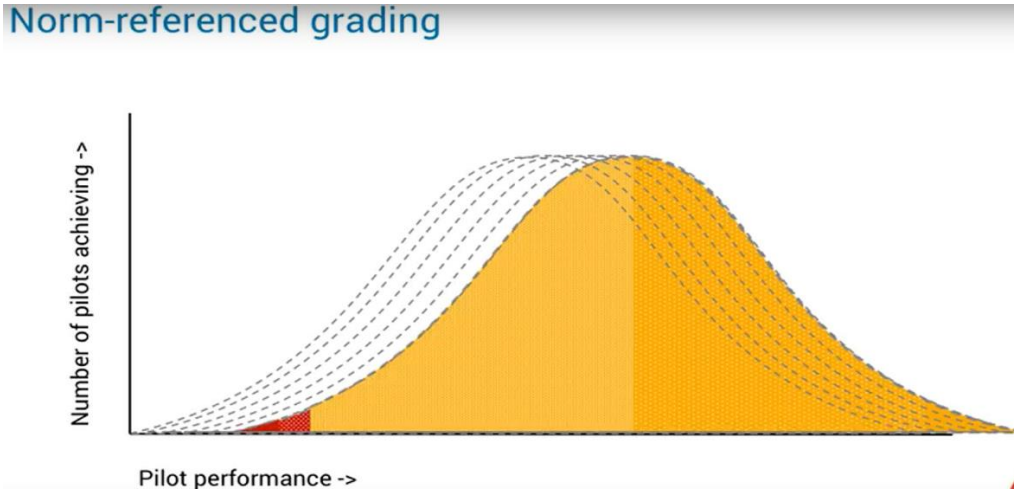
In summary:

— The EBT grading system 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).

— The situation above occurs 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 the grading results of a particular performance are shifting to the right or to the left of the graph.

Conclusion: Measuring competencies (especially the non-technical ones) 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.



[6] EASA performed a focused consultation in the 4th quarter of 2017 and the 1st quarter of 2018 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 persons for crew training, inspectors and consultants.

SUMMARY

The current system provides for the LPC of the Aircrew Regulation a criterion-referenced 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 Appendix to the Opinion (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.

GM1 ORO.FC.231(d)(2)

The ‘desired outcome’ in some of the elements of the table in GM1 ORO.FC.231(d)(2) ‘verification of the accuracy of the grading system’ are transpose from the Appendix 9 guidance from Austro control https://www.austrocontrol.at/jart/prj3/ac/data/dokumente/HB_LSA_PEL_002_2018-03-29_1203646.pdf

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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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

VOLUME AND FSTD QUALIFICATION LEVEL

(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 ORO.GEN.120, the operator may reduce the number of FSTD hours provided an equivalent level of safety is achieved. The programme should not be less than 36 FSTD hours.

(c) Each EBT module should be conducted in an FSTD with a qualification level adequate to complete proficiency checks; therefore, it must be conducted 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 period 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 period. 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.'

AMC1 ORO.FC.231(e) point (c)

EASA is currently updating the requirements for FSTD through RMT.0196 'Update of flight simulation training device 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 Part-FCL of the Aircrew Regulation requires the FSTDs used to revalidate a type rating in the context of CAT to meet the standards required for 'training to proficiency'. There was a consensus in the RMG to provide a similar requirement for the EBT programmes. The actual drafting of the text for this provision was agreed with EASA FSTD experts and members of RMG 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) Enhancement of the availability of cumulonimbus and storms with a strong correlation to motion cues

(4) Availability of multiple storms and cumulonimbus to create a more realistic and challenging weather profile

(5) Greater variation in precipitation effects

(6) Better-modelled ground effects; especially, variations in friction caused by water, snow and ice

(7) ATC

(8) To maximise realism and the benefits of EBT, the air traffic control (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

Currently, EASA is working on a process to allow aviation blended learning environment (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.

(f) EQUIVALENCY OF MALFUNCTIONS

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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 for Airbus, or AFM for other manufacturers, does not normally provide 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 a less qualified but suitable alternative environment (classroom, flight procedure training device, advance computer-based training, aviation blended learning environment (ABLE), etc.). Further guidance can be found in the EASA EBT manual.

(d) The operator should establish procedures to determine what malfunctions should be included in the FSTD. This may include a different malfunction difficulty between the evaluation phase and the SBT.

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 ones 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 putting a significant demand on a proficient crew, 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'

The intention is to require the pilot to be trained in each of the malfunctions that put a significant demand on a proficient crew. The RMG avoided on purpose examples such as multiple-choice test or online PowerPoint presentations. Instead, it proposed advance computer-based training and ABLE to foster new training means.

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

(a) 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.

(b) Notwithstanding point (a), for aircraft types with a limited number of malfunctions in the characteristic of degraded control or loss of instrumentation, the operator may use an alternative means of compliance in accordance with ORO.GEN.120.

AMC1 ORO.FC.231(f)(3)

The RMG considered this provision an important safety objective; for this reason, 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 procedure (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) a significant increase in 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 malfunction characteristics (see more in GM2.ORO.FC.231(f)).

GM1 ORO.FC.231(f)

Once the malfunction is determined as placing a significant demand on a proficient crew, this means that the malfunction has one or more of the malfunction characteristics determined in GM2 ORO.FC.231(f).

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 that require immediate and urgent crew intervention or decision (e.g. malfunctions with memory items)

(b) ‘Complexity’: System malfunctions that require recovery procedures with multiple options to analyse and/or multiple decision paths to apply

(c) ‘Degradation of aircraft control’: System malfunctions that result 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. It includes primary instrumentation to monitor and manage primary aircraft systems (e.g. FLAPS indication, loss of fuel indications, etc.).

(e) 'Management of consequences': System malfunctions that affect 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 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, FCOM for Airbus, 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 place a significant demand of a proficient 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.

(j) The operator may use the rates of the characteristics to determine the difficulty of the malfunction. As SBT is a developing phase, the operator may select a higher difficulty of the malfunctions selected in this phase. Further guidance can be found in the EASA EBT manual.

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 a de-identified 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 be adapted 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.

— Minimisation of errors: a large community of SMEs (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 has been 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 aeroplane to be analysed.

Abnormal and emergency procedures 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 does not have the same consequences below FL100 or at the maximum aircraft Flight Level.

Standardisation guidance

— The subject matter experts that develop 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 with the characteristics assumptions. The operator may include successful resets or restart in addition to the malfunctions considered for the characteristics. When a reset puts a significant demand on 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 as in 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 for 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 period 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.

IMMDEDIACY

'Immediacy': System malfunctions that require 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 a 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 that require 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 that result 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 protections laws, 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 (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 CONSEQUENCES

'Management of consequences': System malfunctions that affect 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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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

APPROACHES THAT PLACE AN 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) unusual design;

(ii) low frequency of exposure; and

(iii) degraded approach guidance;

(3) select at least one approach of each type and method and include them in the EBT programme at the frequency given in the table of assessment and training topics; and

(4) ensure the approaches selected in (3) cover all the characteristics at the frequency given in the table of assessment and training topics.

Note: The approaches listed within Section 2 of the table of assessment and training topics should be selected in this process.

(b) Any approach that is required to be flown in the PF role-specifically should be classified as 'skills retention' and may be trained in the manoeuvres training phase (MT).

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 that require specific approval as defined in the AMC to Part-SPA (e.g. SPA.LVO) 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 or steep approach, etc.

(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, SA CATI.

(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 for each generation provides the type of approach, flight method and frequency for the crew.

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 operations 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 three 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 only a 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 this 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 pilot flying (PF) for each approach; this is because it is part of the line-orientated scenarios. Any approach that is required to be flown specifically in the PF role should be classified as 'skills retention'; therefore, it should be trained in the MT.

The above approaches should be flown simulating normal operations. Enhance vision system (EVS) or Enhance flight vision system (EFVS) or Head-up display (HUD) should be utilised if required in normal operations.

The allocation of the types of approaches into either the EVAL and SBT or the MT is 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), multiple, unrealistic failures should occur 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 is precisely what this is for: to enable the pilot to retain the skill to fly low-probability but higher-risk manoeuvres. The principle behind this type of training is skills retention.

The B frequency has been 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 place a significant demand on a proficient crew. Therefore, mandating at least two 3D approaches of different flight methods with additional demand per year has been 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. It has taken into account which of them are placing a significant demand on a proficient crew and the characteristics of each of them. 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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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. Therefore, the line evaluation of competence should be performed in the aircraft. 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 system approved for their operator's 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 maintain a list and inform the competent authority about the line evaluators suitably qualified to undertake line evaluations of competence.

(e) The person that conducts 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) The validity period should 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 should be counted from the original expiry date.

AMC1 ORO.FC.231(h)

The AMC has been developed following the principles contained in 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 (d)

This provision is transposed from the current AMC1 ORO.FC.230 point (b)(3)(v) 'Line checks should be conducted by a commander nominated by the operator. The operator should inform the competent authority about the persons nominated. (...)'

AMC1 ORO.FC.231(h) point (f) wording 'validity period'

The wording for 'validity period' is similar to that used in ORO.FC.245(d).

The revalidation window (normally 3 months in the LPC) 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).

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

LINE EVALUATION OF COMPETENCE — LINE EVALUATOR

(a) The line evaluator should have a valid line evaluation of competence.

(b) The line evaluator should receive an acceptable training based on the EBT instructor training. The EBT assessment of competence is not required.

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

LINE EVALUATION OF COMPETENCE — EXTENSION OF THE VALIDITY

In order to extend the validity of the line evaluation of competence to:

(a) 2 years, in every cycle, one evaluation phase for each pilot should be conducted by an EBT instructor (EBT instructors) who has (have) a valid line evaluation of competence in the same operator;

(b) 3 years, in addition to point (a) above, the operator should have a feedback process for the monitoring of line operations 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) understands pilots' shortcuts and workarounds; and

(7) assesses safety margins.

AMC1 ORO.FC.231(h)(3)

The 2-3-year extension of the line evaluation of competence 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 being approved for an extension of the validity of the line check. This requirement is mirrored here, as the operator will need more than 3 years of mixed EBT implementation to extend the validity of the line evaluation of competence.

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 has been transposed from FAA AC120-90 dated 27th April 2006 paragraph 5.

AMC1 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, an EBT instructor with current line operations experience is required once a year. That means that the operator should have sufficient EBT instructors to provide the EBT modules who have themselves enrolled in the EBT programme and a line evaluation of competence as specified in the operations manual. The extension of the line evaluation of competence is based on the substitution of the evaluation phase in the EBT module.

Operations in the context refers to normal, abnormal and emergency operations of aircraft.

Therefore, the intention of the provision is to have an EBT instructor who is enrolled in the operator's EBT programme and has a valid line evaluation of competence; however, as the line evaluation of competence requires to the instructor to be enrolled, the final text does not contain the word 'enrolled'.

AMC3 ORO.FC.231(h)(3) point (b)

For the purpose of a feedback process for the monitoring of line operations, the group studied the ATQP line-oriented quality evaluation, ICAO Doc 9803 Line Operations Safety Audit (LOSA) and the FAA LOSA.

'GM1 ORO.FC.A.245 Alternative training and qualification programme
TERMINOLOGY

(a) (…)

(b) 'Line-oriented quality evaluation (LOQE)' is one of the tools used to help evaluate the overall performance of an operation. LOQEs consist of line flights that are observed by appropriately qualified operator personnel to provide feedback to validate the ATQP. The LOQE should be designed to look at those elements of the operation that are unable to be monitored by FDM or Advanced FDM programmes.'

According to the RMG, the most important functions of such a feedback process are the ones mentioned under points (b)(1) to (7).

Point (b)(5) 'identifies design problems in the human-machine interface' was introduced following the information provided in the ICAO Doc 9803 where equipment design may be a cause of normalisation of deviance and therefore should be monitored.

ICAO Doc 9803 Line Operations Safety Audit (LOSA)

'1.2.6 Second, and most important, incident reporting is vulnerable to what has been called "normalization of deviance". Over time, operational personnel develop informal and spontaneous group practices and shortcuts to circumvent deficiencies in equipment design, clumsy procedures or policies that are incompatible with the realities of daily operations, all of which complicate operational tasks.(…)'

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. Other EBT assessments, legacy 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.

The phrase '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

LINE EVALUATOR

(a) AMC1.ORO.FC.146(c) 'EBT instructor training' provides some learning objectives which may be used to qualify the commander nominated by the operator to perform line evaluation of competence. The training may be a minimum of 7 hours, where one hour may be done outside the classroom. The use of advance training environments such as advance computer-based training or ABLE may reduce further the need of classroom training. The assessment of competence may not be required. Further guidance can be found in the EASA EBT manual.

(b) The line evaluator training may be included in the EBT instructor standardisation and concordance programme. This option is however limited due to the limited number of line evaluations of competence that are required (every 2 or 3 years), the difficulties in observing the whole range of performance of competencies and the lack of control of the environment during a line evaluation of competencies. Therefore, the operator may need to use EBT instructors to maintain an acceptable level of standardisation.

(i) GROUND TRAINING

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

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

PERFORMANCE-BASED CONTINUOUS TECHNICAL GROUND TRAINING

(a) Technical ground training programme

(1) The objective of the technical ground training programme is to ensure that pilots have adequate:

(i) knowledge of:

(A) the aircraft systems; and

(B) the operational procedures and requirements; and

(ii) awareness of:

(A) the most significant accidents or incidents that could affect their operations following the 'threat and error management model' or an alternative risk model agreed with the authority; and

(B) the occurrences in the airline or occurrences from other airlines that may be relevant for their operations, accident/incident and occurrence review.

(2) The technical ground training should:

(i) be conducted as part of a 3-year programme;

(ii) allow a customisation of syllabi. The operator should describe in the operations manual the procedure to determine the customisation of syllabi. This customisation should be based on evidence both internal and external to the operator.

(iii) as a minimum, allow the pilot to receive technical ground training every 12 months. The validity period should be counted from the end of the month. When this training is conducted within the last 3 months of the validity period, the new validity period should be counted from the original expiry date.

(3) The technical ground training syllabi should be delivered using different methods and tools.

(i) The selection of the method and tool results from a combination of the learning objectives and the target group receiving the training (WHAT needs to be trained and WHO needs to be trained).

(ii) The selection of the appropriate method and tool must be driven by the desired outcome in terms of adequate knowledge.

(iii) The delivery of the technical ground training syllabi should include the methods or tools to verify if the pilot has acquired the objective of the technical ground training programme. This may be achieved by means a questionnaire, assessment of application of the competency 'knowledge' (KNO) or other suitable methods.

(4) The measurement and evaluation of the training system performance through the feedback process should include the performance of the technical ground training.

(b) Emergency and safety equipment training

(1) Training on the location and use of all emergency and safety equipment 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) The emergency and safety equipment training should include a pilot's assessment of the training received; as a minimum, by means of a questionnaire, or computer-based exercises, 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 proficiency in the use of emergency and safety equipment should 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 proficiency to be achieved in the use of emergency and safety equipment. The implementation plan should comprise the following:

(i) A safety case which should:

(A) demonstrate that the required or equivalent level of proficiency in the use of emergency and safety equipment 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) The measurement and evaluation of the training system performance through the feedback process should include the performance of the emergency and safety equipment training. The feedback should be used as a tool to validate that the emergency and safety equipment training is correctly implemented; this enables substantiation of the emergency and safety equipment training and ensures that objectives have been met.

(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. However, point (a) has been substantially modified.

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) wording '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 (a)

The idea behind the performance-based continuous ground training is to extend the principles of evidence-based training into the area of ground training. Ground training in this context has two objectives:

(1) Ensure adequate knowledge regarding aircraft systems and operational procedures and requirements.

(2) Ensure adequate awareness regarding accidents and incidents following a risk model (e.g. TEM).

Knowledge is essential regarding systems, procedures and requirements in order to understand, interpret and properly apply the aircraft systems operator's procedures.

However, theoretical knowledge of incidents and accidents does not prevent reoccurrence in the future. It is foremost the analysis of the incidents and accidents using an agreed risk model, in order to identify the underlying root causes, which the pilot needs to be aware of, in order to effectively apply countermeasures in the future.

A ground training element should be conducted every 12 calendar months, which should be embedded in a 3-year programme, hereby adapting the EBT period.

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

The provision is transposed from AMC1 ORO.FC.230 point (a)(1)(i)(B), according to which the ground training should include:

'(B) operational procedures and requirements, including ground de-icing/anti-icing and pilot incapacitation;'

However, the reference to '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 (b)(3)(vi)

The provision is transposed from AMC1 ORO.FC.230 point (a)(2)(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 outside 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.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 burden.

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 (a)(1)(i) of AMC1 ORO.FC.A.245 is not included;

Point (a)(1)(ii) of AMC1 ORO.FC.A.245 is transposed with no change;

Point (a)(1)(iii) of AMC1 ORO.FC.A.245 is transposed with slight modifications;

Point (a)(1)(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

(I) make efficient use of training resources, specifically to match the use of training media to the training needs.'

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

PERFORMANCE-BASED CONTINUOUS GROUND TRAINING — INTERNAL AND EXTERNAL EVIDENCE

(a) Operator evidence (inner loop)

(1) Pilot data (individual or group);

(2) Population-based data according to the training metrics determined in the training system performance;

(3) Identified or recognised through the safety management process covered in ORO.GEN.200.

(b) External evidence from the authority and manufacturers (external loop)

(1) Revision of existing rules and regulations, updated versions of the EBT data report, state safety plan;

(2) Training needs derived from updated OSD (if appropriate for ground training), etc.

(c) The evidence drives the selection of the methods and tools.

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

PERFORMANCE-BASED CONTINUOUS GROUND TRAINING — METHODS AND TOOLS

This is a non-exhaustive list of methods and tools to deliver ground training: classroom, presentations, web-based training, self-learning instructions, advance CBT such as virtual reality, chatbots, interactive scenario trainers.

'SPT.012 — safety promotion task 012 — safety material for EBT — CUSTOMISATION OF SYLLABI

The syllabi can be customised at three different steps:

1. The first step would be one syllabus for the whole pilot's population (customisation only at type rating level).
2. The second step would be syllabi for different populations of pilots (for example, all first officers, all B747 pilots, all pilots flying an Airbus model, etc.).
3. The third step would be individual syllabi tailored to the needs of individual pilots (pilot customisation).

The procedure to describe the customisation of syllabi must be described in the OM. Customisation is based on evidence that can be gathered on three different levels, two from the inner loop, one from the outer loop.

(i) Inner loop

- Individual evidence based on grading reports or questionnaires, analysed for either an individual pilot or a group of pilots (for example, all first officers, all B747 pilots, all pilots flying an Airbus model, etc.)
- Operator-specific evidence gathered from the safety management process in accordance with ORO.GEN.200

(ii) Outer loop:

- Evidence gathered from external sources like authorities (e.g. State Safety Plan, etc.), OEMs (e.g. OEBs, OSD, safety documentation such as 'getting to grips', etc.), etc.

SPT.012 — safety promotion task 012 — safety material for EBT — SELECTION OF THE METHOD AND TOOL — LEARNING OBJECTIVES AND TARGET GROUP RECEIVING THE TRAINING

The selection of appropriate methods and tools for proper ground training delivery must be driven by answering two questions. WHO needs to be trained? WHAT needs to be trained (learning objectives)? Training topics that need further explanation or are optimally learned through discussions within a group, should be delivered by providing classroom training or web-based interactive sessions. When selecting the method and tool, operators should be driven by the desire to achieve the optimum outcome, which is maximum possible knowledge increase. An example of a matrix for each question is provided below:

LEARNING OBJECTIVES – What needs to be trained?

1. [Blooms taxonomy] Knowledge – comprehension – application – analysis – synthesis – evaluation
2. [pragmatic] Knowledge/first overview – deeper understanding – competencies/able to perform
3. [pragmatic] Awareness/information – understanding/ knowledge – change of behaviour/performance.

TARGET GROUP – Who needs to be trained?

1. Learning preferences
2. Learning routines
3. Learning & media competencies
4. Level of expertise/experience
5. Job role and responsibility
6. Demographic/cultural characteristics
7. Access to media/resources

ORO.FC.232 EBT programme assessment and training topics

SEE IMPLEMENTING RULES IN THE OPINION ANNEX Ib

AMC1 ORO.FC.232 EBT programme assessment and training topics

ASSESSMENT AND TRAINING TOPICS

Each table of assessment and training topics is specific to the aeroplane generation specified in the title. The component elements in the column headings of the matrix are as follows:

(a) 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.

(b) Frequency. The priority of the topic to be considered in an EBT programme, according to the evidence derived from a large-scale analysis of operational data is linked to a recommended frequency. There are three levels of frequency:

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

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

(3) C — assessment and training topic to be included with defined scenario elements at least once in the 3-year period of the EBT programme.

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

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

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

(f) Example scenario elements (guidance material). The example scenario elements address the training topic and detail the threat and/or error that the crew are exposed to.

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

AMC1 ORO.FC.232 point (b) '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 Opinion 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. This principle is based on the yearly requirement for training topics with frequency B.

GM1 ORO.FC.232 EBT programme assessment and training topics

TABLE OF ASSESSMENT AND TRAINING TOPICS

(a) The assessment and training topics usually have several example scenario elements. At least one example scenario element is selected (e.g. Gen 4 topic 'Go-around' in MT has three example scenario elements — the operator may choose one at each module (frequency A)).

(b) Flight phase for activation:

Abbreviation	*Flight phase*	*Description*
ALL	All	Any or all phases of flight
GND	Flight planning, preflight, engine start & taxi-out	Ground phases up to when the crew increases thrust for taking-off
	Taxi-in, engine shut-down, post-flight & flight closing	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	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	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	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	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	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 includes go-around where the crew aborts the descent to the planned landing runway

Abbreviation	*Flight phase*	*Description*
		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	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.

GM1 ORO.FC.232 EBT

The table was transposed from Table II-1-1 of ICAO Doc 9995. However, the table in the GM does not contain the column that matches each flight phase with the corresponding phase in the training criticality survey. For the sake of transparency, the information is provided below:

Threats/Errors	*All flight phases*	*Potential threats/errors in any or all phases of flight*
Pre-flight and taxi	Phase 1	Pre-flight and taxi: flight preparation to completion of line-up
Take-off	Phase 2	From the application of take-off thrust until the completion of flap and slat retraction
Climb	Phase 3	From the completion of flap and slat retraction until top of climb
Cruise	Phase 4	From top of climb until top of descent
Descent	Phase 5	From top of descent until the earlier of first slat/flap extension or crossing the initial approach fix
Approach	Phase 6	From the earlier of first slat/flap extension or crossing the initial approach fix until 15 m (50 ft) AAL, including go-around
Landing	Phase 7	From 15 m (50 ft) AAL until reaching taxi speed
Taxi and post-flight	Phase 8	From reaching taxi speed until engine shutdown

AMC2 ORO.FC.232 EBT programme assessment and training topics

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

Assessment and training topic		*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 1 — Skill retention															
Manoeuvres training phase	Rejected take-off	B	Engine failure after the application of take-off thrust and before reaching V1 (may be in LVO or CAT I or above)	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.	TO	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
	Failure of the critical engine between V1 and V2	B	Failure of the critical engine from V1 and before reaching V2 in the lowest CAT I visibility conditions or in LVO conditions.		TO	The manoeuvre is complete at a point when the aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement. Only one failure of the critical engine between V1 and V2 a year may be done in LVO conditions.	x			x					
	Failure of one engine on take-off	B	Failure of one engine from V1 and before reaching V2 in lowest CAT I visibility conditions or in LVO conditions.		TO	The manoeuvre is complete at a point when the aircraft is stabilised in a clean configuration with engine-out procedures completed. Only one failure of the critical engine between V1 and V2 a year may be done in LVO conditions.	x			x					
			Failure of one engine above V2 (any segment of the TO) in lowest CAT I visibility conditions or in LVO conditions.			The manoeuvre is complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x		x	x					
	Emergency descent	C	Initiation of emergency descent from normal cruise altitude		CRZ	The manoeuvre is complete once the aircraft is stabilised in emergency descent configuration (and profile).	x		x	x					
	Engine-out approach & landing	B	With the critical engine failed, normal landing		LDG	Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					
	Engine-out approach & go-around	B	With the 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		APP	This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is complete at a point when the 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	Go-around, all engines operative		APP	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					
			Go-around, all engines operative			Initiation of a go-around from DA followed by visual circuit and landing	x		x	x					
			Go-around, all engines operative			During flare/rejected landing	x		x	x					

Assessment and training topic		*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
	Pilot qualification to operate in either pilot's seat	B	Only for commanders whose duties require them to operate in either pilot's seat		APP	Complete the manoeuvres mandated in ORO.FC.235.	Intentionally left in blank.								

Assessment and training topic		*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 2 — Equivalency of approaches relevant to operations															
MT	Approach type A or B	B	Approach type A or B flight method 3D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type A	B	Approach type A flight method 2D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	Approach requiring specific approval	See equivalency of approaches relevant to operations — specific approval	APP	Approaches flown from FAF to landing or go around	x		x	x					
EVAL or SBT	Approach type A	B	Approach type A flight method 3D or 2D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type B	B	Approach type B flight method 3D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	Approach requiring specific approval	See equivalency of approaches relevant to operations — specific approval	APP	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 3 — Training topics with frequency (A) in alphabetical order															
Evaluation or 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 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 the 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			Turbulence that increases to severe turbulence		x			x		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 approach (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			In approach, unexpected braking action 'good to medium' reported by the preceding aircraft		x				x	x	x	
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x				x			
EVAL or SBT	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. The means of mitigating errors are included in this topic. The errors are described as mishandled auto flight systems, inappropriate mode selection, flight management	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.	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			Engine-out special terrain procedures	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP	system(s) and inappropriate autopilot usage.	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.										
			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			Automation fail to capture the approach altitude in descent (e.g. last altitude before the FAP). Ideally, the failure occurs when the workload is high (e.g. configuration of the aircraft for final approach).					x	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 the 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
Evaluation or scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates the general CRM principles and objectives. It includes: communication; leadership and teamwork; problem-solving and decision-making; situation awareness and management of information; and 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>Exposure to event or sequence of events to allow the pilot to build awareness of human factors in aviation and the human limitations. This includes the development of the following competencies:</u> <u>Communication:</u> Demonstrate: — effective use of language; — responsiveness to feedback; and — capability to state the plans and resolve ambiguities. <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>	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
			GND			Apron fuel spilling					x	x		x	
			CRZ			Important water leak in an aircraft galley		x			x	x		x	
			ALL			A relevant number of cabin crew are wounded or incapacitated. Additionally, the cabin crew wounded or incapacitated are the most competent (e.g. senior cabin crew member).					x	x		x	
			ALL			Unruly passenger(s)					x			x	
			GND			Passenger oxygen: passenger service unit open and mask falling down					x	x		x	
			ALL			Passenger with medical problems — medical emergency					x			x	
			CRZ			Credible threat reported to the crew. Stowaway or fugitive on board.		x			x		x	x	
			GND			No METAR or TAFOR is available for destination due to industrial action at the destination airport	x	x			x	x			
			CRZ			Credible bomb threat reported to crew		x			x		x	x	
EVAL or SBT			APP			ACAS warning immediately following a go-around, with a descent manoeuvre required		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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
					Prioritise, delegate and receive assistance to maximise focus on the task. Continuously monitor the flight progress.										
EVAL or SBT	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOPs). This is not intended to list example scenario elements, 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 are 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								
EVAL or SBT	Go-around management	A	APP	Any threat or error that can result in circumstances that require a decision to perform a 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 skills 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									
Evaluation	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	Flight with unreliable airspeed, which may or may not be recoverable	x			x			x		X
			CLB CRZ			Alternate flight control modes according to malfunction characteristics	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
			DES APP		Detects deviations through instrument scanning										
			CLB CRZ DES APP		Maintains spare mental capacity during manual aircraft control Maintains the aircraft within the normal flight envelope	ACAS RA requires the pilot to descend or ATC immediate descent	x	x		x					
			DES		Applies knowledge of the relationship between aircraft attitude, speed and thrust	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			Interception of the glide slope from above (correlation with unstable approach training)			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 manually flown at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights	X			X			X	X	
			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		
			APP LDG			Approach planned with autoland, followed by a failure below 1 000 ft requiring a go-around and an immediate landing due to fuel shortage.	x		x		x		x		
EVAL or SBT	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 monitoring. Modules in the FSTD should be treated like those in an aircraft so that trainees have the opportunity to develop the competency with the practice of the right techniques and attitudes related to these topics through pilot performance, and that instructors	Recognise mismanaged aircraft state. Observe the pilot's behaviour: how the pilot is mitigating errors, performing cross-checking, monitoring performance and dealing with a mismanaged aircraft state, in order to ensure that observed deviations, errors and mistakes are taken as learning opportunities throughout the programme.	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:	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
				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.	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.	Demonstration exercise — recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM								
	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 approach (not reported)	x	x				x	x		
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
Section 3 — Training topics with frequency (B) per phase and in alphabetical order, except for the upset prevention due to the difference in the EBT phases															
EVAL, MT or SBT	Upset prevention training	B	N/A	Compliance with AMC1 or AMC2 to 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. The elements are numbered with letters from A to I in Table 1 of AMC1 ORO.FC.220&230. Each element is made up of several numbered components. Through the principles of EBT, covering one component should	Early recognition and prevention of upset conditions. When the differences between LHS and RHS are not significant in the handling of the aircraft, UPRT may be conducted in either seat.	See Table 1 of AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								
			CRZ			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
			TO APP			Severe wind shear or wake turbulence during take-off or approach			x	x		x	x		
			CRZ			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			At the maximum cruise flight level for current aircraft weight, turbulence to trigger over speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
			CRZ	satisfy the requirement to cover the element.		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			High-altitude TCAS RA. Where the RA is required to be flown in manual flight	x			x			x	x	
EVAL or SBT	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 approach(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			
Evaluation or 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. For instance. 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 The operator should vary malfunctions for each characteristic over the EBT cycle.	Recognise system malfunction. Take appropriate action including correct stop/go decision. Apply the appropriate procedure correctly. Maintain aircraft control. Manage consequences. Apply crew operating procedures where necessary. Respond appropriately to additional system abnormalities associated with MEL dispatch.	For full details, see the malfunction equivalency methodology. Unless specified otherwise in the operational suitability data, at least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below seven for each year. For each crew member, the characteristics of degraded control and loss of instrumentation should be in the role of pilot flying and the others may be in the role of pilot flying or pilot monitoring. (i) System malfunctions that require 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 that require complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures, major electrical system failure. (iii) System malfunctions that result 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 that result 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 a 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 that require 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			Malfunction on take-off high speed below V1	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
			TO			Malfunction on take-off high speed above V1	x					x			
			GND			During taxi to the runway, a spurious brake temperature announcement. The crew had the correct brake temperature moments before the failure.					X	X	X		
			TO			Tyre failure during take-off					x	x		x	
			TO			Malfunction on initial climb	x					x			
			APP			Malfunction on approach	x					x		x	
			APP			Malfunction on go-around	x					x		x	
			LDG			Malfunction during landing	x	x		x		x	x		
Evaluation or 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 is linked 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 manage 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 procedures 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 a 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 inappropriate 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 procedures 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			Take-off on runway with reduced cleared width due to snow	x			x	x		x		
			TO			Stop/go decision in hazardous conditions					x	x		x	
Evaluatio	Surprise	B	ALL	The data analysed during the development of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a	Exposure to an unexpected event or sequence of events at the defined frequency in order to build resilience.	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
				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.											
	Terrain	B	ALL	Alert, warning, or conflict	Anticipate terrain threats. Prepare for terrain threats. Recognise unsafe terrain clearance. Take appropriate action. Apply the appropriate procedures 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 (TAWS) (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 APP			ATC provides a wrong QNH		x					x		
			DES			'Virtual mountain' refers to 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, stress	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								
Section 3 — Training topics frequency (C) per phase and in alphabetical order, except for the upset prevention due to the difference in the EBT phases															
Manoeuvres training phase	Upset recovery	C	N/A	Compliance with AMC1 or AMC2 to ORO.FC.220&230 Include the recovery exercises in Table 2 of AMC1 ORO.FC.220&230 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years. Through the principles of EBT, covering one component should	Recognise upset condition. Make timely and appropriate intervention. Take appropriate action. Assure timely and appropriate intervention. (AMC1 ORO.FC.220&230 Table 2 component 1) Assure aircraft control.	Table 2 of AMC1 ORO.FC.220&230: Exercises for upset recovery training	Intentionally blank								
						A. **Recovery from developed upsets**									
			CLB DES			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.	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
			CRZ	satisfy the requirement to cover the whole element of recovery from developed upsets. The same principles applies to the exercises of components 2, 3 and 4 where one exercise may satisfy the requirement to cover the whole component. 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. If done in ISI: The instructor should position the aircraft within but close to the edge of the validated training envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the validated training envelope.	Maintain or restore a safe flight path. Assess consequential issues. Manage outcomes. Consolidated summary of aeroplane recovery techniques. (AMC1 ORO.FC.220&230 Table 2 component 5) Note: The operator should assess if the exercises should be practice for the either seat qualification.	3. Recovery from nose high at various bank angles	x			x			x	x	
			CRZ			4. Recovery from nose low at various bank angles	x			x			x	x	
			CRZ												
			APP			Demonstration at a normal cruising altitude. Set conditions and disable aircraft systems as necessary to enable trainee to perform stall recovery according to OEM instructions	x			x			x		
			CLB DES			Demonstration at an intermediate altitude during early stages of the approach. Set conditions and disable aircraft systems as necessary to enable trainee to perform stall recovery according to OEM instructions	x			x			x		
						Recovery from a wake turbulence position with high-bank angle	x		x	x			x		
EVAL or 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							
			APP			Destination temporally closed					x	x	x	x	
			CRZ			Rescue and firefighting services (RFFS) level reduction at destination		x			x		x		
			APP			Runway change before the interception of the localiser or similar navigation aid in azimuth			x		x		x	x	
			GND/ TO			Stray dogs at the opposite threshold runway		x			x		x		
			ALL			Poor quality transmissions		x							
EVAL or SBT	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that affects performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only to practise psychomotor skills and reinforce procedures to manage engine failures.	Recognise engine failure. Take appropriate action. Apply appropriate procedure correctly. Maintain aircraft control. Manage consequences.	Engine failure or engine malfunction on take-off low speed	x			x		x		x	
			TO			Engine failure or engine malfunction on take-off high speed below V1	x			x		x		x	
			TO			Engine failure or engine malfunction on take-off above V1	x					x	x	x	
			TO			Engine failure or engine malfunction on initial climb	x					x	x		
			APP			Engine malfunction	x					x		x	
			CRZ			Engine failure in cruise (with autopilot)	x		x				x		
			LDG			Engine failure or engine malfunction 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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix							*Competency map*								
EVAL or SBT	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			Fire or smoke on Take-off high speed below V1	x			x	x	x			
			TO			Fire or smoke on Take-off high speed above V1	x				x	x			
			TO			Fire or smoke on 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			
			CLB CRZ DES			Lithium battery fire in the cockpit or cabin compartment	x	x			x	x		x	
			APP			Flight deck or cabin fire		x			x	x			X
			GND			Any of the example scenarios elements above ending in an evacuation		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
EVAL or SBT	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	
			GND			Fuel ground staff on industrial action. Only limited amount of fuel available, which is below the calculated fuel for the flight.					x	x	x	x	
			GND			Advice crew that there is a change of the load sheet figures during taxi to the runway. The crew may have limited time due to a calculated take-off time (CTOT) — ATC slot	x							x	
			GND			Braking action reported 'medium'. The information is transmitted just before take-off. The flight is subject to a calculated take-off time (CTOT) — ATC slot.					x		x	x	
Evaluation or scenario-based training	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 on ground	x		x			x	x		
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance in flight		x			x	x	x		
			GND			Standard initial departure change during taxi. The flight may be subject to a CTOT — ATC slot.					x		x	x	
			APP			Loss of runway lighting below decision height		x				x	x		
			CRZ			No fly zone: when the crew changes control frequency, the new ATCO informs the crew that they are flying over an unannounced 'no fly zone' and not included in the NOTAMs. To trigger such an event, the context can as an example be as follows: an unexpected military conflict in the territory the aircraft is flying over or the crew is forced to re-route in flight and the new route flies over a city that has an important event such the Olympic					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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 4 Jet — Recurrent assessment and training matrix						*Competency map*								
					games, a G20/G7 submit, or the route is flying near a space rocket launch close to the time of the launch, like Guiana Space Centre, cape Cañaveral, etc.).										
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 that requires 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 ORO.FC.232 EBT programme assessment and training topics

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

Assessment and training topic		*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 1 — Skill retention															
Manoeuvres training phase	Rejected take-off	B	Engine failure after the application of take-off thrust and before reaching V1 (may be in LVO or CAT I or above)	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.	TO	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
	Failure of the critical engine between V1 and V2	A	Failure of the critical engine from V1 and before reaching V2 in the lowest CAT I visibility conditions or in LVO conditions.		TO	The manoeuvre is complete at a point when the aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement. Only one failure of the critical engine between V1 and V2 a year may be done in LVO conditions.	x			x					
	Failure of one engine on take-off	B	Failure of one engine from V1 and before reaching V2 in lowest CAT I visibility conditions or in LVO conditions.		TO	The manoeuvre is complete at a point when the aircraft is stabilised in a clean configuration with engine-out procedures completed. Only one failure of the critical engine between V1 and V2 a year may be done in LVO conditions.	x			x					
			Failure of one engine above V2 (any segment of the TO) in lowest CAT I visibility conditions or in LVO conditions.			The manoeuvre is complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x		x	x					
	Emergency descent	C	Initiation of emergency descent from normal cruise altitude		CRZ	The manoeuvre is complete once the aircraft is stabilised in emergency descent configuration (and profile).	x		x	x					
	Engine-out approach & landing	B	With the critical engine failed, normal landing		LDG	Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					
	Engine-out approach & go-around	B	With the 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		APP	This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is complete at a point when the 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	Go-around, all engines operative		APP	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					
			Go-around, all engines operative			Initiation of a go-around from DA followed by visual circuit and landing	x		x	x					
			Go-around, all engines operative			During flare/rejected landing	x		x	x					
	Pilot qualification to operate in either pilot's seat	B	Only for commanders whose duties require them to operate in either pilot's seat		APP	Complete the manoeuvres mandated in ORO.FC.235.	Intentionally left in blank.								

Assessment and training topic		*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 2 — Equivalency of approaches relevant to operations															
MT	Approach type A or B	B	Approach type A or B flight method 3D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type A	B	Approach type A flight method 2D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	Approach requiring specific approval	See equivalency of approaches relevant to operations — specific approval	APP	Approaches flown from FAF to landing or go around	x		x	x					
EVAL or SBT	Approach type A	B	Approach type A flight method 3D or 2D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type B	B	Approach type B flight method 3D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	Approach requiring specific approval	See equivalency of approaches relevant to operations — specific approval	APP	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Section 3 — Training topics with frequency (A) in alphabetical order															
Evaluation or 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 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 the 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			Turbulence that increases to severe turbulence		x			x		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 approach (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			In approach, unexpected braking action 'good to medium' reported by the preceding aircraft		x				x	x	x	
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x				x			
EVAL or SBT	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. The means of mitigating errors are included in this topic. The errors are described as mishandled auto flight systems, inappropriate mode selection, flight management system(s) and inappropriate 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.	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		

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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP		Take appropriate action if necessary. Restore correct auto flight state. Identify and manage consequences.	Automation fail to capture the approach altitude in descent (e.g. last altitude before the FAP). Ideally, the failure occurs when the workload is high (e.g. configuration of the aircraft for final approach).					x	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 the 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
Evaluation or scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates the general CRM principles and objectives. It includes: communication; leadership and teamwork; problem-solving and decision-making; situation awareness and management of information; and 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>Exposure to event or sequence of events to allow the pilot to build awareness of human factors in aviation and the human limitations. This includes the development of the following competencies:</u> <u>Communication:</u> Demonstrate: — effective use of language; — responsiveness to feedback; and — capability to state the plans and resolve ambiguities. <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
			GND			Apron fuel spilling					x	x		x	
			CRZ			Important water leak in an aircraft galley		x			x	x		x	
			ALL			A relevant number of cabin crew are wounded or incapacitated. Additionally, the cabin crew wounded or incapacitated are the most competent (e.g. senior cabin crew member).					x	x		x	
			ALL			Unruly passenger(s)					x			x	
			GND			Passenger oxygen: passenger service unit open and mask falling down					x	x		x	
			ALL			Passenger with medical problems — medical emergency					x			x	
			CRZ			Credible threat reported to the crew. Stowaway or fugitive on board.		x			x		x	x	
			GND			No METAR or TAFOR is available for destination due to industrial action at the destination airport	x	x			x	x			
			CRZ			Credible bomb threat reported to crew		x			x		x	x	
EVAL or SBT			APP			ACAS warning immediately following a go-around, with a descent manoeuvre required		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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
EVAL or SBT	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOPs). This is not intended to list example scenario elements, 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 are 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								
EVAL or SBT	Go-around management	A	APP	Any threat or error that can result in circumstances that require a decision to perform a 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 skills 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									
Evaluation or scenario-based	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 or may not be 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 requires the pilot to descend or ATC immediate descent	x	x		x					
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
			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			Interception of the glide slope from above (correlation with unstable approach training)			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 manually flown at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights	X			X			X	X	
			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		
			APP LDG			Approach planned with autoland, followed by a failure below 1 000 ft requiring a go-around and an immediate landing due to fuel shortage.	x		x		x		x		
EVAL or SBT	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 monitoring. Modules in the FSTD should be treated like those in an aircraft so that trainees have the opportunity to develop the 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.	Recognise mismanaged aircraft state. Observe the pilot's behaviour: how the pilot is mitigating errors, performing cross-checking, monitoring performance and dealing with a mismanaged aircraft state, in order to 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.	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		

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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
				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.	Take appropriate action if necessary. Restore desired aircraft state. Identify and manage consequences.										
	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 approach (not reported)	x	x				x	x		
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
Section 3 — Training topics with frequency (B) per phase and in alphabetical order, except for the upset prevention due to the difference in the EBT phases															
EVAL, MT or SBT	Upset prevention training	B	N/A	Compliance with AMC1 or AMC2 to 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. The elements are numbered with letters from A to I in Table 1 of AMC1 ORO.FC.220&230. Each element is made up of several numbered components. Through the principles of EBT, covering one component should satisfy the requirement to cover the element.	Early recognition and prevention of upset conditions. When the differences between LHS and RHS are not significant in the handling of the aircraft, UPRT may be conducted in either seat.	See Table 1 of AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								
			CRZ			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
			TO APP			Severe wind shear or wake turbulence during take-off or approach			x	x		x	x		
			CRZ			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			At the maximum cruise flight level for current aircraft weight, turbulence to trigger over speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	x		x	x			x		
			CRZ			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			High-altitude TCAS RA. Where the RA is required to be flown in manual flight	x			x			x	x	
EVAL or	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.	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 approach(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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP		Maintain directional control and safe flight path.	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			
Evaluation or 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. For instance. 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 The operator should vary malfunctions for each characteristic over the EBT cycle.	Recognise system malfunction. Take appropriate action including correct stop/go decision. Apply the appropriate procedure correctly. Maintain aircraft control. Manage consequences. Apply crew operating procedures where necessary. Respond appropriately to additional system abnormalities associated with MEL dispatch.	For full details, see the malfunction equivalency methodology. Unless specified otherwise in the operational suitability data, at least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below seven for each year. For each crew member, the characteristics of degraded control and loss of instrumentation should be in the role of pilot flying and the others may be in the role of pilot flying or pilot monitoring. (i) System malfunctions that require 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 that require complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures, major electrical system failure. (iii) System malfunctions that result 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 that result 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 a 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 that require 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			Malfunction on take-off high speed below V1	x				x	x			
			TO			Malfunction on take-off high speed above V1	x					x			
			GND			During taxi to the runway, a spurious brake temperature announcement. The crew had the correct brake temperature moments before the failure.					X	X	X		
			TO			Tyre failure during take-off					x	x		x	
			TO			Malfunction on initial climb	x					x			
			APP			Malfunction on approach	x					x		x	
			APP			Malfunction on go-around	x					x		x	
			LDG			Malfunction 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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
Evaluation or 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 is linked 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 manage 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 procedures 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 a 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 inappropriate 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 or scenario-based training phases	Surprise	B	ALL	The data analysed during the development 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 in order to build resilience.	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
	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			
EVAL or SBT	Workload, distraction, pressure, stress	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								
Section 3 — Training topics frequency (C) per phase and in alphabetical order, except for the upset prevention due to the difference in the EBT phases															
Manoeuvres training phase or SBT	Upset recovery	C	N/A	Compliance with AMC1 or AMC2 to ORO.FC.220&230 Include the recovery exercises in Table 2 of AMC1 ORO.FC.220&230 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years. Through the principles of EBT, covering one component should satisfy the requirement to cover the whole element of recovery from developed upsets. The same principles applies to the exercises of components 2, 3 and 4 where one exercise may satisfy the requirement to cover the whole component. An aeroplane upset is defined as an undesired aeroplane state in flight	Recognise upset condition. Make timely and appropriate intervention. Take appropriate action. Assure timely and appropriate intervention. (AMC1 ORO.FC.220&230 Table 2 component 1) Assure aircraft control. Maintain or restore a safe flight path. Assess consequential issues. Manage outcomes. Consolidated summary of aeroplane recovery techniques. (AMC1 ORO.FC.220&230 Table 2 component 5)	Table 2 of AMC1 ORO.FC.220&230: Exercises for upset recovery training									
						A. **Recovery from developed upsets**	Intentionally blank								
			CLB DES			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.	x			x			x	x	
			CRZ			3. Recovery from nose high at various bank angles	x			x			x	x	
			CRZ			4. Recovery from nose low at various bank angles	x			x			x	x	
			CRZ			Demonstration at a normal cruising altitude. Set conditions and disable aircraft systems as necessary to enable trainee to perform stall recovery according to OEM instructions	x			x			x		
			APP			Demonstration at an intermediate altitude during early stages of the approach. Set conditions and disable aircraft systems as necessary to enable trainee to perform stall recovery according to OEM instructions	x			x			x		
			CLB DES												

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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
				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. If done in ISI: The instructor should position the aircraft within but close to the edge of the validated training envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the validated training envelope.	Note: The operator should assess if the exercises should be practice for the either seat qualification.	Recovery from a wake turbulence position with high-bank angle	x		x	x			x		
EVAL or 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							
			APP			Destination temporally closed					x	x	x	x	
			CRZ			Rescue and firefighting services (RFFS) level reduction at destination		x			x		x		
			APP			Runway change before the interception of the localiser or similar navigation aid in azimuth			x		x		x	x	
			GND/ TO			Stray dogs at the opposite threshold runway		x			x		x		
			ALL			Poor quality transmissions		x							
EVAL or SBT	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that affects performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only to practise psychomotor skills and reinforce procedures to manage engine failures.	Recognise engine failure. Take appropriate action. Apply appropriate procedure correctly. Maintain aircraft control. Manage consequences.	Engine failure or engine malfunction on take-off low speed	x			x		x		x	
			TO			Engine failure or engine malfunction on take-off high speed below V1	x			x		x		x	
			TO			Engine failure or engine malfunction on take-off above V1	x					x	x	x	
			TO			Engine failure or engine malfunction on initial climb	x					x	x		
			APP			Engine malfunction	x					x		x	
			CRZ			Engine failure in cruise (with autopilot)	x		x				x		
			LDG			Engine failure or engine malfunction on landing				x					
EVAL or SBT	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			Fire or smoke on Take-off high speed below V1	x			x	x	x			
			TO			Fire or smoke on Take-off high speed above V1	x				x	x			
			TO			Fire or smoke on Initial climb	x				x	x			
			CRZ			Cargo fire						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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
			APP			Engine fire in approach (extinguishable)		x				x			
			APP			Engine fire in approach (non-extinguishable)		x			x	x			
			CLB CRZ DES			Lithium battery fire in the cockpit or cabin compartment	x	x			x	x		x	
			APP			Flight deck or cabin fire		x			x	x			X
			GND			Any of the example scenarios elements above ending in an evacuation		x			x	x		x	
EVAL or SBT	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 or SBT	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	
			GND			Fuel ground staff on industrial action. Only limited amount of fuel available, which is below the calculated fuel for the flight.					x	x	x	x	
			GND			Advice crew that there is a change of the load sheet figures during taxi to the runway. The crew may have limited time due to a calculated take-off time (CTOT) — ATC slot	x							x	
			GND			Braking action reported 'medium'. The information is transmitted just before take-off. The flight is subject to a calculated take-off time (CTOT) — ATC slot.					x		x	x	
Evaluation or 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 on ground	x		x			x	x		
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance in flight		x			x	x	x		
			GND			Standard initial departure change during taxi. The flight may be subject to a CTOT — ATC slot.					x		x	x	
			APP			Loss of runway lighting below decision height		x				x	x		
			CRZ			No fly zone: when the crew changes control frequency, the new ATCO informs the crew that they are flying over an unannounced 'no fly zone' and not included in the NOTAMs. To trigger such an event, the context can as an example be as follows: an unexpected military conflict in the territory the aircraft is flying over or the crew is forced to re-route in flight and the new route flies over a city that has an important event such the Olympic games, a G20/G7 submit, or the route is flying near a space rocket launch close to the time of the launch, like Guiana Space Centre, cape Cañaveral, etc.).					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	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Jet — Recurrent assessment and training matrix							*Competency map*								
					Aeronautical Information Publication.										
EVAL or SBT	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 procedures 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			Take-off on runway with reduced cleared width due to snow	x			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 the appropriate procedures 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 (TAWS) (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 APP			ATC provides a wrong QNH		x					x		
			DES			'Virtual mountain' refers to 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 that requires crew intervention		x				x	x	x	

AMC4 ORO.FC.232 EBT programme assessment and training topics

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

	Assessment and training topic	*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Section 1 — Skill retention															
Manoeuvres training phase	Rejected take-off	A	Engine failure after the application of take-off thrust and before reaching V1 (may be in LVO or CAT I or above)	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.	TO	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
	Failure of the critical engine between V1 and V2	A	Failure of the critical engine from V1 and before reaching V2 in the lowest CAT I visibility conditions or in LVO conditions.		TO	The manoeuvre is complete at a point when the aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement. Only one failure of the critical engine between V1 and V2 a year may be done in LVO conditions.	x			x					
	Failure of one engine on take-off	B	Failure of one engine from V1 and before reaching V2 in lowest CAT I visibility conditions or in LVO conditions.		TO	The manoeuvre is complete at a point when the aircraft is stabilised in a clean configuration with engine-out procedures completed. Only one failure of the critical engine between V1 and V2 a year may be done in LVO conditions.	x			x					
			Failure of one engine above V2 (any segment of the TO) in lowest CAT I visibility conditions or in LVO conditions.			The manoeuvre is complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x		x	x					
	Emergency descent	C	Initiation of emergency descent from normal cruise altitude		CRZ	The manoeuvre is complete once the aircraft is stabilised in emergency descent configuration (and profile).	x		x	x					
	Engine-out approach & landing	A	With the critical engine failed, normal landing		LDG	Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					
	Engine-out approach & go-around	A	With the 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		APP	This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is complete at a point when the 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	Go-around, all engines operative		APP	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					
			Go-around, all engines operative			Initiation of a go-around from DA followed by visual circuit and landing	x		x	x					
			Go-around, all engines operative			During flare/rejected landing	x		x	x					
	Pilot qualification to operate in either pilot's seat	B	Only for commanders whose duties require them to operate in either pilot's seat		APP	Complete the manoeuvres mandated in ORO.FC.235.	Intentionally left in blank.								

Assessment and training topic		*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Section 2 — Equivalency of approaches relevant to operations															
MT	Approach type A or B	B	Approach type A or B flight method 3D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type A	B	Approach type A flight method 2D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	Approach requiring specific approval	See equivalency of approaches relevant to operations — specific approval	APP	Approaches flown from FAF to landing or go around	x		x	x					
EVAL or SBT	Approach type A	B	Approach type A flight method 3D or 2D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type B	B	Approach type B flight method 3D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	Approach requiring specific approval	See equivalency of approaches relevant to operations — specific approval	APP	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Section 3 — Training topics with frequency (A) in alphabetical order															
Evaluation or 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 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 the 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			Turbulence that increases to severe turbulence		x			x		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 approach (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			In approach, unexpected braking action 'good to medium' reported by the preceding aircraft		x				x	x	x	
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x				x			
EVAL or SBT	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. The means of mitigating errors are included in this topic. The errors are described as mishandled auto flight systems, inappropriate mode selection, flight management system(s) and inappropriate 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.	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		

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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			APP		Take appropriate action if necessary. Restore correct auto flight state. Identify and manage consequences.	Automation fail to capture the approach altitude in descent (e.g. last altitude before the FAP). Ideally, the failure occurs when the workload is high (e.g. configuration of the aircraft for final approach).					x	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 the 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
Evaluation or scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates the general CRM principles and objectives. It includes: communication; leadership and teamwork; problem-solving and decision-making; situation awareness and management of information; and 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>Exposure to event or sequence of events to allow the pilot to build awareness of human factors in aviation and the human limitations. This includes the development of the following competencies:</u> <u>Communication:</u> Demonstrate: — effective use of language; — responsiveness to feedback; and — capability to state the plans and resolve ambiguities. <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
			GND			Apron fuel spilling					x	x		x	
			CRZ			Important water leak in an aircraft galley		x			x	x		x	
			ALL			A relevant number of cabin crew are wounded or incapacitated. Additionally, the cabin crew wounded or incapacitated are the most competent (e.g. senior cabin crew member).					x	x		x	
			ALL			Unruly passenger(s)					x			x	
			GND			Passenger oxygen: passenger service unit open and mask falling down					x	x		x	
			ALL			Passenger with medical problems — medical emergency					x			x	
			CRZ			Credible threat reported to the crew. Stowaway or fugitive on board.		x			x		x	x	
			GND			No METAR or TAFOR is available for destination due to industrial action at the destination airport	x	x			x	x			
			CRZ			Credible bomb threat reported to crew		x			x		x	x	
EVAL or SBT			APP			ACAS warning immediately following a go-around, with a descent manoeuvre required		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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL or SBT	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOPs). This is not intended to list example scenario elements, 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 are 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								
EVAL or SBT	Go-around management	A	APP	Any threat or error that can result in circumstances that require a decision to perform a 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 skills 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									
Evaluation or scenario-based	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 or may not be 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 requires the pilot to descend or ATC immediate descent	x	x		x					
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			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			Interception of the glide slope from above (correlation with unstable approach training)			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 manually flown at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights	X			X			X	X	
			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		
			APP LDG			Approach planned with autoland, followed by a failure below 1 000 ft requiring a go-around and an immediate landing due to fuel shortage.	x		x		x		x		
EVAL or SBT	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 monitoring. Modules in the FSTD should be treated like those in an aircraft so that trainees have the opportunity to develop the 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.	Recognise mismanaged aircraft state. Observe the pilot's behaviour: how the pilot is mitigating errors, performing cross-checking, monitoring performance and dealing with a mismanaged aircraft state, in order to 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.	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		

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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
				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.	Take appropriate action if necessary. Restore desired aircraft state. Identify and manage consequences.										
	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 approach (not reported)	x	x				x	x		
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
Section 3 — Training topics with frequency (B) per phase and in alphabetical order, except for the upset prevention due to the difference in the EBT phases															
EVAL, MT or SBT	Upset prevention training	B	N/A	Compliance with AMC1 or AMC2 to 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. The elements are numbered with letters from A to I in Table 1 of AMC1 ORO.FC.220&230. Each element is made up of several numbered components. Through the principles of EBT, covering one component should satisfy the requirement to cover the element.	Early recognition and prevention of upset conditions. When the differences between LHS and RHS are not significant in the handling of the aircraft, UPRT may be conducted in either seat.	See Table 1 of AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								
			CRZ			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
			TO APP			Severe wind shear or wake turbulence during take-off or approach			x	x		x	x		
			CRZ			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			At the maximum cruise flight level for current aircraft weight, turbulence to trigger over speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	x		x	x			x		
			CRZ			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			High-altitude TCAS RA. Where the RA is required to be flown in manual flight	x			x			x	x	
Evalua	Aircraft system malfunctions, including	B	ALL	Any internal failure(s) apparent or not apparent to the crew	Recognise system malfunction. Take appropriate action including correct stop/go decision.	For full details, see the malfunction equivalency methodology. Unless specified otherwise in the operational suitability data, at least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below seven for each year. For each crew	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
	operations under MEL			Any item cleared by the MEL but having an impact upon flight operations. For instance. 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 The operator should vary malfunctions for each characteristic over the EBT cycle.	Apply the appropriate procedure correctly. Maintain aircraft control. Manage consequences. Apply crew operating procedures where necessary. Respond appropriately to additional system abnormalities associated with MEL dispatch.	member, the characteristics of degraded control and loss of instrumentation should be in the role of pilot flying and the others may be in the role of pilot flying or pilot monitoring. (i) System malfunctions that require 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 that require complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures, major electrical system failure. (iii) System malfunctions that result 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 that result 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.									
			TO			MEL items with crew operating procedures applicable during take-off						x			X
			TO			Response to an additional factor that is affected by a 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 that require 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			Malfunction on take-off high speed below V1	x				x	x			
			TO			Malfunction on take-off high speed above V1	x					x			
			GND			During taxi to the runway, a spurious brake temperature announcement. The crew had the correct brake temperature moments before the failure.					X	X	X		
			TO			Tyre failure during take-off					x	x		x	
			TO			Malfunction on initial climb	x					x			
			APP			Malfunction on approach	x					x		x	
			APP			Malfunction on go-around	x					x		x	
			LDG			Malfunction during landing	x	x		x		x	x		
Evaluation or scenario-based	Aircraft system management	B		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It is linked 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 manage 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 procedures if applicable.	Approach in poor visibility	x		x	x				x	
			APP			Approach in poor visibility with deteriorations necessitating a decision to perform a go-around	x		x	x					
			LDG			Landing in poor visibility				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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
					Maintain directional control and safe flight path.										
	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 inappropriate 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 or scenario-based training phases	Surprise	B	ALL	The data analysed during the development 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 in order to build resilience.	Intentionally blank	Intentionally blank								
EVAL or SBT	Terrain	B	ALL	Alert, warning, or conflict	Anticipate terrain threats. Prepare for terrain threats. Recognise unsafe terrain clearance. Take appropriate action. Apply the appropriate procedures correctly. Maintain aircraft control. Restore safe flight path. Manage consequences.	ATC clearance giving insufficient terrain clearance	x	x			x				
			ALL			Demonstration of terrain avoidance warning systems (TAWS) (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 APP			ATC provides a wrong QNH		x					x		
			DES			'Virtual mountain' refers to 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	
	Wind shear recovery	B	TO	With or without warnings including predictive. A wind shear scenario is	Anticipate potential for wind shear.	Predictive wind shear warning during take-off					x	x			
			TO			Wind shear encounter during take-off	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			TO	ideally combined into an adverse-weather scenario containing other elements.	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.	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			
EVAL or SBT	Workload, distraction, pressure, stress	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								
Section 3 — Training topics frequency (C) per phase and in alphabetical order, except for the upset prevention due to the difference in the EBT phases															
Manoeuvres training phase or SBT	Upset recovery	C	N/A	Compliance with AMC1 or AMC2 to ORO.FC.220&230 Include the recovery exercises in Table 2 of AMC1 ORO.FC.220&230 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years. Through the principles of EBT, covering one component should satisfy the requirement to cover the whole element of recovery from developed upsets. The same principles applies to the exercises of components 2, 3 and 4 where one exercise may satisfy the requirement to cover the whole component. 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	Recognise upset condition. Make timely and appropriate intervention. Take appropriate action. Assure timely and appropriate intervention. (AMC1 ORO.FC.220&230 Table 2 component 1) Assure aircraft control. Maintain or restore a safe flight path. Assess consequential issues. Manage outcomes. Consolidated summary of aeroplane recovery techniques. (AMC1 ORO.FC.220&230 Table 2 component 5) Note: The operator should assess if the exercises should be practice for the either seat qualification.	Table 2 of AMC1 ORO.FC.220&230: Exercises for upset recovery training										
						A. **Recovery from developed upsets**	Intentionally blank								
			CLB DES			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.	x			x			x	x	
			CRZ			3. Recovery from nose high at various bank angles	x			x			x	x	
			CRZ			4. Recovery from nose low at various bank angles	x			x			x	x	
			CRZ												
			APP			Demonstration at a normal cruising altitude. Set conditions and disable aircraft systems as necessary to enable trainee to perform stall recovery according to OEM instructions	x			x			x		
						Demonstration at an intermediate altitude during early stages of the approach. Set conditions and disable aircraft systems as necessary to enable trainee to perform stall recovery according to OEM instructions	x			x			x		
			CLB DES			Recovery from a wake turbulence position with high-bank angle	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
				inappropriate airspeeds for the conditions. The example scenario elements may be done in ISI, as non-ISI or a combination of both. If done in ISI: The instructor should position the aircraft within but close to the edge of the validated training envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the validated training envelope.											
EVAL or SBT	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		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 approach(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			
EVAL or 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							
			APP			Destination temporally closed					x	x	x	x	
			CRZ			Rescue and firefighting services (RFFS) level reduction at destination		x			x		x		
			APP			Runway change before the interception of the localiser or similar navigation aid in azimuth			x		x		x	x	
			GND/ TO			Stray dogs at the opposite threshold runway		x			x		x		
			ALL			Poor quality transmissions		x							
EVAL or SBT	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that affects performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only to practise psychomotor skills and reinforce procedures to manage engine failures.	Recognise engine failure. Take appropriate action. Apply appropriate procedure correctly. Maintain aircraft control. Manage consequences.	Engine failure or engine malfunction on take-off low speed	x			x		x		x	
			TO			Engine failure or engine malfunction on take-off high speed below V1	x			x		x		x	
			TO			Engine failure or engine malfunction on take-off above V1	x					x	x	x	
			TO			Engine failure or engine malfunction on initial climb	x					x	x		
			APP			Engine malfunction	x					x		x	
			CRZ			Engine failure in cruise (with autopilot)	x		x				x		
			LDG			Engine failure or engine malfunction 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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL or SBT	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			Fire or smoke on Take-off high speed below V1	x			x	x	x			
			TO			Fire or smoke on Take-off high speed above V1	x				x	x			
			TO			Fire or smoke on 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			
			CLB CRZ DES			Lithium battery fire in the cockpit or cabin compartment	x	x			x	x		x	
			APP			Flight deck or cabin fire		x			x	x			X
			GND			Any of the example scenarios elements above ending in an evacuation		x			x	x		x	
EVAL or SBT	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 or SBT	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	
			GND			Fuel ground staff on industrial action. Only limited amount of fuel available, which is below the calculated fuel for the flight.					x	x	x	x	
			GND			Advice crew that there is a change of the load sheet figures during taxi to the runway. The crew may have limited time due to a calculated take-off time (CTOT) — ATC slot	x							x	
			GND			Braking action reported 'medium'. The information is transmitted just before take-off. The flight is subject to a calculated take-off time (CTOT) — ATC slot.					x		x	x	
Evaluation or scenario-based training	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 on ground	x		x			x	x		
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance in flight		x			x	x	x		
			GND			Standard initial departure change during taxi. The flight may be subject to a CTOT — ATC slot.					x		x	x	
			APP			Loss of runway lighting below decision height		x				x	x		
			CRZ			No fly zone: when the crew changes control frequency, the new ATCO informs the crew that they are flying over an unannounced 'no fly zone' and not included in the NOTAMs. To trigger such an event, the context can as an example be as follows: an unexpected military conflict in the territory the aircraft is flying over or the crew is forced to re-route in flight and the new route flies over a city that has an important event such the Olympic					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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 3 Turboprop — Recurrent assessment and training matrix							*Competency map*								
						games, a G20/G7 submit, or the route is flying near a space rocket launch close to the time of the launch, like Guiana Space Centre, cape Cañaveral, etc.).									
	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								
EVAL or SBT	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 procedures 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			Take-off on runway with reduced cleared width due to snow	x			x	x		x		
			TO			Stop/go decision in hazardous conditions					x	x		x	
EVAL or SBT	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 that requires crew intervention		x				x	x	x	

AMC5 ORO.FC.232 EBT programme assessment and training topics

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

Given the very small number of turbo-jet aeroplanes of the second generation in current use in commercial air transport operations, the operator must apply for an alternative means of compliance to develop a table of assessment and training topics to apply EBT.

AMC6 ORO.FC.232 EBT programme assessment and training topics

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

	Assessment and training topic	*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
	Generation 2 Turboprop — Recurrent assessment and training matrix						*Competency map*								
Section 1 — Skill retention															
Manoeuvres training phase	Rejected take-off	A	Engine failure after the application of take-off thrust and before reaching V1 (may be in LVO or CAT I or above)	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.	TO	From initiation of take-off to complete stop (or as applicable to procedure)	x			x					
	Failure of the critical engine between V1 and V2	A	Failure of the critical engine from V1 and before reaching V2 in the lowest CAT I visibility conditions or in LVO conditions.		TO	The manoeuvre is complete at a point when the aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement. Only one failure of the critical engine between V1 and V2 a year may be done in LVO conditions.	x			x					
	Failure of one engine on take-off	B	Failure of one engine from V1 and before reaching V2 in lowest CAT I visibility conditions or in LVO conditions.		TO	The manoeuvre is complete at a point when the aircraft is stabilised in a clean configuration with engine-out procedures completed. Only one failure of the critical engine between V1 and V2 a year may be done in LVO conditions.	x			x					
			Failure of one engine above V2 (any segment of the TO) in lowest CAT I visibility conditions or in LVO conditions.			The manoeuvre is complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x		x	x					
	Emergency descent	C	Initiation of emergency descent from normal cruise altitude		CRZ	The manoeuvre is complete once the aircraft is stabilised in emergency descent configuration (and profile).	x		x	x					
	Engine-out approach & landing	A	With the critical engine failed, normal landing		LDG	Initiation in a stabilised engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x					
	Engine-out approach & go-around	A	With the 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		APP	This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is complete at a point when the 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	Go-around, all engines operative		APP	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					
			Go-around, all engines operative			Initiation of a go-around from DA followed by visual circuit and landing	x		x	x					
			Go-around, all engines operative			During flare/rejected landing	x		x	x					

Assessment and training topic		*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
	Pilot qualification to operate in either pilot's seat	B	Only for commanders whose duties require them to operate in either pilot's seat		APP	Complete the manoeuvres mandated in ORO.FC.235.	Intentionally left in blank.								

	Assessment and training topic	*Frequency*	*Description (includes type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Flight phase for activation*	*Guidance material (GM) Example scenario elements*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Section 2 — Equivalency of approaches relevant to operations															
MT	Approach type A or B	B	Approach type A or B flight method 3D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type A	B	Approach type A flight method 2D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	Approach requiring specific approval	See equivalency of approaches relevant to operations — specific approval	APP	Approaches flown from FAF to landing or go around	x		x	x					
EVAL or SBT	Approach type A	B	Approach type A flight method 3D or 2D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	Approach type B	B	Approach type B flight method 3D	See equivalency of approaches relevant to operations that place an additional demand on a proficient crew	APP	See equivalency of approaches relevant to operations	x		x	x			x		X
	SPA approach(es)	B	Approach requiring specific approval	See equivalency of approaches relevant to operations — specific approval	APP	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
Section 3 — Training topics with frequency (A) in alphabetical order															
Evaluation or 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 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 the 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			Turbulence that increases to severe turbulence		x			x		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 approach (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			In approach, unexpected braking action 'good to medium' reported by the preceding aircraft		x				x	x	x	
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x				x			
	Aircraft system management	A		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It is linked 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 manage a minimum fuel situation.					x	x	x	x	
EVAL or SBT	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,	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).	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			Recoveries from TAWS, management of energy state to restore automated flight	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			DES APP	vigilance and flexibility needed to change from one mode to another. The means of mitigating errors are included in this topic. The errors are described as mishandled auto flight systems, inappropriate mode selection, flight management system(s) and inappropriate autopilot usage.	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.									
			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			Automation fail to capture the approach altitude in descent (e.g. last altitude before the FAP). Ideally, the failure occurs when the workload is high (e.g. configuration of the aircraft for final approach).					x	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 the 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
Evaluation or scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates the general CRM principles and objectives. It includes: communication; leadership and teamwork; problem-solving and decision-making; situation awareness and management of information; and 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.	Exposure to event or sequence of events to allow the pilot to build awareness of human factors in aviation and the human limitations. This includes the development of the following competencies: Communication: Demonstrate: — effective use of language; — responsiveness to feedback; and — capability to state the plans and resolve ambiguities. 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	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
			GND			Apron fuel spilling					x	x		x	
			CRZ			Important water leak in an aircraft galley		x			x	x		x	
			ALL			A relevant number of cabin crew are wounded or incapacitated. Additionally, the cabin crew wounded or incapacitated are the most competent (e.g. senior cabin crew member).					x	x		x	
			ALL			Unruly passenger(s)					x			x	
			GND			Passenger oxygen: passenger service unit open and mask falling down					x	x		x	
			ALL			Passenger with medical problems — medical emergency					x			x	
			CRZ			Credible threat reported to the crew. Stowaway or fugitive on board.		x			x		x	x	
			GND			No METAR or TAFOR is available for destination due to industrial action at the destination airport	x	x			x	x			
			CRZ			Credible bomb threat reported to crew		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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL or SBT			APP		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 aircraft 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.	ACAS warning immediately following a go-around, with a descent manoeuvre required		x			x	x	x	X	
EVAL or SBT	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOPs). This is not intended to list example scenario elements, 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 are 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								
EVAL or SBT	Go-around management	A	APP	Any threat or error that can result in circumstances that require a decision to perform a 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		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		

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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			APP	anticipated. This topic is completely distinct from the go-around manoeuvre listed in the manoeuvres training section that is intended only to practise psychomotor skills and a simple application of the procedures.		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									
Evaluation or 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 or may not be 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 requires the pilot 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			Interception of the glide slope from above (correlation with unstable approach training)			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 manually flown at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights	X			X			X	X	
			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		
			APP LDG			Approach planned with autoland, followed by a failure below 1 000 ft requiring a go-around and an immediate landing due to fuel shortage.	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL or SBT	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 monitoring. Modules in the FSTD should be treated like those in an aircraft so that trainees have the opportunity to develop the 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 the pilot's behaviour: how the pilot is mitigating errors, performing cross-checking, monitoring performance and dealing with a mismanaged aircraft state, in order to 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 approach (not reported)	x	x				x	x		
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x		x			
Section 3 — Training topics with frequency (B) per phase and in alphabetical order, except for the upset prevention due to the difference in the EBT phases															
EVAL, MT	Upset prevention training	B	N/A	Compliance with AMC1 or AMC2 to ORO.FC.220&230 Include upset prevention elements in Table 1 for the recurrent training	Early recognition and prevention of upset conditions.	See Table 1 of AMC1 ORO.FC.220&230: Elements and respective components of upset prevention training.	Intentionally blank								
			CRZ			Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take			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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
				programme at least every 12 calendar months, such that all the elements are covered over a period not exceeding 3 years. The elements are numbered with letters from A to I in Table 1 of AMC1 ORO.FC.220&230. Each element is made up of several numbered components. Through the principles of EBT, covering one component should satisfy the requirement to cover the element.	When the differences between LHS and RHS are not significant in the handling of the aircraft, UPRT may be conducted in either seat.	the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist.									
			TO APP			Severe wind shear or wake turbulence during take-off or approach			x	x		x	x		
			CRZ			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			At the maximum cruise flight level for current aircraft weight, turbulence to trigger over speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	x		x	x			x		
			CRZ			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			High-altitude TCAS RA. Where the RA is required to be flown in manual flight	x			x			x	x	
Evaluation or 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. For instance. 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 The operator should vary malfunctions for each characteristic over the EBT cycle.	Recognise system malfunction. Take appropriate action including correct stop/go decision. Apply the appropriate procedure correctly. Maintain aircraft control. Manage consequences. Apply crew operating procedures where necessary. Respond appropriately to additional system abnormalities associated with MEL dispatch.	For full details, see the malfunction equivalency methodology. Unless specified otherwise in the operational suitability data, at least one malfunction with each characteristic should be included every year. Combining characteristics should not reduce the number of malfunctions below seven for each year. For each crew member, the characteristics of degraded control and loss of instrumentation should be in the role of pilot flying and the others may be in the role of pilot flying or pilot monitoring. (i) System malfunctions that require 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 that require complex procedures, e.g. multiple hydraulic system failures, smoke and fumes procedures, major electrical system failure. (iii) System malfunctions that result 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 that result 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 a 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 that require 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			Malfunction on take-off high speed below V1	x				x	x			
			TO			Malfunction on take-off high speed above V1	x					x			
			GND			During taxi to the runway, a spurious brake temperature announcement. The crew had the correct brake temperature moments before the failure.					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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			TO			Tyre failure during take-off					x	x		x	
			TO			Malfunction on initial climb	x					x			
			APP			Malfunction on approach	x					x		x	
			APP			Malfunction on go-around	x					x		x	
			LDG			Malfunction during landing	x	x		x		x	x		
	Engine failure	B	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that affects performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only to practise psychomotor skills and reinforce procedures to manage engine failures.	Recognise engine failure. Take appropriate action. Apply appropriate procedure correctly. Maintain aircraft control. Manage consequences.	Engine failure or engine malfunction on take-off low speed	x			x		x		x	
			TO			Engine failure or engine malfunction on take-off high speed below V1	x			x		x		x	
			TO			Engine failure or engine malfunction on take-off above V1	x					x	x	x	
			TO			Engine failure or engine malfunction on initial climb	x					x	x		
			APP			Engine malfunction	x					x		x	
			CRZ			Engine failure in cruise (with autopilot)	x		x				x		
			LDG			Engine failure or engine malfunction on landing				x					
EVAL or SBT	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 inappropriate 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 or scenario-based training phases	Surprise	B	ALL	The data analysed during the development 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 in order to build resilience.	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
EVAL or SBT	Terrain	B	ALL	Alert, warning, or conflict	Anticipate terrain threats. Prepare for terrain threats. Recognise unsafe terrain clearance. Take appropriate action. Apply the appropriate procedures correctly. Maintain aircraft control. Restore safe flight path. Manage consequences.	ATC clearance giving insufficient terrain clearance	x	x			x				
			ALL			Demonstration of terrain avoidance warning systems (TAWS) (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 APP			ATC provides a wrong QNH		x					x		
			DES			'Virtual mountain' refers to 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	
EVAL or SBT	Workload, distraction, pressure, stress	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								
Section 3 — Training topics frequency (C) per phase and in alphabetical order, except for the upset prevention due to the difference in the EBT phases															
Manoeuvres training phase or SBT	Upset recovery	C	N/A	Compliance with AMC1 or AMC2 to ORO.FC.220&230 Include the recovery exercises in Table 2 of AMC1 ORO.FC.220&230 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years. Through the principles of EBT, covering one component should satisfy the requirement to cover the whole element of recovery from developed upsets. The same principles applies to the exercises of components 2, 3 and 4 where one exercise may satisfy the requirement to cover the whole component. 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.	Recognise upset condition. Make timely and appropriate intervention. Take appropriate action. Assure timely and appropriate intervention. (AMC1 ORO.FC.220&230 Table 2 component 1) Assure aircraft control. Maintain or restore a safe flight path. Assess consequential issues. Manage outcomes. Consolidated summary of aeroplane recovery techniques. (AMC1 ORO.FC.220&230 Table 2 component 5) Note: The operator should assess if the exercises should be practice for the either seat qualification.	Table 2 of AMC1 ORO.FC.220&230: Exercises for upset recovery training									
						A. **Recovery from developed upsets**	Intentionally blank								
			CLB DES			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.	x			x			x	x	
			CRZ			3. Recovery from nose high at various bank angles	x			x			x	x	
			CRZ			4. Recovery from nose low at various bank angles	x			x			x	x	
			CRZ APP			Demonstration at a normal cruising altitude. Set conditions and disable aircraft systems as necessary to enable trainee to perform stall recovery according to OEM instructions	x			x			x		
						Demonstration at an intermediate altitude during early stages of the approach. Set conditions and disable aircraft systems as necessary to enable trainee to perform stall recovery according to OEM instructions	x			x			x		
			CLB DES			Recovery from a wake turbulence position with high-bank angle	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
				The example scenario elements may be done in ISI, as non-ISI or a combination of both. If done in ISI: The instructor should position the aircraft within but close to the edge of the validated training envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the validated training envelope.											
EVAL or SBT	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 approach(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			
	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 procedures 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 a go-around	x		x	x					
			LDG			Landing in poor visibility				x		x	x		
EVAL or 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							
			APP			Destination temporally closed					x	x	x	x	
			CRZ			Rescue and firefighting services (RFFS) level reduction at destination		x			x		x		
			APP			Runway change before the interception of the localiser or similar navigation aid in azimuth			x		x		x	x	
			GND/ TO			Stray dogs at the opposite threshold runway		x			x		x		
			ALL			Poor quality transmissions		x							
EVAL or SBT	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			Fire or smoke on Take-off high speed below V1	x			x	x	x			
			TO			Fire or smoke on Take-off high speed above V1	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
			TO			Fire or smoke on 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			
			CLB CRZ DES			Lithium battery fire in the cockpit or cabin compartment	x	x			x	x		x	
			APP			Flight deck or cabin fire		x			x	x			X
			GND			Any of the example scenarios elements above ending in an evacuation		x			x	x		x	
EVAL or SBT	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 or SBT	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	
			GND			Fuel ground staff on industrial action. Only limited amount of fuel available, which is below the calculated fuel for the flight.					x	x	x	x	
			GND			Advice crew that there is a change of the load sheet figures during taxi to the runway. The crew may have limited time due to a calculated take-off time (CTOT) — ATC slot	x							x	
			GND			Braking action reported 'medium'. The information is transmitted just before take-off. The flight is subject to a calculated take-off time (CTOT) — ATC slot.					x		x	x	
Evaluation or 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 on ground	x		x			x	x		
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance in flight		x			x	x	x		
			GND			Standard initial departure change during taxi. The flight may be subject to a CTOT — ATC slot.					x		x	x	
			APP			Loss of runway lighting below decision height		x				x	x		
			CRZ			No fly zone: when the crew changes control frequency, the new ATCO informs the crew that they are flying over an unannounced 'no fly zone' and not included in the NOTAMs. To trigger such an event, the context can as an example be as follows: an unexpected military conflict in the territory the aircraft is flying over or the crew is forced to re-route in flight and the new route flies over a city that has an important event such the Olympic games, a G20/G7 submit, or the route is flying near a space rocket launch close to the time of the launch, like Guiana Space Centre, cape Cañaveral, etc.).					x	x	x		
	Operations- or type-specific	C	ALL	Intentionally blank	Intentionally blank	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*	*PRO*	*COM*	*FPA*	*FPM*	*LTW*	*PSD*	*SAW*	*WLM*	*KNO*
Generation 2 Turboprop — Recurrent assessment and training matrix							*Competency map*								
	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								
EVAL or SBT	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 procedures 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			Take-off on runway with reduced cleared width due to snow	x			x	x		x		
			TO			Stop/go decision in hazardous conditions					x	x		x	
EVAL or SBT	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 that requires 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			

AMC7 ORO.FC232 EBT programme assessment and training topics

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

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 FSTDs 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.

AMC 2 to AMC6 ORO.FC.232

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 'rejected take-off' manoeuvre in generation 4 and 3 Jet has moved from frequency A in Doc 9995 to frequency B. The ATQP operators in the RMG demonstrated that their pilots are equally proficient in demonstrating this manoeuvre. The amendment was agreed in June 2019.

— The engine failure on take-off followed the same approach described above for 'rejected take-off'; however, EASA did not find such general consensus for the 'failure of critical engine between V1&V2' for generation 3; therefore, for generation 3, only one of the two engine failures has move from frequency A in Doc 9995 to frequency B. For generation 4, both engine failures have moved from frequency A to frequency B.

— A new manoeuvre 'failure of the critical engine above V2 (any segment of the TO)' is introduced at a frequency B. This manoeuvre complements the existing manoeuvre of 'failure of one engine on take-off - failure of one engine from V1 and before reaching V2'; only one of them is required. The reason is to allow the pilot to cope with this failure outside the segment of V1 and V2. Data provided by the operators in the RMG shows that engine failures are more probable in another segment than V1 and V2. Therefore, it allows the operators to complement their programme with a manoeuvre that should cover better their operational risks. The amendment was agreed in June 2019.

— The three go-arounds in the manoeuvres training phase are merged because it was confusing for the operators. Frequencies are also merged. That means that the operator may choose only one of the three go-arounds at a frequency A.

— The introduction of either seat qualification in accordance with ORO.FC.235 with a frequency B in line with ATQP ORO.FC.A.245.

— 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 three 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 has highlighted that ISI is not the only means of training this operational risk; therefore, an increased flexibility in regard to the means to deliver this training topic was introduced. Furthermore, the 'Data Report for Evidence-Based Training'[7] 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 training this topic in all phases of the modules providing thus 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.

— Stress is added to the original training topic 'workload, distraction, pressure' as according to the experts consulted, it is covered in this training topic. In addition, there is alignment with the provision of CRM.

— A new training topic (operations of special airport approval) was introduced with a frequency of 'C' in order to ensure time for airports with special approval (e.g. Funchal, Innsbruck, etc.)

— Training topic 'upset recovery training' was extensively amended. ICAO Doc 9995 was published before the ICAO 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 training this topic in the MT and SBT of the modules providing thus more flexibility. EASA excluded this training topic (recovery) from the evaluation phase. The reason agreed by the experts consulted by EASA was: in the evaluation phase, every skilled pilot will avoid in the upset prevention stage the need to go into a recovery from upset; therefore, in order to avoid negative training, the recovery part should be avoided in the evaluation phase.

— Furthermore, the experts consulted by EASA found that some of the recovery example scenario elements described in Doc 9995 to be example scenario elements related to prevention; therefore, EASA transferred them to the training topic of upset prevention — frequency B. For example, the example scenario element '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

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

beyond which an upset condition could exist' is located in Doc 9995 in the training topic 'upset recovery'; however, in AMC1 ORO.FC.220&230 table 1 and Doc 1001 'UPRT manual', this example scenario element is located in the prevention part; therefore, the conclusion of EASA and its experts was to move it to upset prevention.

— Table 2 of AMC1 ORO.FC.220&230 – Recovery- elements and components were transposed into the training topic of recovery in ORO.FC.232. The competency map was agreed following the Delphi methodology.

— Some more example scenario elements were introduced by the experts of the rulemaking group with a special emphasis on scenarios of LTW and WLM.

AMC1 ORO.FC.232(b)(1) EBT programme assessment and training topics

EBT DATA REPORT

(a) The data report is a large-scale comprehensive study of operational data. It identifies the areas of pilot training for improvement, providing the prioritisation of germane and relevant training topics to guide in the construction of suitable EBT programmes. The data report uses other studies, a variety of data sources and/or varied methodology to mitigate the inherent bias associated with individual types of data sources.

(b) The data report should:

(1) be endorsed or developed by the competent authority, the Agency or ICAO

(2) be reviewed by a team of experts in pilot training, representing airline operators, pilot associations, regulators, and original equipment manufacturers;

(3) use data or information (training data, operational data and safety data) from the following sources:

(i) accident investigation bodies;

(ii) competent authorities;

(iii) original equipment manufacturers (OEM) — aircraft;

(iv) EASA safety information;

(v) operators; and

(vi) studies or reports (aviation or scientific);

(4) analyse the data with the following objectives:

(i) to substantiate the need for change in the assessment and training programmes for commercial transport pilots;

(ii) to provide evidence from data analyses to support the derivation of training topics, prioritised according to aircraft generation;

(iii) to challenge and/or corroborate the other sources of data (e.g. Training Criticality Survey and Training Guidance) with operational data;

(iv) to provide feedback regarding the effectiveness of changes implemented through the adoption of competency-based training methodologies; and

(v) to validate or ascertain practices, findings or conclusions made previously by the industry;

(5) include the studies and define the use of such studies in the data report following the criteria below:

(i) The study is relevant from a training perspective (e.g. if incorporating a training change mitigates the risk found in the study).

(ii) There is evidence that it will assist with the identification of competencies to be developed in training in order to mitigate risks encountered in the evolving operational environment.

(iii) The findings of the study will be corroborative or challenging across the spectrum of the analysis made in the data report.

(iv) The study allows the analysis and comparison of the data or findings in the data report and it is coming from industry-respected research or studies;

(6) include an evidence table for the purpose of:

(i) integrating the evidence of the analyses in points (4) and (5);

(ii) identifying meaningful patterns;

(iii) enabling the grouping of evidence to support the key findings; and

(iv) facilitating the prioritisation of results; and

(7) include a prioritisation of the training topics for the purpose of translating data into useful events and scenarios to assess and develop pilot performance (assessment and training topics). The prioritisation shall:

(i) systematically rank threats, errors and competencies along with the factors leading to accidents and serious incidents from multiple data sources to formulate a table of assessment and training topics;

(ii) be performed for each of the generations of aircraft. This allows highlighting the differences and commonalities between generations; and

(iii) ensure sufficient flexibility in the process to allow enhancement of the training programmes according to the type of operation, culture and type of aircraft.

AMC1 ORO.FC.232(b)(1)

EASA developed this AMC on the basis of the IATA Data report for Evidence-based training. The intent of this AMC is to provided clarity and the necessary methodology to developed a Data report.

AMC1 ORO.FC.232(b)(3) EBT programme assessment and training topics

AIRCRAFT TYPES BY GENERATIONS

The operator should only develop an EBT programme for aircraft types for which there is a table of assessment and training topics.

Generation 4 — Jet)	From 1988. EFIS cockpit — FMS equipped FADEC Fly-by-wire control systems Advanced flight envelope protection Integrated auto flight control system — navigation performance, and terrain avoidance systems Generation fatal accident average rate: 0,1/million flights	A318/A319/A320/A321 (including neo), A330, A340-200/300, A340-500/600, B777, A380, B787, A350, Bombardier C Series (A220), Embraer E170/E175/E190/E195
Generation 3 — Jet	From 1969 EFIS cockpit — FMS equipped FADEC Integrated auto flight control system — navigation performance, and terrain avoidance systems Basic flight envelope protection — stick shaker/pusher	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,

	Generation fatal accident average rate: 0,2/million flights	F100, Bombardier CRJ Series, Embraer ERJ 135/145
Generation 3 — Turboprop	From 1992 EFIS cockpit — FMS equipped EEC/ECU or higher engine control Integrated auto flight control system — navigation performance and terrain avoidance systems Basic flight envelope protection — stick shaker/pusher	ATR 42-600, ATR 72-600, Bombardier Dash 8-400, BAE ATP, Saab 2000
Generation 2 — Jet	From 1964. Integrated auto-flight system. EEC/ECU or higher engine control Analogue/CRT instrument display Basic flight envelope protection — stick shaker/pusher Generation fatal accident average rate: 0,7/million flights	A300 (except A300-600), BAC111, B727, B737-100/200, B747-100/200/300, DC9, DC10, F28, L1011
Generation 2 — Turboprop	From 1964 Analogue/CRT instrument display EEC/ECU Basic flight envelope protection — stick shaker/pusher Integrated auto flight control system	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, Embraer 120
Generation 1 — Jet	From 1952 First commercial jets. Manual engine control Analogue instrument display Not integrated auto flight control system Basic flight envelope protection — stick shaker/pusher, attitude warning Generation fatal accident average rate: 3.0/million flights	DC8, B707

AMC1 ORO.FC.232(b)(3)

The RMG developed this AMC based on the following principles:

(1) Automation and human interaction with this automation

(2) Accident rate: data report for EBT as a reference for each generation

(3) Technology driven, the fatal rate is qualifying

This provision is transposed from ICAO Doc 9995 Appendix 1 with two differences:

(1) There is a definition of each generation.

(2) Embraer 120 was moved from GEN3 Turboprop to GEN2 Turboprop, the reason is as follows:

— The equipment in Embraer 120 is really similar to that of ATR 42-500 (or ATR 200/300). ATR 42-500 and below are classified GEN2 Turboprop. Even though the RMG acknowledged that E120 has GPWS, they considered that this reason alone was not enough to classify the E120 as GEN3 Turboprop.

— The new definitions of aircraft generation include a year for each generation. Therefore, Embraer 120 should be included in GEN2 Turboprop as it was certified in October 1985.

— The RMG reviewed the number of Embraer 120 flying in Europe. Their number is low and therefore the possible impact of this change is low.

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 the 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 the 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 the 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 the 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 the 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 EBT programmes, ORO.FC.231(a)(3) requires the pilot to complete a minimum of two modules of the EBT programme, separated by a period of more than 3 months, within a 12-month period. In addition, the pilot is required to be 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 the 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 generations, the operator has to fulfil both generation table of assessment and training topics as per ORO.FC.232.

(B) ORO.FC.230 (c) requires one line check every year. When credits are defined in the 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 EBT programmes, ORO.FC.231(h) requires one line evaluation of competence every year. When credits are defined in the 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. In such case, the operator should meet the requirements to extend the validity of the line evaluation of competence to 2 years. Extension to 3 years should not be allowed.

(C) Annual emergency and safety equipment training and checking should cover all requirements for each type.

(b) Helicopters […]

AMC1 ORO.FC.240

The RMG developed the AMC and concluded that:

— ORO.FC.240 is applicable to EBT and does not require modification. However, some minor modifications were needed in AMC1 ORO.FC.240.

'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.'

— 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.

In addition, the RMG discussed whether the simulator sessions of the module should be performed in the same aircraft type or it is possible to perform the simulator sessions in different aircraft types. The conclusion was that simulator session 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).

AMC1 ORO.FC.240 point (a)(4)(vii)

The RMG following the principles contained in ORO.FC.240 agreed to not allow extension of validity of the line evaluation of competence further than those allowed in ORO.FC.240.

ORO.FC.240 and AMC1 ORO.FC.240 allow consecutive line checks; therefore, a check is required 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. Therefore, the provision proposed for the line evaluation of competence limits the extension of 3 years only to single fleet operation and therefore ensures for operations of more than one type or variant 1 line evaluation of competence every 2 years, that ensures at least 1 LEoC every 3 years programme.

AMC1 ORO.FC.240 point (a)(4)(vii)(B)

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 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. Therefore, point (f) limits the extension of 3 years only to single fleet operations and therefore ensures for operations of more than one type or variant one line evaluation of competence every 2 years, which ensures at least one line evaluation of competence every 3 years.

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; and

(d) the administrative procedure that includes the completion of Appendix 9, and the rest of administrative procedures in Part-FCL FCL.1030 points (b), (c) and (d) that include 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 evidence 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 EBT manager, who is an examiner designated to provide a final assessment of the data collected, and the administrative procedure should be maintained. As there are several people involved in the technical assessment, the administrative procedure involves the EBT manager who bears 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 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 EBT manager who is an examiner responsible for the operator's EBT programme — ensuring that the manoeuvres assessed are of a good training value and that the applicant completed those manoeuvres. The EBT manager will be mostly responsible for the completion of Appendix 10. This person 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 EBT manager 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.010 Definitions

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.015 Application and issue, revalidation and renewal of licences, ratings and certificates

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

GM1 FCL.520.A ATPL(A) – Skill test

ATPL SKILL TEST IN AN EBT MODULE

The skill test in accordance with Appendix 9 may be combine with an EBT module. It may follow the same process already described in mixed EBT for the LPC. The competent authority may provide guidance. Further guidance can be found in the EASA EBT manual.

FCL.625 — Validity, revalidation and renewal

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.625.A IR(A) — Revalidation

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

AMC2 FCL.740(b) Validity and renewal of class and type ratings

RENEWAL OF CLASS AND TYPE RATINGS: REFRESHER TRAINING AT AN AOC

An AOC approved for renewal of type ratings under Part-ORO can provide refresher training only:

(a) for applicants enrolled under its own EBT programme; and

(b) if the rating has lapsed by no more than 1 year.

If the rating has lapsed by more than 1 year, the training should be performed at an ATO and AMC1 FCL.740(b) applies.

FCL.720.A — Revalidation of class and type ratings — aeroplanes

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.905.TRI TRI — Privileges and conditions

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.905.SFI SFI — Privileges and conditions

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.930.SFI Training course

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.1015.Examiner standardisation

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.1025 Validity, revalidation and renewal of examiner certificates

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

FCL.1010.SFE SFE — Prerequisites

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

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;

(c) For EBT practical assessment, in AMC1 to Appendix 10;

(d) For assessments of competence for instructors, in AMC5 FCL.935;

GM1 FCL.1030(b)(3)(ii) Conduct of skill tests, proficiency checks and assessments of competence

REVALIDATION OF CLASS AND TYPE RATINGS — AEROPLANES — REQUIRED MANOEUVRES AND EXERCISES IN THE CONTEXT OF APPENDIX 10 (EBT PRACTICAL ASSESSMENT)

The confirmation that all the required manoeuvres and exercises have been completed means that during the period of validity of the type rating, the applicant has completed the operator's EBT programme applicable to that period.

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 point (b)(3)(ii) of 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 for type ratings, and proficiency check for IRs when combined with type ratings — EBT practical assessment

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

AMC1 to Appendix 10 — Proficiency check for type ratings, and proficiency check for IRs when combined with type ratings — EBT practical assessment

APPLICATION AND REPORT FORM — LICENCES ADMINISTRATIVE PROCEDURES

(a) Minimum information provided in the form for Appendix 10.

Applicant's last name(s):		Applicant's first name(s):
Signature of applicant:		State of licence issue:
Type of licence held:		Licence number:
Type rating:		FSTD (aircraft type):
EBT module 1	Session 1……..Name of the instructor:_____, Type and number of licence:_____ **Location, date and time:** _____ FSTD ID code:_____	
	Session 2……..Name of the instructor:_____, Type and number of licence:_____ **Location, date and time:** _____ FSTD ID code:_____	
	Session X……Name of the instructor:_____, Type and number of licence:_____ **Location, date and time:** _____ FSTD ID code:_____	
	Completion of the module: ☐	_____date / signature (EBT manager)
EBT module 2	Session 1……..Name of the instructor:_____, Type and number of licence:_____ **Location, date and time:** _____ FSTD ID code:_____	
	Session 2……..Name of the instructor:_____, Type and number of licence:_____ **Location, date and time:** _____ FSTD ID code:_____	
	Session X……Name of the instructor:_____, Type and number of licence:_____ **Location, date and time:** _____ FSTD ID code:_____	
	Completion of the module: ☐	_____date / signature (EBT manager)
	(…)	
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 (EBT manager)
Completion of the operator's EBT programme from____(date) to ____(date) ☐	_____**date / signature (EBT manager)**
Name(s) in capital letters: Type and number of licence: Examiner certificate number:	**Signature of examiner (EBT manager)** _____ Date:
Delegation of signature for licence endorsement (instructor)	
Name: Position in the operator: Date:	**Signature**

GM1 to Appendix 10 — Proficiency check for type ratings, and proficiency check for IRs when combined with type rating — EBT practical assessment

REVALIDATION OF LICENCES — ADMINISTRATIVE PROCEDURES

(a) The operator may nominate several EBT managers to ensure at least one examiner for each fleet, but also for other reasons, such as workload to manage the EBT programme, several locations of the training facilities, or bases, etc.

(b) For the first licence revalidation after the transition from mixed EBT, the examiner may use one mixed EBT module in addition to the other EBT module(s) as a means to revalidate the licence.

(c) In accordance with the approved procedure under Appendix 10, 4. (c) (2), the EBT manager may nominate the EBT instructor who completed the EBT module as the person to whom the signature of the examiner is delegated. A stamp or electronic signature may exclusively be given from the EBT manager to the EBT instructor, in order to document the delegation in a transparent and secure manner. Following that process, EBT instructors on behalf of the EBT manager can endorse an applicant's licence.

GM1 to Appendix 10 point (b)

The GM clarifies what the examiner can do during the transition to full EBT in the case the pilot has not completed two EBT modules under full EBT. As during mixed EBT the pilot is completing an EBT module, this can be used as a means to revalidate the licence under full EBT. The GM was introduced as a consequence of the public consultation of the NPA.

GM2 to Appendix 10 — Proficiency check for type ratings, and proficiency check for IRs when combined with type rating — EBT practical assessment

EBT PRACTICAL ASSESSMENT — PROFICIENCY CHECK

EBT practical assessment (or **Practical assessment)** is defined in FCL.010. 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 EBT practical assessments conducted in the EBT programme and the final review of the examiner. In fact, one single EBT practical assessment 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, corresponding to at least two EBT modules within the validity period of the type rating.

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 an EBT practical assessment 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) on 'verification of the accuracy of the grading system'.

To conclude this explanatory note, the definition of 'competency' (where the term 'skills' is included) in Annex I to the Air OPS Regulation is provided below.

'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 that it assesses and develops the competency application of procedures in many events

					instead of only in an 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 event during the before take-off procedures. The expected added value of EBT is that it assesses and develops the competency application of procedures in many events instead of only in an 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 the critical engine between V1 & V2 frequency B	Covered by the manoeuvres training phase Failure of the 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: (a) establishment of the final configuration; or (b) completion of the abnormal checklist.

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 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: (a) full stop and completion of the abnormal checklist initial actions; or (b) 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 in 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 (M)	Abnormal and emergency procedures. Minimum of 3 for the crew	Proposal to add fire and smoke management The evacuation is not prescribed in in Part-FCL		
	3.8.1* (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	3.8.3.4 * (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	3.8.4 * (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	4.4* (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 the 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, ratings or certificates — persons

AMC2 ARA.GEN.315(a) Procedure for issue, revalidation, renewal or change of licences, ratings 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 EBT programme, the competent authority should in addition to the requirements in AMC1 ARA.GEN.315(a) verify that:

(a) the EBT manager is a current examiner in the type rating filled in in Appendix 10;

(b) when the EBT manager 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, have an instructor certificate and be indicated in Appendix 10;

(3) the approved procedure for delegation of signature should include procedures to prevent the instructor from signing the licence when the performance of the applicant is below the minimum acceptable level or the EBT programme applicable to the validity period has not been completed.

(c) the EBT manager of the operator in which the applicant is enrolled ensures that the applicant has completed the EBT programme;

(d) the EBT manager of the operator in which the applicant is enrolled ensures that the instructors that conducted the training to the applicant have been standardised.

(e) the operator performs a verification of the grading system once every 3 years; and

(f) the EBT manager 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 Opinion 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 EBT PROGRAMME

(c) 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.

Instructors are already allowed to sign licences under FCL.945 in certain conditions:

'FCL.945 Obligations for instructors

Upon completion of the training flight for the revalidation of an SEP or TMG class rating in accordance with FCL.740.A (b)(1) and only in the event of fulfilment of all the other revalidation criteria required by FCL.740.A (b)(1) the instructor shall endorse the applicant's licence with the new expiry date of the rating or certificate, if specifically authorised for that purpose by the competent authority responsible for the applicant's licence.'

AMC2 ARA.GEN.315(a) point (b)

EASA performed several rounds of consultations regarding the implementation of the delegation of signatures. One element brought up to the attention of EASA, was the need to ensure a lean process to perform the signature of licences. Although EASA has initiated the project to implement the electronic signature of licences, this project may take years to conclude. In the meantime, the simulator training centre may be a good location where after the completion of the training module the pilot and a personnel of the training department (instructor) may complete the signature of the licence. For the sake of clarity and due to some comments in the CRD regarding the process of signature delegation, EASA decided to provide clarity and level playing field by requiring the instructor to be the person to whom the examiner (EBT manager) may delegate his or her signature.

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 EBT programme.

Appendix 10 covers this item:

'Completion of the operator's EBT programme ☐ _____signature/date (EBT manager)'

AMC2 ARA.GEN.315(a) point (d)

This provision refers to AMC1 ORO.FC.146(c) and AMC2 ORO.FC.146(c).

The oversight of this provision falls under the jurisdiction of the competent authority issuing the EBT approval; however, the licensing authority may at its own discretion inspect the training records of the instructors that pertain to revalidation of licences.

AMC1 ORO.FC.146(c) Personnel providing training, checking and assessment
EBT INSTRUCTOR — INITIAL STANDARDISATION PROGRAMME

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

(1) EBT instructor training; and

(2) EBT assessment of competence.

[…]

AMC2 ORO.FC.146(c) Personnel providing training, checking and assessment

EBT INSTRUCTOR — RECURRENT STANDARDISATION PROGRAMME

The EBT instructor should:

(a) conduct an EBT module every 12 months. The 12-month period should be counted from the end of the month the module was taken. If this has not been fulfilled, the EBT instructor should complete an EBT assessment of competence. When the module is undertaken within the last 3 months of the period, the new period should be counted from the original expiry date;

(b) receive annual recurrent standardisation. The recurrent standardisation should include:

(1) refresher EBT training; and

(2) concordance training; and

(c) complete an assessment of competence every 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 of competence.

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

SEE IMPLEMENTING RULES IN THE OPINION ANNEX IIb

ARA.FCL.205 Monitoring of examiners

AMC2 ARA.FCL.205 Monitoring of examiners

EBT PROGRAMME

The operator's competent authority should include the EBT managers in the programme of monitoring of examiner even if they hold an examiner certificate issue by other competent authority. At the discretion of the competent authority, this may also include an inspection of training delivery within the EBT programme.

GM1 to AMC2 ARA.FCL.205 Monitoring of examiners

EBT PROGRAMME — INSPECTION OF TRAINING DELIVERY

When the authority conducts an inspection of the FCL requirements (e.g. training delivery), it is advisable that the inspector of the competent authority follows the requirements laid down in AMC1 ARO.OPS.226(a). This inspection may be combined with the oversight required in ARO.OPS.226 of Regulation (EU) No 965/2012.

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 EBT programme. This is because the delivery of an EBT module is performed by instructors on behalf of the EBT manager 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_12-2019Q3.pdf for use by examiners with a Part-FCL examiner certificate conducting a proficiency

check of a licence holder whose licence was issued by a competent authority (CA) other than their own.

As an EBT practical assessment 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

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 this GM 'Where this inspection of training delivery is to be conducted, the inspector of the competent authority may 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.