European Union Aviation Safety Agency

Opinion No 08/2019 (A)

Subpart FC 'Flight Crew' of Annex III (Part-ORO) to Regulation (EU) No 965/2012
Update of ORO.FC: evidence-based training (EBT)

RELATED NPA/CRD 2018-07 — RMT.0599

EXECUTIVE SUMMARY

This Opinion delivers the results of two rulemaking tasks (RMTs): RMT.0599 'Update of ORO.FC' and RMT.0681 'Alignment of implementing rules and acceptable means of compliance/guidance material with Regulation (EU) No 376/2014'. The detailed structure of this Opinion is given in Section 1.1.

The objective of this Opinion regarding RMT.0599 is to update the flight crew training requirements to improve pilot competencies. The proposed requirements provide additional efficiency in the field of flight crew training and achieve a smooth transition to competency-based training.

The present EBT Opinion is part of a global safety initiative endorsed by ICAO whose objective is to determine the relevance of the existing pilot training according to aircraft generation. EBT intends to improve safety and to enhance the capability of flight crews to operate the aircraft in all flight regimes and to be able to recognise and manage unexpected situations. The EBT concept is designed to maximise learning and minimise formal checking.

This Opinion is a second step in the European rulemaking actions to implement EBT. The first step was completed in 2015 with the publication of ED Decision 2015/027/R that provided guidance material to allow the implementation of a 'mixed EBT' which maintains the current operator proficiency check (OPC) and licence proficiency check (LPC). This Opinion proposes further changes to the Air OPS and Air Crew Regulations to allow authorities to approve the baseline EBT, which replaces OPC and LPC. This will allow a single philosophy of recurrent training within the airline. Further work is foreseen in the context of the activities of RMT.0599 to allow expansion of EBT to the operator conversion course and initial type rating, as well as to other types of aircraft (e.g. helicopters and business jets).

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

Action area:	Human factors and competence of personnel		
Affected rules:	Part-DEF, Part-ARO and Part-ORO of the Air OPS Regulation, Part-FCL and Part-ARA of the Aircrew Regulation		
Affected stakeholders:	Member States, pilots, instructors, examiners, approved training organisations and operators		
Driver:	Safety	**Rulemaking group:**	Yes
Impact assessment:	Full	**Rulemaking Procedure:**	Standard

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1. About this Opinion

1.1. How this Opinion was developed

The European Union Aviation Safety Agency (EASA) developed this Opinion in line with Regulation (EU) 2018/1139[1] (the 'Basic Regulation') and the Rulemaking Procedure[2].

It contains the results of two RMTs into one consolidated document while separate explanatory notes elaborate on the background and provide detailed explanations for the different RMTs.

The structure of this Opinion, including its annexes, is the following:

— Opinion No 08/2019:
  — Opinion No 08/2019 (A) (Part A): Explanatory Note related to RMT.0599 'Update of ORO.FC — evidence-based training (EBT)'
  — Opinion No 08/2019 (B) (Part B): Explanatory Note related to RMT.0681 'Alignment of implementing rules with Regulation (EU) No 376/2014'
— Annex Ia to Opinion No 08/2019: draft Cover Regulation amending Regulation (EU) No 965/2012
— Annex Ib to Opinion No 08/2019: draft Annex to draft Cover Regulation amending Regulation (EU) No 965/2012
— Annex IIa to Opinion No 08/2019: draft Cover Regulation amending Regulation (EU) No 1178/2011
— Annex IIb to Opinion No 08/2019: draft Annex to draft Cover Regulation amending Regulation (EU) No 1178/2011

For the purpose of this document, references to 'this Opinion' or 'this rulemaking activity' shall be understood as referring to the scope of Opinion No 08/2019 (A). The related rulemaking activity is included in the European Plan for Aviation Safety (EPAS) 2019-2023 under RMT.0599. The scope and timescales of the task were defined in the related ToR[3].

The *draft* text of this Opinion has been developed by EASA based on the input of Rulemaking Group (RMG) RMT.0599. This group is divided in the:

1. Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1535612134845&uri=CELEX:32018R1139).
2. EASA is bound to follow a structured rulemaking process as required by Article 115(1) of Regulation (EU) 2018/1139. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure).
3. https://www.easa.europa.eu/sites/default/files/dfu/ToR%20%26%20Concept%20Paper%20RMT.0599%20Issue%201.pdf

(a) Main Group[4], which ensures consistency across the different tasks of RMT.0599. It also deals with other updates of ORO.FC;

(b) Evidence-based training (EBT) subgroup[5], that is responsible for developing the EBT concept; and

(c) Helicopter subgroup[6] that is developing and updating the helicopter training requirements including EBT.

This Opinion is primarily based on the inputs provided by the EBT subgroup. Due to the novelty of the EBT concept, EASA also consulted the Main group RMT.0599 on a regular basis, organised a workshop[7] with the participation of industry representatives in February 2017 and performed four rounds of focused consultation with:

(1) the Netherlands Aerospace Centre (NLR)[8] with regard to instructor concordance and grading;

(2) the Spanish competent authority (AESA)[9] and Iberia group[10] for the implementation of the EBT programme;

(3) the Italian competent authority (ENAC)[11] and Alitalia[12] with regard to equivalency of malfunctions; and

(4) CAA Denmark (Trafik)[13] and Thomas Cook Scandinavia[14] on the oversight and follow-up of the EBT programme.

All interested parties were consulted through NPA 2018-07[15]. 726 comments were received from interested parties, including industry, national aviation authorities (NAAs) and social partners.

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

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

6 Chaired by Tim Rolfe (Heli-offshore).

7 1st Workshop on the Implementation of the Evidence-based Training

8 Focal point: Frederik Mohrmann.

9 Focal point: Carlos Artiles and Enrique Monzón.

10 Focal point: Captain Ignacio Gallego Alemany.

11 Focal point Mario Tortorici and Sandro Apolloni.

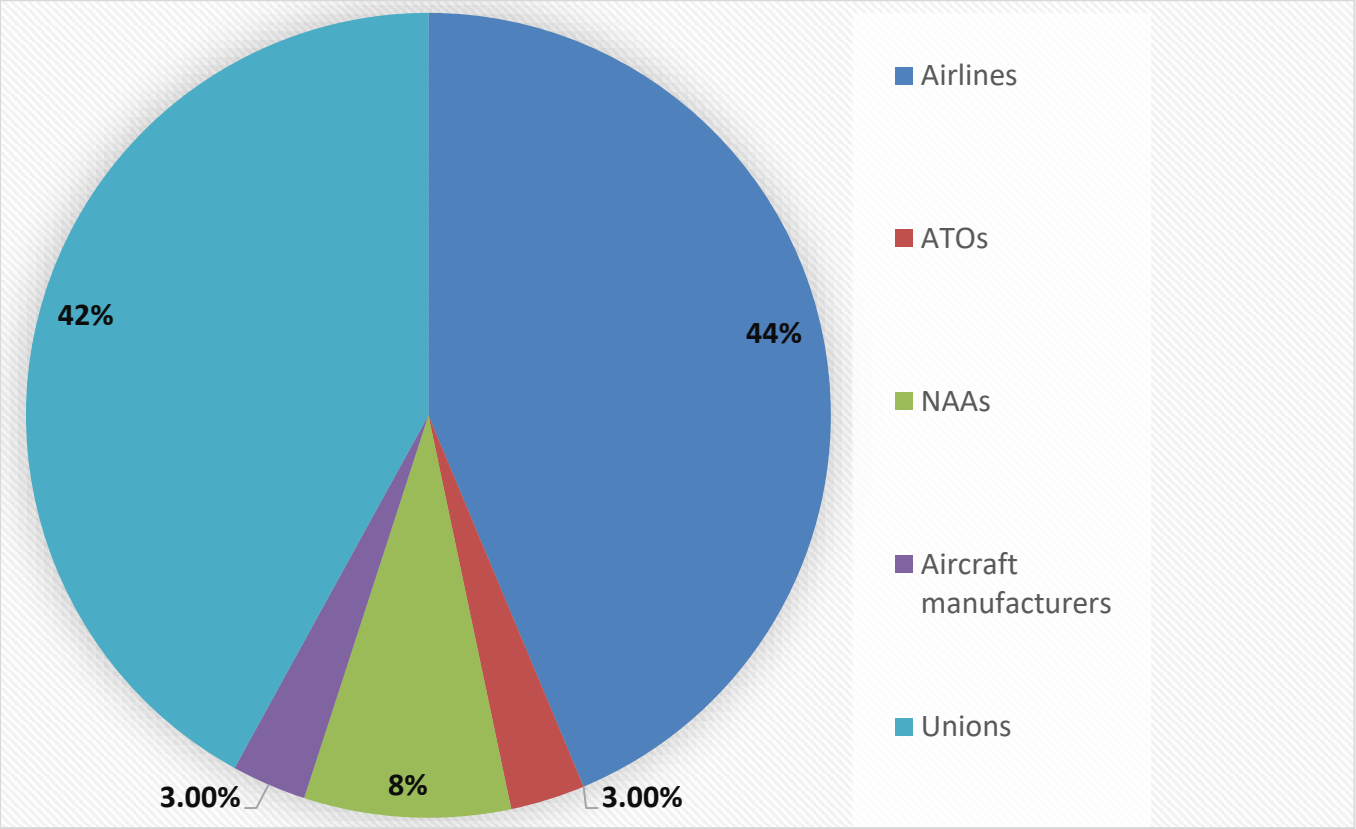
12 Focal point: Massimo Giavalisco and Fabio Polloni.

13 Focal point Lise-Lotte Olsen Deigaard

14 Focal point: Henrik Lyngse

15 In accordance with Article 115 of Regulation (EU) 2018/1139 and Articles 6(3) and 7 of the Rulemaking Procedure.

Percentage (%) of comments received from each of the interested parties



EASA has addressed and responded to the comments received on the NPA. EASA reviewed the comments received during the public consultation and during the focused consultation with the support of Review Group (RG) RMT.0599. The comments received and EASA's responses to them are presented in Comment-Response Documents (CRDs) 2018-07(A) and 2018-07(B)[16], and they are also summarised under Section 2.4 below.

The *final* text of this Opinion and the draft regulations have been developed by EASA based on the input of RMG RMT.0599 and the focused consultation. The draft rule text proposed by EASA is published on the EASA website[17].

1.2. The next steps

This Opinion contains the proposed amendments to Regulation (EU) No 965/2012[18] (the 'Air OPS Regulation') and to Regulation (EU) No 1178/2011[19] (the 'Aircrew Regulation') and their potential impacts. It is submitted to the European Commission, which will use it as a technical basis in order to prepare EU regulations.

16 http://easa.europa.eu/document-library/comment-response-documents

17 http://easa.europa.eu/document-library/opinions

18 Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1) (http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R0965&rid=1).

19 Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1528301490110&uri=CELEX:32011R1178).

The decisions that contain the related certification specifications (CSs), acceptable means of compliance (AMC) and guidance material (GM) will be published by EASA when the related regulations are adopted by the European Commission.

For information, the Appendix to this Opinion presents the rationale behind the changes at implementing rule level. Further to this, the Appendix provides the draft text for the related EASA decisions that contains certification specifications (CS), acceptable means of compliance (AMC) and guidance material (GM), as well as the rationale behind that text.

Following the publication of the regulations, EASA foresees to support the implementation of the Regulation with the following actions:

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

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

— A dedicated safety promotion task (SPT.012) is included in EPAS. The intent of this task is to facilitate EBT implementation.

2. In summary — why and what

A further analysis of the rationale and objectives addressed by this proposal is provided in Notice of proposed Amendment 2018-07(A) Update of ORO.FC — evidence-based training subtask in the Impact Assessment chapter.

2.1. Why we need to change the rules — issue/rationale

The complexity of the aviation system is continuously increasing; also, new technologies are emerging rapidly on the aviation market. Therefore, it is of key importance for the aviation personnel to:

(a) have the right competencies through the adaptation of training methods in order to cope with new challenges. This is one of the most significant systemic issues in the EPAS[20], 2016-2020, 2017-2021, 2018-2022, and 2019-2023; and

(b) take advantage of the safety-enhancing opportunities presented by new technologies. (EPAS 2018-2022, Section 5.2.2 'Human factors and competence of personnel' and EPAS 2019-2023, Section 5.1.2 'Human factors and competence of personnel'.

2.1.1. Why we need new rules on EBT in Europe

Aircraft design and reliability have improved steadily and significantly over time; yet, accidents still occur, even in cases when the aircraft and systems were operating without malfunction. It is impossible to foresee all plausible accident scenarios, especially in today's aviation system where its complexity and high reliability mean that the next accident may be something completely unexpected.

In addition to this, the wealth of accident and incident reports and the provision of flight data analysis offer the possibility to identify risks encountered in actual operations and therefore offer the industry with the opportunity to tailor training programmes in order to mitigate those risks that flight crew members face in operations.

EBT addresses both elements (prepare the pilot for the unexpected and mitigate operational risks) by moving from task-based training to prioritising the development and assessment of key competencies, leading to a better training outcome. The scenarios recommended in EBT are simply a vehicle and a means to assess and develop competence. Mastering a finite number of competencies should allow a pilot to manage situations in flight that are unforeseen by the aviation industry and for which the pilot has not been specifically trained.

(ICAO Doc 9995 AN/497 'Manual of Evidence-based Training' First edition - 2013 – Chapter Background).

Furthermore, this approach is also supported by scientific studies such as the 'Manual Operation for 4th Generation Airliners' financed by the European Commision. In its 'Final Report Summary', the following is stated:

'5.2. Training Development

A possible solution identified to improve flight training would be to train competencies instead of pre-described flight maneuvers, many of those being non-technical. Such competency transfer between scenarios could create more resilient flight crews that are more prepared to handle operational events

[20] https://www.easa.europa.eu/easa-and-you/safety-management/european-plan-aviation-safety

instead of the scripted and sometimes predictable scenarios currently used in training. A way to do this would be the implementation of Evidence-Based Training (EBT) concepts. To support this training methodology, this deliverable presents a scenario development method to generate scenarios for competency-based training.'

2.1.2. Safety recommendations (SRs) — outcome of the EASA safety assessment

The following safety recommendations (SRs) addressed to EASA from aircraft accident investigation report(s) published by the designated safety investigation authority[21], have been considered during this RMT.

FRAN-2013-017	The French Accident Investigation Board recommends that EASA, in coordination with manufacturers, operators and major non-European aviation authorities ensure that go-around training integrates instruction explaining the methodology for monitoring primary flight parameters, in particular, pitch, thrust then speed.
Evaluation of the SR	This Opinion addresses the SR through the transposition of Appendices 2 to 6 to Doc 9995 where are all the following are required at a frequency of twice per year (frequency A): — the training topics: — monitoring, cross-checking, error management, mismanaged aircraft state; and — go-around management; and — the manoeuvres training on: — go-around, all engines operative; — go-around, all engines operative followed by a visual circuit, manually flown; and — go-around, all engines operative during flare/rejected landing.

FRAN-2013-018	The French Accident Investigation Board recommends that EASA, in cooperation with the national civil aviation authorities and major non-European aviation authorities, ensure that during recurrent periodic training, training organizations and operators give greater importance to the assessment and maintenance of the monitoring capabilities of public transport pilots.
Evaluation of the SR	This Opinion addresses the SR through the transposition of Appendices 2 to 6 to Doc 9995 where the training topic: 'Monitoring, cross-checking, error management, mismanaged aircraft state' is required at a frequency of twice per year (Frequency A).

FRAN-2013-022	The French Accident Investigation Board recommends that EASA review regulatory requirements for initial and periodic training in order to ensure that go-arounds with all engines operating are performed sufficiently frequently during training.

[21] Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC (OJ L 295, 12.11.2010, p. 35) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1479716039678&uri=CELEX:32010R0996).

Evaluation of the SR	This Opinion addresses the SR through the transposition of Appendices 2 to 6 to Doc 9995 where are all the following are required at a frequency of twice per year (frequency A): — the training topic 'Go-around management'; and — the manoeuvres training on: — go-around, all engines operative: high energy, initiation during the approach at 150 to 300 m (500 to 1 000 ft) below the missed approach level off altitude; — go-around, all engines operative followed by a visual circuit, manually flown; and — go-around, all engines operative: during flare/rejected landing.

FRAN-2013-033	The French Accident Investigation Board recommends that EASA, in cooperation with the national civil aviation authorities and major non-European aviation authorities, ensure that the risks associated with dispersion and/or channelized attention during the go-around, to the detriment of the primary flight parameters, be taught to crews.
Evaluation of the SR	This Opinion addresses the SR through the transposition of Appendices 2 to 6 to Doc 9995 where are all the following are required at a frequency of twice per year (frequency A): — the training topics: — monitoring, cross-checking, error management, mismanaged aircraft state; and — go-around management; and — the manoeuvres training on: — go-around, all engines operative: high energy, initiation during the approach at 150 to 300 m (500 to 1 000 ft) below the missed approach level off altitude; — go-around, all engines operative followed by a visual circuit, manually flown; and — go-around, all engines operative: during flare/rejected landing.

FRAN-2013-035	The French Accident Investigation Board recommends that EASA, in coordination with manufacturers, operators and major non-European aviation authorities, study whether to extend these measures to other procedures requiring high workload in a short time frame.
Evaluation of the SR	This Opinion addresses the SR through the transposition of Appendices 2 to 6 to Doc 9995 where training topic 'Competencies non-technical (CRM)' and 14 other example scenarios where the competency 'workload management' is trained, are required at a frequency of twice per year (Frequency A), (crew resource management (CRM) includes

	communication, leadership and teamwork, problem-solving and decision-making, situation awareness, and workload management).

FRAN-2014-005	The French Accident Investigation Board recommends that EASA, in coordination with national authorities, make changes to the training requirements for pilots so as to include periodic reminders on the effects of contaminants such as ice on stall and loss of control on take-off.
Evaluation of the SR	This Opinion addresses the SR through the transposition of Appendices 2 to 6 to Doc 9995 where training topic 'adverse weather' is addressed at a frequency of twice per year (Frequency A). Furthermore, for CAT, EASA is taking benefit of this recurrent training and checking scheme to mandate recurrent flight crew upset prevention and recovery training (UPRT) (see ED Decision 2015/012/R[22], published on 4 May 2015). The related AMC1 ORO.FC.220&230 identifies icing and contamination effects as key components of the upset prevention training programme, and recurrent training now covers all upset aspects over a period not exceeding 3 years. In EBT, these provisions still apply.

FRAN-2015-062	[unofficial translation]: EASA should define the terms on how an operator can set up a risk-based training as described in Doc 9995. [French] [original text] - L'AESA définisse les modalités permettant à un exploitant de mettre en oeuvre la formation basée sur les risques telle que précisée dans le doc OACI 9995 de l'OACI. [Recommandation 2015-062].
Evaluation of the SR	This Opinion addresses the SR through the transposition of Doc 9995. Furthermore, ED Decision 2015/027/R[23], published on 16 December 2015, enables the implementation of EBT according to the principles established in Doc 9995 taking into account the European Union regulatory framework.

FRAN-2015-063	[unofficial translation]: EASA promotes CAT operators to consider issues related to CRM and wind shear in the EBT scenario. [French] - L'AESA incite les exploitants de transport aérien commercial à prendre en compte des problématiques relatives au CRM et au cisaillement de vent dans la conception des scénarii EBT. [Recommandation 2015-063].
Evaluation of the SR	This Opinion addresses the SR through the transposition of Doc 9995. Furthermore, ED Decision 2015/027/R, published on 16 December 2015, contains new GM to support the implementation of EBT by operators, to be conducted in flight simulation training devices (FSTDs), according to the principles established in Doc 9995. The GM is associated with the existing points (a), b) and (f) of ORO.FC.230 'Recurrent training and checking' and ORO.FC.A.245 'Alternative training and qualification programme' (see Organisation Requirements for Operators - Flight Crew (ORO.FC) of the Air OPS Regulation.

22 https://www.easa.europa.eu/document-library/agency-decisions/ed-decision-2015012r
23 https://www.easa.europa.eu/document-library/agency-decisions/ed-decision-2015027r

	CRM and wind shear are specifically addressed in the recurrent assessment and training matrices in Doc 9995, to which the new GM refers.

2.1.3. ICAO amendments

Following the work initiated by the Flight Crew Licensing and Training Panel (FCLTP)[24], in 2006 ICAO published Doc 9868 'Procedures for Air Navigation Services — Training (PANS-TRG)' — a document that contains procedures for the development and implementation of a competency-based training programme to support the Annex 1[25] requirements. This was followed in 2013 by an amendment of the aforementioned document for the introduction of EBT, which was accompanied by Doc 9995. The intention was to provide guidance to civil aviation authorities (CAAs), operators and ATOs on the recurrent assessment and training of pilots referred to in ICAO Annex 6 'Operation of Aircraft' and ICAO Annex 1 'Personnel Licensing', 1.2.5 'Validity of licenses'. Finally, through Amendment 2 to Doc 9868 (also issued in 2013), procedures for EBT were introduced in order to provide a means of assessing and training key areas of flight crew performance in a recurrent training system. In addition, more detailed guidance on qualifications of the instructor was provided.

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 1 of the Basic Regulation.

This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in Section 2.1.

The objective of this Opinion is to update the flight crew training requirements in order to improve assessment and training of human factors; in particular, the personnel competence. At the same time, it provides additional efficiency in the field of flight crew training while achieving a smooth transition to competency-based training.

The specific objectives of this proposal are to:

(a) maintain the high aviation safety level by:

  (1) ensuring that the recurrent training and checking programmes are adequate to provide pilots with the necessary knowledge, skills and attitudes (KSA) to be competent in their job — under this objective, EASA proposes in this Opinion new provisions to implement EBT as a first step towards the full implementation of competency-based training across Subpart FC of Part-ORO; and

  (2) addressing the SRs outlined in Section 2.1.2 'Safety recommendations';

(b) remain in compliance with ICAO by ensuring that the European rules align with the latest amendments outlined in Section 2.1.3 'ICAO amendments', especially with regard to the EBT; and

(c) contribute to the production of efficient regulations by adapting the necessary training standards and rules to ensure that the level of safety can only be positively affected by:

[24] Meeting held in Montreal, from 8 to 19 December 2003.

[25] International Standards and Recommended Practices ICAO — Annex 1 to the Convention on International Civil Aviation — Personnel Licensing.

(1) introducing performance-based regulation principles;

(2) ensuring consistency of training-related rules across the applicable parts of Annex III (Part-ORO) to the Air OPS Regulation and Annex I (Part-FCL) to the Aircrew Regulation; and

(3) ensuring the correct balance between implementing rules (IRs) and CS, AMC & GM on the subject issue.

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

ICAO Doc 9995 contains a complete competency framework ('core competencies') with competency descriptions and related behavioural indicators, encompassing what was previously known as both technical and non-technical knowledge, skills and attitudes (KSA). This way, the training content is aligned with the actual competencies necessary to operate safely, effectively and efficiently in a CAT environment.

Following this rationale, EASA decided to contribute to the development of regulations that ensure that pilot training and checking are adequate to provide a pilot with the necessary KSA to recognise and manage unexpected and unusual situations.

Traditional approaches to training development involve the decomposition of jobs into tasks. For each task, there is a related objective, an assessment and associated elements in a training plan. A limitation of this approach is that each task must be taught and assessed. In complex systems or when jobs evolve rapidly, it may not be possible to teach and assess each task. Moreover, learners may demonstrate the ability to perform tasks in isolation without being competent in their job.

Competency-based assessment and training on the other hand are based on the concept that competencies are transferable[26]. In the design of a competency-based assessment and training programme, a limited number of competencies are defined and used across a variety of activities and contexts.

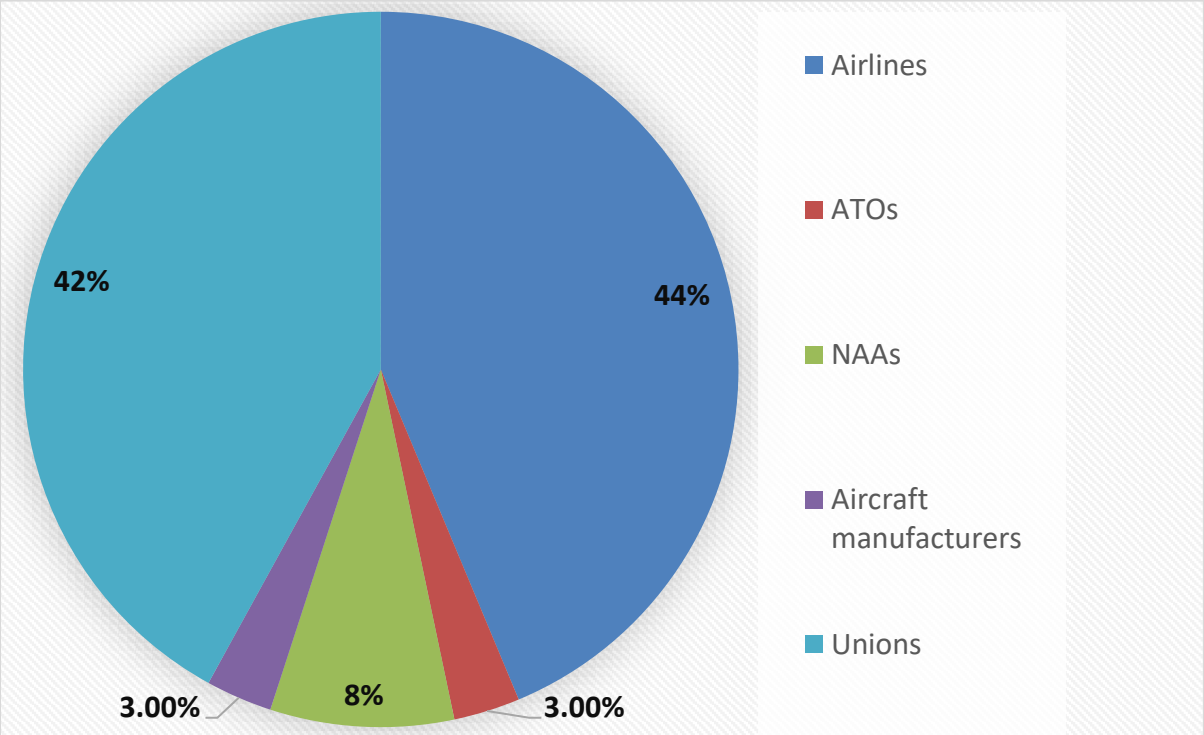
As new technologies emerge and the complexity of the aviation system increases, the existence of a competency framework is of key importance in order for pilots to be trained on a complete and relevant set of competencies. This competency framework should allow pilots to operate more safely, effectively and efficiently in a CAT environment. Furthermore, it should allow the training community to adapt their training methods in order to manage unexpected events through reactive analyses. In other words, mastering these competencies should allow the pilot to manage situations that are unforeseen by the industry and for which the pilot has not been specifically trained.

[26] See study MAN4GEN https://cordis.europa.eu/project/rcn/104513/factsheet/en

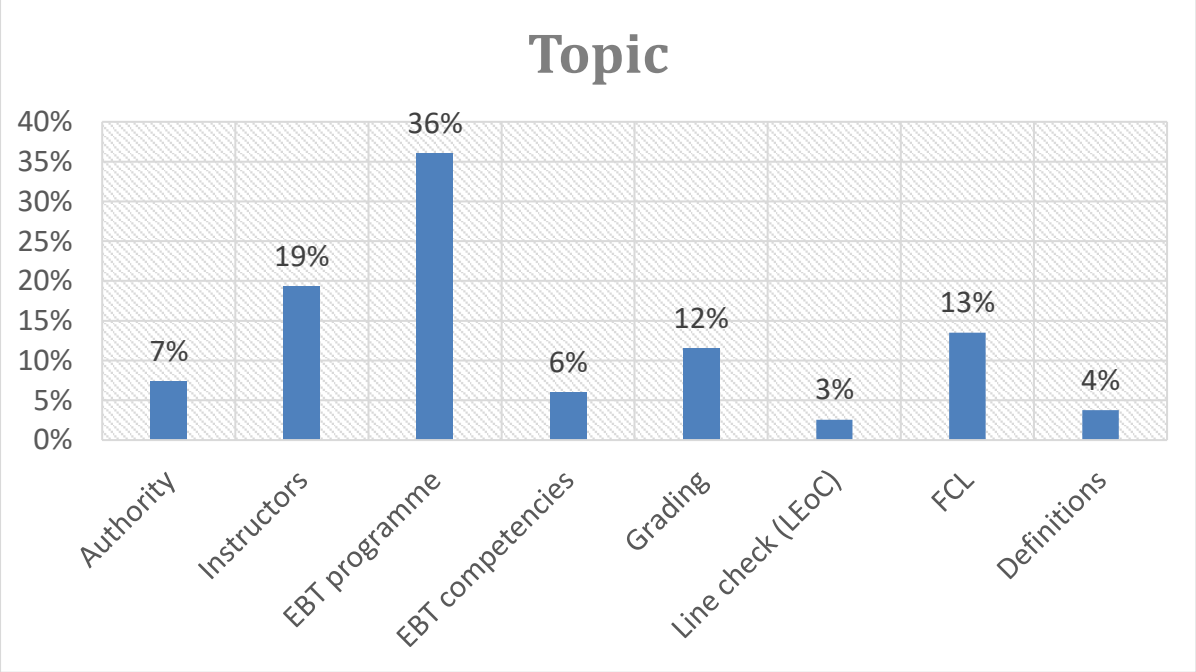
2.4. What are the stakeholders' views — outcome of the consultation

NPA 2018-07 received about 726 comments.

The percentage (%) of comments received from each type of stakeholder was the following:



The percentage of comments by topic is presented below.



The percentage of comments per type of stakeholder is presented below.

Stakeholder		
Competent authorities (NAAs)		
Number of comments	**The topic of the comments**	**Position of the stakeholder**
NAAs made about 8 % to 9 % of all the comments on the NPA. The main contributors were the authorities of France, United Kingdom, the Czech Republic and the Netherlands. Other contributors were Finland, Sweden, Malta, and Germany.	The comments addressed Part-ORO (42 % of the comments), Part-FCL (22 % of the comments) and Part-ARO (22 % of the comments). An additional 9 % of the comments made by the Member States were generic and in support of the proposal. Finally, 3 % of the comments made by the authorities addressed the definitions proposed in the NPA.	- in favour of implementing EBT - no comments against the concept of revalidation in accordance with FCL.740 and Appendix 10. However, one comment raises concerns about the delegation of signature in the licence revalidation allowed in EBT - in favour of providing more criteria or increasing the regulatory level in some provisionS (e.g. moving GM to AMC or moving AMC to IR - a few comments request to limit some of the flexibility allowed in the proposal (e.g. alternative competency frameworks, etc.)

Airlines		
Number of comments	**The topic of the comments**	**Position of the stakeholder**
44 % of all the comments made on the NPA. Except for one small/medium-sized business jet operator, only major airlines commented on the NPA.	The majority of the comments were on Part-ORO. However, there were comments on Part-ARO (3 % of the airline comments), on Part-DEF (3 %) and on Part-FCL (13,5 %).	- in favour of implementing EBT - demanding more prescription or definitions in some requirements - demanding less prescription and more flexibility in some other provisions - the airlines have different positions, with some of them requesting more flexibility while others are asking for a more prescriptive approach to avoid competitive disadvantages.

Approved training organisations (ATOs)		
Number of comments	**The topic of the comments**	**Position of the stakeholder**
About 3 % of all the comments on the NPA. Only the two biggest ATOs and simulator providers in the world made comments on the NPA. No comments received from medium-sized or small ATOs.	The majority of the comments were on Part-ORO (about 85 % of all the comments they made). They also made comments on Part-FCL (the remaining 15 %).	- in favour of implementing EBT - allow ATOs to train EBT under their privileges instead of under the operator's privileges. The proposal allows ATOs to train EBT under ORO.GEN.205 on contracting activities.

Employee associations		
Number of comments	**The topic of the comments**	**Position of the stakeholder**
This type of stakeholder made about 42 % of all the comments on the NPA. The comments were coordinated between the European Cockpit Association and the German and French unions and/or federation.	The majority of comments made by employee associations is on Part-ORO (67 % of the comments made by the unions). They also made comments on Part-FCL (about 18 % of the comments made by the unions). 8% of the comments made by this type of stakeholder were on Part-ARO.	- in favour of implementing EBT - however, they have serious concerns in regard to the use of instructors, the use of examiners and data protection.

	4 % of the comments were on the definitions.	

Original aircraft manufacturers (OAMs)		
Number of comments	**The topic of the comments**	**Position of the stakeholder**
This type of stakeholder made about 3 % of all the comments on the NPA. Only one manufacturer-provided comments.	The majority of comments made by this stakeholder were made on Part-ORO. The other comments are on Part-ARO (22 % of the comments made by this type of stakeholder) and on the definitions (about 5 % of the comments made by this type of stakeholder)	- in favour of implementing EBT - generally speaking, this type of stakeholder requires more guidance on some of the provisions.

2.5. What are the expected benefits and drawbacks of the proposals

2.5.1. Expected benefits

Studies[27] show that the effective implementation of EBT should bring about a significant contribution to aviation safety by strengthening the competencies of flight crews and enabling them to handle abnormal and unexpected situations safely. It is expected that the safety benefit of EBT would be demonstrated over time by continually improving a system targeted at focused learning[28]. The implementation of the EBT programme would ensure a level of safety at least equivalent to that provided by compliance with the existing pilot training requirements of ORO.FC.230 of Annex III (Part-ORO) to the Air OPS Regulation and Appendix 9 to Annex I (Part-FCL) to the Aircrew Regulation. Safety benefits should be expected through a qualitative approach, using competencies to develop resilience by exposure to varying and challenging situations. The overall result would be better training of the pilots involved and a lower flight-crew-related accident rate in the future.

The level of training of pilots and personnel dealing with pilot training within the air operator certificate (AOC) holders would be improved. The EBT concept is designed to maximise learning and minimise formal checking. Where checking is required, it should evolve towards measuring the process of managing situations rather than only the outcome of this process. This will lead to a substantial change towards more learning opportunities for pilots, by recognising the expectation that professionals should continuously strive to learn and develop their capabilities, rather than only being focused on demonstrating performance according to minimum regulatory standards. The pilots will be assessed and their licences will be revalidated based on evidence from clearly described EBT evaluation modules and development of competencies throughout the EBT programme. The data[29] shows that the remedial training for flight crew who fail in the LPCs and OPCs is reduced by half (50 %) after the implementation of EBT. Therefore, the proposal is expected to have a positive social impact on the stakeholders (pilots and organisations). Based on the improved skills and competencies, EBT might also have also a potentially positive effect on the flight crew career development.

There would be a positive social impact on the type rating instructors (TRIs) and type rating examiners (TREs) as well, because they will receive competency-based training to improve their knowledge and skills. The same applies for the competent authorities' instructors who would improve their

[27] Man4Gen Study www.man4gen.eu; IATA, Data Report for Evidence-based Training, 2013; experience of operators that have implemented EBT

[28] IATA, Data Report for Evidence-based Training, 2013

[29] Based on the feedback by operators who implemented full EBT worldwide, 2008-2015, EASA questionnaire 2016

knowledge by following EBT training and/or participating in all phases of the implementation of EBT by the operator and by overseeing the training of TRIs/TREs.

As regards the economic impacts, a full cost-benefit analysis was performed for two different cases: a medium-sized/large operator (e.g. 1 000 pilots) and a small operator (e.g. 100 pilots). The objective was to understand the difference in the economic benefits and costs for the operator, depending on its size.

The implementation of EBT is expected to bring economic benefits as follows:

— Line check: 2 years after EBT implementation, an operator may be allowed to extend the line check, i.e. a pilot's line check requirement is reduced from 1 per year to 1 every 2 years. The benefit is that the operator is saving the costs it pays annually for the line check of all flight crew.

— Ground training: A pilot's safety equipment procedure (SEP) training requirement is reduced from 1 per year to 1 every 2 years. The benefit is saving the daily wage of the flight crew. In addition, less CRM training is expected due to the integration of non-technical competencies in the EBT programme (1 day per pilot/year to 1 day per pilot/3 years).

— Saving due to the decrease in the percentage of pilots who fail in OPC/LPC: Saving in daily wages of the flight crew for the time that they do not fly.

— Indirect saving (flexibility): A reduction in pilot workload is expected due to the flexibility to run simulator sessions outside the peak flying months. The benefit is assumed to be circa 1 % of the annual wage of a pilot saved, multiplied by the number of the pilots who would be available to fly instead of going to the simulator.

The operator could reap these benefits on the basis of its performance in implementing EBT which would be overseen and granted by the competent authority.

2.5.2. Expected drawbacks

Despite the overall positive social impact on the affected stakeholders, some drawbacks regarding the work of the TREs could be expected. The workload and the volume and scope of the work performed by the TREs would be reduced as the revalidation of the licences will not be based on a single simulator session; it will be based on the evidence obtained through the EBT system. The reduced workload might affect negatively the current role, position and the number of examiners. Although the amount of training in EBT remains unchanged, the role of the trainer will be now performed under the privileges of the TRI certificate, instead of the TRE certificate.

In terms of cost, the cost-benefit analysis described the following types of costs related to preparation, adoption and implementation of EBT (one-off and recurrent):

— Development of EBT competency framework and EBT programme (one-off);

— Training of the operator’s training manager and instructors to deliver EBT (one-off);

— Purchase of an IT assessment tool to support the implementation of EBT (one-off);

— Costs for maintaining licences for the IT tool (recurrent);

— Update of the EBT training programme (recurrent); and

— Refresher training of the EBT instructors (recurrent).

As regards the competent authorities, the requirement for inspectors to be competent in the approval of and the oversight over EBT programmes would result in increased competent authority's workload in the short term (ca 200 hours one-off costs for initial training, approval of operator's training programme). They would be offset with normalisation of the workload in the consecutive years in EBT oversight (ca 50-70 hours recurrent costs per operator). In addition, the workload and the relative costs for the competent authority are expected to decrease with time, as there might be a higher take-up of the EBT programmes by AOC holders. As EBT implementation supports performance- and risk-based oversight, the overall impact on the competent authority is considered very low negative in the first years and neutral in the consecutive years.

2.5.3. Overall conclusion

Table 1: Overview of economic impacts per type of operator

AOC (A) operator	*EBT benefits (annual)[30] EUR*	*EBT one-off costs[31] EUR*	*EBT recurrent costs (annual) EUR*	*Net benefit (benefits-recurrent costs) in EUR*	*Saving per pilot/ year EUR*	*Return of investment*
Medium-sized /large (1 000 pilots)	ca 0.9 M	ca 1 M	ca 0.2 M	0.7 M	ca 700	≥ 3 years
Small (100 pilots)	ca 0.1 M	ca 0.2 M	ca 0.02 M	0.08 M	ca 800[32]	≥ 4 years

The cost-benefit analysis demonstrates that the EBT implementation in recurrent training and checking of flight crew in a medium-sized/large operator is a cost-effective solution. The profitability indicators show a return of investment shortly after 3 years of EBT implementation, considering that the operator would receive full economic benefits based on its performance and the decision of the competent authority.

Similarly, to the medium-sized/large operator, a small operator has the potential to reap net economic benefits from the EBT implementation. However, a small operator may encounter difficulties in deploying the EBT concept due to the need to make additional investments in data collection and analysis of existing threats, and identification of potential weaknesses in the operator's operational safety. These costs are not quantified in the cost-benefit model due to lack of reliable data. Overall, small airlines could not have the available resources or expertise to develop EBT and hence it might be difficult to implement the EBT concept in the short term.

30 It is assumed that the operator could reap the economic benefits 2 years after full implementation of the EBT.

31 Assuming that the operator would make these investment costs in the course of the 2 preparatory years (when the operator would run its traditional training and would make the EBT investment one-off costs).

32 The amount is a bit higher than for the medium-sized/large operator because of the assumption that the small operator employs 100 pilots.

Therefore, the regulatory impact assessment recommends the implementation of EBT for recurrent training and checking on a voluntary basis by AOC holders. For the full impact assessment of alternative options, please refer to Chapter 3 'Impact assessment' in NPA 2018-07(A).

2.6. How we monitor and evaluate the rules

It is recommended that the rules are subject to monitoring and, in case it is necessary, to an evaluation of their relevance, impact, effectiveness and efficiency. It is recommended that the following monitoring indicators are used to review the implementation of the new provisions.

Table 2: Proposed indicative list of indicators to monitor the results of the rules

Monitoring indicator	Description and rationale of the indicator	Data source	Indicative frequency of data collection
% of AOC(A) holders which implemented EBT in EASA MSs	The EBT concept would be implemented on a voluntary basis and it is recommended to monitor how many AOC(A) holders would implement it.	Survey	2 years after rules are in place
No and trend in occurrences for AOC(A) holders where training is a key enabler	The current RMT contributes to mitigating safety-related issues, which play a role in improving safety across all aviation domains.	EASA Annual Safety Review ECCAIRS database	Annual

If an ex post evaluation is needed, it is recommended to be carried out indicatively 5 years after the rules are in place.

Cologne, 16 December 2019

Patrick KY
Executive Director

3. References

3.1. Affected regulations

— Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1)

— Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1)

3.2. Related decisions

— Decision N° 2012/015/Directorate R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council 'Guidance Material to Annex I – Definitions'

— Decision 2014/025/R of the Executive Director of the Agency of 28 July 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ARO of Commission Regulation (EU) No 965/2012 and repealing Decision 2014/014/R of the Executive Director of the Agency of 24 April 2014 'AMC and GM to Part-ARO — Issue 3'

— Decision 2014/017/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ORO of Commission Regulation (EU) No 965/2012 and repealing Decision 2012/017/R of the Executive Director of the Agency of 24 October 2012 'AMC and GM to Part-ORO — Issue 2'

— Decision N° 2012/006/Directorate R of the Executive Director of the Agency of 19th April 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council 'Acceptable Means of Compliance and Guidance Material to Part-ARA'

— Decision N° 2011/016/R of the Executive Director of the European Aviation Safety Agency of 15 December 2011 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council 'Acceptable Means of Compliance and Guidance Material to Part-FCL'

3.3. Other reference documents

— Decision No 2015/027/R of the Executive Director of the European Aviation Safety Agency of 16 December 2015 on guidance material to Part-ORO of Regulation (EU) No 965/2012 on the

implementation of evidence-based training (EBT) within the European regulatory framework (Mixed EBT)

— ICAO Annex 1 to the Convention on International Civil Aviation 'Personnel Licensing', 11th Edition, July 2011

— ICAO Annex 6 to the Convention on International Civil Aviation 'Operation of Aircraft', 10th Edition, July 2016

— ICAO Doc 9868 'Procedures for air navigation services Training' Second Edition, 2016

— ICAO Doc 9995 AN/497 'Manual of Evidence-based Training' First edition - 2013

— ICAO Doc 10011 AN/506 'Manual on aeroplane upset prevention and recovery training' First edition – 2014

— ICAO Doc 9841 AN/456 'Manual on the Approval of Training Organizations' Second edition – 2012

— ICAO Doc 9379 AN/916 'Manual of Procedures for Establishment and Management of a State's Personnel Licensing System'

4. Appendix

Appendix to Opinion No 08/2019 (A) 'Rationale behind the proposed amendments to the implementing rules — Draft CS, AMC & GM as well as safety promotion actions that are associated with the implementing rules — Rationale behind the draft CS and AMC & GM'