



Explanatory Note to Decision 2018/001/R

Acceptable Means of Compliance and Guidance Material to Part-FCL and to Part-ORA of Commission Regulation (EU) No 1178/2011, as amended, as regards the theoretical knowledge syllabi and learning objectives for airline transport pilot licence (ATPL), multi-crew pilot licence (MPL), commercial pilot licence (CPL), and instrument rating (IR) for aeroplanes (A) and helicopters (H)

RELATED NPAs/CRDs: 2016-03(A)(B)(C)(D)(E)(F) — RMT.0595

EXECUTIVE SUMMARY

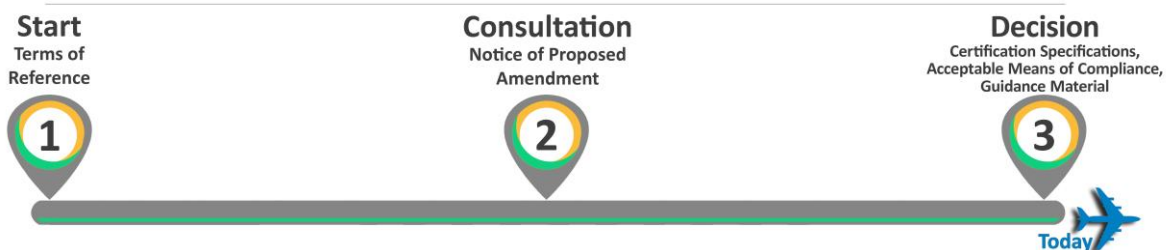
Decision 2018/001/R addresses a safety and regulatory coordination issue related to flight crew licensing, and it has been developed in response to the European Plan for Aviation Safety (EPAS) safety actions.

This Decision contains the updated Learning Objectives (LOs) for the theoretical knowledge syllabi and ground school examinations, and introduces the threat and error management (TEM) concept and its application. The updated LOs correspond to today’s operational environment and ensure that commercial pilots are equipped with the knowledge and understanding relevant to modern flight deck and current industry needs. The updated pilot training will contribute to the overall enhancement of the pilots’ core competencies and their ability to make informed decisions.

The Decision also introduces new LOs under Area 100 ‘Knowledge, skills and attitudes’ (KSA) whose aim is to enhance the pilots’ KSA contained in the core competencies. This Area 100 contains requirements for approved training organisations (ATOs) to assess student pilots’ KSA. These skills focus on the pilots’ ability to apply their knowledge and understanding across subjects and to demonstrate technical and non-technical skills. These LOs will, therefore, not be the subject of examinations organised by competent authorities or their agents, but will be assessed by the ATOs to ensure that student pilots have an adequate level of competence before they are allowed to sit their final theoretical knowledge examinations.

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|-------------------------------|---|------------------------------|----------|
| Action area: | Aviation personnel | | |
| Affected rules: | Acceptable Means of Compliance (AMCs)/Guidance Material (GM) to Part-FCL; Acceptable Means of Compliance (AMCs)/Guidance Material (GM) to Part-ORA | | |
| Affected stakeholders: | Pilots; operators; approved training organisations (ATOs); competent authorities (CAs); student pilots; providers of textbooks and training material; European Central Question Bank (ECQB) | | |
| Driver: | Safety | Rulemaking group: | Yes |
| Impact assessment: | Light | Rulemaking Procedure: | Standard |

EASA rulemaking process



11.3.2015

9.6.2016

6.2.2018



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1. About this Decision

The European Aviation Safety Agency (EASA) developed ED Decision 2018/001/R in line with Regulation (EC) No 216/2008¹ (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure².

This rulemaking activity is included in the EASA 5-year Rulemaking Programme³ under rulemaking task RMT.0595. The scope and timescales of the task were defined in the related Terms of Reference (ToR RMT.0595 Issue 1)⁴.

The text of this Decision has been developed by EASA based on the input of the RMT.0595 Rulemaking Group (RMG), which was led by industry representatives and comprised EASA staff acting as group members and also providing the secretariat. All interested parties were consulted through Notice of Proposed Amendments (NPAs) 2016-03(A)(B)(C)(D)(E)(F)^{5,6}.

1 164 individual comments were received from interested parties, including industry, national aviation authorities (NAAs) and other stakeholders. The majority of the comments contained multiple statements, mostly relating to the amended LOs.

EASA reviewed the comments received during the public consultation. To assist EASA in reviewing the comments, an NPA Review Group was formed. This Group, led by EASA, was made up of representatives from industry and NAAs. The related comments received and EASA's responses thereto are presented in Comment-Response Document (CRD) 2016-03(A)(B)(C)(D)(E)(F)⁷.

The final text of this Decision with the AMCs/GM has been developed by EASA.

The major milestones of this rulemaking activity are presented on the title page.

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

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

³ <http://easa.europa.eu/rulemaking/annual-programme-and-planning.php>

⁴ <https://www.easa.europa.eu/document-library/terms-of-reference-and-group-compositions/tor-rmt0595>

⁵ In accordance with Article 52 of Regulation (EC) No 216/2008, and Articles 6(3) and 7 of the Rulemaking Procedure.

⁶ <https://www.easa.europa.eu/document-library/notices-of-proposed-amendment>

⁷ <https://www.easa.europa.eu/document-library/comment-response-documents>



2. In summary — why and what

2.1. Why we need to change the AMCs/GM

The last significant technical update of the syllabi and LOs for the airline transport pilot licence (ATPL), multi-crew pilot licence (MPL), commercial pilot licence (CPL), and instrument rating (IR) theoretical knowledge courses for aeroplane and helicopter categories was conducted in 2006. Given the emergence of new technologies and the advancement of training philosophy there was a need to review, amend, and update these LOs (where necessary). The theoretical knowledge training for ATPL, MPL, CPL and IRs should provide all the necessary knowledge and competencies to prepare pilots for performing state-of-the-art flight operations. The opportunity to review the applicable examination procedures, as required, was also taken.

It should be noted that the currency and relevance of syllabi and LOs is a precondition for ensuring that the ECQB adequately performs the function for which it is intended and meets its safety objectives.

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation.

This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in Chapter 2.

The primary objective of this Decision is to enhance the theoretical knowledge training, assessment and subsequent examinations for ATPL, MPL, CPL, IR, competency-based instrument rating (aeroplanes) (CB-IR(A)), and en-route instrument rating (EIR) for aeroplanes and helicopters.

The specific objectives of this Decision are:

- to update the theoretical knowledge syllabi and LOs whilst also improving teaching methodologies and accommodating evolving learning needs; and
- to facilitate updating the ECQB, thus ensuring that it is current and relevant to evolving training needs.

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

This Decision amends the AMCs/GM to Part-FCL and Part-ORA in order to ensure that the applicable theoretical knowledge syllabi remain up to date and relevant, further developing and enhancing the pilots' KSA.

2.4. Overview of the issues to be addressed

This Decision contains two Annexes:

1. Annex I contains the AMCs and GM to Part-FCL; and
2. Annex II contains the AMCs and GM to Part-ORA.

During the development of the amendments, the following activities have been undertaken:

- The current categorisation of subject areas has been assessed to ensure that it remains meaningful. Amendments have been made, where considered necessary, taking into account the direct impact of such changes on the examination procedures. In addition, some topics have



been moved between or deleted from subject areas to minimise and, where possible, eliminate duplication.

- Each subject area has been reviewed to check that the syllabus structure and LOs are drafted in compliance with the newly developed taxonomy guidelines for the drafting of LOs, and amendments have been made, where considered necessary.
- The LOs of each subject area have been reviewed to ensure they are current, up to date, and relevant — and amendments have been made, where considered necessary.
- The subject areas common to both aeroplanes and helicopters have been reviewed and new aeroplane- or helicopter-specific LOs have been introduced, where considered necessary.
- Each subject area has been reviewed to consider whether the LOs are relevant and proportionate for the specific examinations (ATPL, MPL, CPL, IR, CB-IR(A) and EIR). Amendments have been made, where considered appropriate and practicable.
- The LOs that were considered outdated and no longer relevant to the modern operating environment were identified early on in the rulemaking process. This allowed the EASA staff managing the ECQB to ensure that subject-matter experts would not be tasked to develop new questions on these LOs. However, existing questions on these specific LOs will remain in the ECQB until the full transition to the new system is completed.
- The syllabi structure of the amended AMCs has been checked for consistency across all subject areas.
- In considering subject areas and LOs, the depth of knowledge required in relation to ICAO Annexes, Documents, and Standards and Recommended Practices (SARPs), and the differences between these and the applicable European Union (EU) rules have been taken into account. Recent rulemaking deliverables and EU regulations were also considered. The appropriate rule references specified in the syllabi and LOs have been reviewed and amended where necessary. For Subject 010 'Air Law' and Subject 070 'Operational Procedures' a full set of references to the applicable legislation is provided.
- The amendments to the syllabi structure and LOs have been considered with regard to any potential impact on the content of skill tests and proficiency checks.
- Guidelines on structuring and drafting syllabi items and LOs will be prepared in a separate EASA internal document, and are not included in this Decision. These guidelines are to be used by groups of experts in the future, when the need to propose new LOs has been identified.
- In addition, the subset of LOs required for the CB-IR(A) and EIR has been reviewed to ensure consistency between the syllabi; these LOs have now been merged into the same tables as those containing the LOs for the ATPL, MPL, CPL, and IR.
- The transition from the currently applicable to the new syllabi and LOs has been considered, taking into account current rules on theoretical knowledge examinations.
- The Jeppesen Student Pilot Route Manual which is part of the current syllabus (AMC1 FCL.310; FCL515(b); FCL.615(b)) was updated and revised. The revised version is called the General Student Pilot Route Manual (GSPRM) and fits both the current syllabus and the new one presented in this Decision. In order to ensure a quality training tool, the list of aerodromes from



which charts are included was changed, compared to the NPA, in consultation with the General Navigation and Flight Planning and Monitoring subject specialist subgroups. The content of the GSPRM is given in this Decision and any chart provider interested in producing a GSPRM, to the complete specifications made, is invited to contact the ECQB team at ECQB@easa.europa.eu.

For the development of this Decision, the work of the following EASA RMTs and published NPAs and Decisions have been taken into account:

- RMT.0256 on performance-based navigation (PBN) and, in particular, the amendments to syllabi and LOs related to PBN operations (ED Decision 2016/008/R⁸);
- RMT.0188 & RMT.0189 (former FCL.002) updating Part-FCL (Annex I to Commission Regulation (EU) No 1178/2011), which includes a draft set of AMCs incorporating LOs to the syllabus of theoretical knowledge for ATPL, MPL, CPL and IR (ED Decision 2016/008/R);
- The comments received on NPA 2014-29(D)(1) & (D)(2)⁹; and
- RMT.0581 & RMT.0582 ‘Loss of control prevention and recovery training’ (NPA 2015-13)¹⁰.

2.5. The review and update over a number of steps

The review and update of the syllabi and LOs is planned to take place over a number of steps.

First step

The first step was the publication of the LOs in 2016.

With Decision 2016/008/R of 2 May 2016, the Executive Director issued Acceptable Means of Compliance and Guidance Material to Part-FCL of Commission Regulation (EU) No 1178/2011 related to the detailed theoretical knowledge syllabus and learning objectives for ATPL, MPL, CPL and IR for aeroplanes and helicopters. The AMCs and GM related to the LOs contained in Annex II to Decision 2016/008/R were not changed compared to the text proposed with NPA 2014-29(D)(1) & (D)(2).

At that time a new rulemaking activity was already established to do a technical review of the theoretical knowledge syllabi, LOs, and examination procedures for the ATPL, MPL, CPL, IR, CB-IR(A) and EIR. This rulemaking activity is included in the EASA’s Revised 2014-2017 Rulemaking Programme¹¹ under RMT.0595.

Second step

The second step is the publication of this Decision following the technical review of the theoretical knowledge syllabi, LOs, and examination procedures. The text of the NPA was developed by the RMT.0595 Rulemaking Group (RMG), which was led by industry representatives and comprised EASA staff acting as group members and also providing the secretariat. The RMT.0595 NPA Review Group helped EASA to write the responses in the CRD and amend the syllabi and LOs.

⁸ <https://www.easa.europa.eu/document-library/agency-decisions/ed-decision-2016008r>

⁹ <https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2014-29-d1>,

<https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2014-29-d2>

¹⁰ <https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2015-13>

¹¹ <https://www.easa.europa.eu/document-library/rulemaking-programmes/revised-2014-2017-rulemaking-programme>

This Decision updates the LOs and theoretical knowledge syllabi, and introduces the TEM concept and its application. The updated LOs correspond to today's operational environment and ensure that commercial pilots are equipped with the knowledge and understanding relevant to modern flight operations and current industry needs.

The Decision also introduces new LOs under Area 100 KSA, which aims to consolidate students' understanding of the different theoretical knowledge subjects within the framework of the relevant ICAO core competencies. This Area 100 KSA contains requirements for ATOs to assess student pilots' KSA. These skills focus on the pilots' ability to apply their knowledge and understanding across subjects and to demonstrate technical and non-technical skills. These Area 100 KSA LOs will not be the subject of examinations organised by competent authorities using questions drawn from the ECQB, but will be assessed by the ATOs to ensure that student pilots have an adequate level of competency before they are allowed to sit their final theoretical knowledge examination. This modernised theoretical knowledge training will contribute to the overall enhancement of pilots' core competencies and their ability to make informed decisions.

The LO tables are published in Annex I to this Decision. These LO tables are published as a clean document to assist ATOs working with them to modify their training materials and courseware. The LO tables with the marked amendments are published together with the CRDs, and are meant purely as a documentation tool. These marked amendments show deleted text, new or amended text as shown below:

- (a) deleted text is ~~struck through~~;
- (b) new or amended text is highlighted in grey.

CRDs 2016-03(A)(B)(C)(D)(E)(F) are published together with this Decision in 2018/Q1.

Third step

The third step is the publication of a decision amending the examination procedures in the relevant AMCs to ARA.FCL.300(b) 'Examination procedures'. Additionally, these amendments will integrate the examination procedures for the CB-IR(A) and EIR examinations currently found in AMC2 ARA.FCL.300(b). These AMCs were already consulted upon during the NPA process, but EASA wishes to undertake further consideration of the effect of introducing different question styles in the examinations, and the consequence of developing and introducing scenario-based questions, before finalising the future examination structure. These examination tables will specify the total number of questions in each examination, the distribution of questions related to the different syllabus topics, and the time allowed for each examination.

In the same decision (or in another subsequent decision), EASA will publish Subject 090 'Radio Communications' as appendix to Annex I to this decision. Subject 090 was also consulted upon during the NPA, and Subjects 091 'VFR Communications' and 092 'IFR Communications' have been combined into one subject, and renumbered as Subject 090 'Radio Communications'. The publication of Subject 090 'Radio Communications' is only possible once Regulation (EU) No 1178/2011 has been amended to combine the subjects. This amendment is proposed in Opinion No 06/2017¹² and expected

¹² <https://www.easa.europa.eu/document-library/opinions/opinion-062017>

to be adopted by the Commission in 2018/Q2. Only thereafter can EASA publish the LOs for Subject 090 'Radio Communications'.

2.6. Overview of the main amendments

The following main amendments have been made:

Amendments to Annex I, Subpart FCL:

- A new AMC1 FCL.025(a)(2) has been added. It introduces the requirement that student pilots should be first assessed for Area 100 KSA before being recommended for the final theoretical knowledge examination paper.
- AMC1 FCL.310; FCL.515(b); FCL.615(b) 'Theoretical knowledge examination' has been substantially revised as follows:
 - Several LOs have been categorised as comprising 'Basic Knowledge (BK)' in a newly added column in the LO tables. These LOs will no longer be the subject of dedicated examination questions which focus only on the specific subject matter required by the LO, for example, recalling the appropriate unit of measurement to be used. However, student pilots will still be required to assimilate the specific knowledge required by the BK LOs in order to have the ability to answer examination questions based on LOs which target higher levels of understanding in the same subject. These other LOs, themselves, build upon this basic knowledge. The ATOs must ensure that all LOs (including BK LOs) in the syllabus applicable to the course of training being delivered are covered. The reason for introducing the concept of BK is to ensure that the level of competency examined is appropriate to the licence category and privileges sought.
 - The LOs required for the recently developed CB-IR(A) and EIR have been reviewed. To ensure consistency among the syllabi, the CB-IR(A) and EIR LOs currently in AMC2 FCL.615(b) to AMC8 FCL.615(b) 'IR — Theoretical knowledge and flight instruction' have been merged into the same tables with those for the ATPL, MPL, CPL and IR in the revised AMC1 FCL.310; FCL.515(b); FCL.615(b).
 - The LOs that are considered to be outdated or otherwise irrelevant to today's operating environment and practices have been deleted.
 - The LOs that are duplicated in different subject areas have been identified and wherever possible kept in only one subject area.
 - New LOs have been added to take account of new technology, current safety priorities, changes in operational practices and the outcome of the work done in other RMTs (e.g. LOs on upset prevention and recovery training (UPRT)).
 - A new column with 'Remarks' has been added to the LO tables. This column is empty and serves as a placeholder for future new licences (for example, the remote pilot licence).
 - The deletion or addition of some LOs, paragraphs, topics or subtopics, together with moving some LOs from one topic or subject to another, necessitated the renumbering of the LOs, paragraphs, topics and/or subtopics. To facilitate easy reference to a particular LO during the public consultation period, all the LOs were numbered sequentially,



including those planned for deletion (the set of digits in brackets indicates the LO position within a certain paragraph or subtopic). The final numbering has now been properly adjusted in this ED Decision — all LOs are numbered sequentially in each paragraph. In order to help examination delivery systems function optimally, the LOs in each subject are catalogued in the following way:

- 010 00 00 00 — Subject
 - 010 01 00 00 — Topic
 - 010 01 01 00 — Subtopic
 - 010 01 01 01 — Paragraph
 - 010 01 01 01 (01) — LO
- A new LO area (Area 100 KSA) has been added. This area deliberately has cross-subject applicability and focuses on the development of pilots' core competencies. It is applicable only for courses that contain theoretical knowledge training for the issue of an ATPL, MPL and CPL in aeroplane or helicopter categories. These LOs will not be examined under the ECQB system, but are instead to be assessed by the ATOs. The head of training at the ATO will have to be satisfied that the candidate has attained the required level of competency in this new LO area before they apply to sit the final theoretical knowledge examination paper.
 - The LOs have also been reviewed to ensure greater clarity in the level of understanding that is required. This is based on the taxonomy of verbs described in the new GM1 FCL.310; FCL.515(b); FCL.615(b). For example, in the text of some LOs the verb 'state' has been changed to 'explain', requiring student pilots to demonstrate that they are able to understand and apply the required knowledge.
 - A summary of the main amendments per subject is given below:

SUBJECT 010 — AIR LAW

- A full set of references to the applicable legislation has been added to most of the LOs. The basis for the LOs includes the Standardised European Rules of the Air (SERA), the applicable ICAO Annexes and Documents and, to a lesser extent, the European Air Operations Regulation (Regulation (EU) No 965/2012).
- The LOs about general ICAO agreements (such as the International Air Services Transit Agreement (ICAO Doc 7500); the Tokyo, The Hague and Montreal Conventions; the Rome and Warsaw Bilateral Agreements) have been deleted.
- The LOs requiring descriptions of organisations like the International Air Transport Association (IATA) and the European Civil Aviation Conference (ECAC) have been deleted.
- LOs on certification specifications (CSs) and ICAO Annex 8 'Airworthiness of Aircraft', considered beyond the necessary knowledge of a professional pilot, have been deleted.
- A small number of new LOs have been introduced.



- Fix tolerance areas are considered outdated with the increasing use of required navigation performance (RNP) and performance-based navigation (PBN). LOs concerning the use of flight management system (FMS)/area navigation (RNAV) equipment have been deleted as that has no relevance for Subject 010.
- LOs on radio altimeter operating areas are outdated and have therefore been deleted.

SUBJECT 020 — AIRCRAFT GENERAL KNOWLEDGE

- The revision of Subject 020 subject matter has added more emphasis on what is relevant to a pilot rather than going in to great depth on the technical aspects. The pilot's perspective is the use of a system rather than the technical aspects appropriate to an engineering level.
- This is particularly evident in Subject 022 'Instrumentation', where a lot of the technical design descriptions for the basic flight instruments have been substituted by a greater consideration of more advanced automation and the use of electronic displays and systems. The emphasis on automation is aimed at increasing the candidate's awareness of automation and on how the autoflight systems function and interact with other systems. It is becoming evident that in recent times there has been an increasing number of incidents relating to automation mismanagement, hence the need to include what is relevant rather than relying on theoretical knowledge that is based on legacy principles.
- New LOs have been introduced to reflect current aircraft design, systems architecture, and on-board equipment, e.g. LOs covering electric no-bleed air conditioning, lithium-ion batteries, electrically actuated brakes, composite materials, head-up displays, synthetic visual systems and enhanced vision systems.
- Significant revision of the LOs relating to fly-by-wire control systems for aeroplanes was undertaken.
- There is movement of LOs between different subjects (for example, on the magnetic compass) which were moved from General Navigation to Instrumentation and on the FMS, navigation database, aircraft/performance database, control display unit (CDU), electronic flight instrument system (EFIS), primary flight display (PFD), and the navigation display (ND) which were moved from Radio Navigation to Instrumentation.

SUBJECT 031 — MASS AND BALANCE

- LOs regarding fundamentals of centre-of-gravity (CG) calculations have been deleted or moved to other LO sections.
- The terminology used in the LOs has been brought up to date considering current practices.
- Improvements were made to the identification of documentation in certain LOs, for example, reference to the balance schedule for the helicopter category examinations was introduced.



- The LOs relating to the application of last-minute changes (LMCs) on loading documentation were deleted.
- A new LO requiring an understanding of how the aircraft communications addressing and reporting system (ACARS), electronic flight bags (EFBs), and 'less paper in the cockpit' (LPC) software may present load and balance information has been added. This LO is BK.
- The LO on the dry operating index (DOI) was extended to include the calculation of the DOI.

SUBJECT 032 — PERFORMANCE (AEROPLANE)

- The repetition of LOs across the different topic sections have been deleted.
- The order of the subject LOs was modified to present a more coherent subject structure.
- Outdated terms were deleted or updated.
- New LOs have been added to cover the basic concepts on which aeroplane performance is established.

SUBJECT 033 — FLIGHT PLANNING AND MONITORING

- The LOs on VFR navigation techniques that had been proposed to be moved to Flight Planning and Monitoring in the NPA have been returned to General Navigation.
- Several new LOs have been introduced to ensure that future commercial pilots are aware of terrain separation criteria.
- New LOs covering the PBN terminology for instrument approach procedures are introduced.
- A number of definitions relating to different altitudes were proposed for deletion in the NPA but these are retained.
- The required content of the GSPRM is stated before the tables containing the LOs for this subject.

SUBJECT 034 — PERFORMANCE (HELICOPTER)

- LOs mentioning V1 have been changed as V1 is not used in helicopter take-offs.
- A minimum number of changes have been made to this subject area. Only a few LOs are deleted, no new LOs have been introduced, and no LO has been marked as BK either.

SUBJECT 040 — HUMAN PERFORMANCE AND LIMITATIONS

- Subject 040 has been extensively edited, with many of its parts deleted. As a result, the syllabus has been restructured.



- The LOs on the atmosphere and Boyle's, Dalton's, Henry's and the General Gas Laws were too detailed and have been adjusted to be relevant for pilots.
- The LOs on pulse rates of the heart and respiratory rates and processes have been adjusted to ensure that they are of practical use for pilots.
- The LOs on the effects of sun storms and harmful radiation from the sun were considered as having no practical use and as a consequence are deleted.
- The LOs on the central, peripheral and autonomic nervous systems have been limited to focus on the main parts of the nervous system.
- The paragraph about personal hygiene has been deleted.
- Fatigue risk management has been added as a new LO.
- The LOs on automation are completely revised.

SUBJECT 050 — METEOROLOGY

- The overall structure of Subject 050 'Meteorology' remains unchanged; the existing syllabus was considered to logically present the necessary LOs to achieve a good understanding of the subject matter.
- In the light of comments received during the public consultation phase, it was decided to substantially reduce the number of LOs marked as BK. On reflection, it was considered that continuing to examine some of the basic, fundamental concepts in this subject was in fact desirable in order to verify an acceptable assimilation of knowledge.
- The new topic area 'World area forecast system and meteorological offices' has been included under Subject 050 10 04 01. All the six LOs of this Subject are identified as BK since it was not considered necessary to test the knowledge of this topic in the examination.
- Following the receipt of stakeholder comments it was decided to retain the topic 'Stratospheric conditions' which was proposed to be deleted in the NPA. Additionally, the LOs in this area are now also eligible for examination for the CPL category.
- A new paragraph 'Ice crystal icing' has been introduced for the following reason: Several engine power loss and damage events have occurred in convective weather above the altitudes typically associated with icing conditions. Research has shown that strong convective weather (thunderstorm activity) can lift high concentrations of moisture to high altitudes where it can freeze into very small ice crystals, perhaps as small as 40 microns (the size of flour grains). These crystals can affect an engine when flying through convective weather. Industry is using the phrase 'ice crystal icing' to describe these icing conditions, and to differentiate them from icing conditions due to supercooled liquid. Ice crystals do not adhere to cold airframe surfaces because the ice crystals bounce off. However, the crystals can partially melt and stick to relatively warm engine surfaces.

- The standard barometric lapse rate of pressure near mean sea level (MSL) for use in examination questions has been defined as 30 ft (9 m) per 1 hPa.
- Steam fog has been renamed 'sea smoke'.
- LOs relating to hazards including mountain waves, clear-air turbulence, tropical revolving storms, monsoons, icing, turbulence, and thunderstorms have all received some minor amendment to ensure an appropriate focus on these flight-safety-critical areas.

SUBJECT 061 — GENERAL NAVIGATION

- In order to facilitate the necessary improvements to the 061 LOs, Subject 061 has been totally rearranged and rewritten. The reason for the new 061 document is to produce a much clearer document for NAAs, the ECQB and ATOs.
- The necessity for a pilot to be able to perform mental calculations has been highlighted as a potential safety issue by the training needs analysis (TNA). There is, therefore, a section within the new Subject 061, which clarifies the requirement that will be tested in the licensing examinations. In addition, specific VFR navigation techniques have been described and again these techniques will be examined. There will be no mandate for ATOs to teach these techniques solely, and other techniques may be instructed and applied. However, it should be noted that the techniques described will be the basis for licensing examination questions.
- The LOs on VFR navigation techniques that had been proposed to be moved to Flight Planning and Monitoring in the NPA have been returned to General Navigation.
- The LOs on the magnetic compass were moved to Instrumentation.

SUBJECT 062 — RADIO NAVIGATION

- The radio navigation LOs contained some general knowledge which was considered to be the equivalent of that taught at school; this presented an opportunity for a small reduction in the total number of LOs.
- The LOs on microwave landing system (MLS) are retained.
- The LOs on global navigation satellite system (GNSS) are extensively modified with many LOs deleted as they were considered to go into too much technical detail.
- The LOs on secondary surveillance radar (SSR) Mode S and PBN were modified.
- The LOs concerning the FMS, navigation database, aircraft/performance database, control display unit (CDU), electronic flight instrument system (EFIS), primary flight display (PFD), and the navigation display (ND) are moved from Radio Navigation to Instrumentation.



SUBJECT 070 — OPERATIONAL PROCEDURES

- A full set of references to the applicable legislation has been added to most of the LOs.
- The LOs on polar navigation have been deleted because this topic is covered in General Navigation and Instrumentation.
- Many LO levels have been changed from 'state' to 'explain' in order to focus more on understanding rather than on learning facts by heart.
- The LOs which included more than one objective under a single LO or which contained a large amount of information in a single entry have been split up into several LOs to enable proper examination of the relevant knowledge.

SUBJECT 081 — PRINCIPLES OF FLIGHT (AEROPLANE)

- The wording of some LOs has been changed for clarification and to increase understanding.
- Some LOs have been moved or split in order to be placed and examined in a single appropriate section(s).
- Some LOs have been deleted to prevent repetition.
- The LOs referring to the boundary layer, stall and shock stall have been moved to the more appropriate new section titled 'Stall, shock stall, and upset prevention and recovery'.
- The LOs on the aerodynamic moment and moment coefficients have been deleted, and the LOs referring to the neutral point and stick force have been adjusted to reflect the essential knowledge required by a pilot.
- The LOs on the phenomenon of flutter have been simplified to essential facts.

SUBJECT 082 — PRINCIPLES OF FLIGHT (HELICOPTER)

- Some LOs have been amended to increase understanding and to give a more precise description.
- LOs about velocities of the blade, azimuth angle of the blades, and forces and stresses on the blade have been deleted.
- The paragraphs 'Origins of the vertical vibrations', 'Tail-rotor description', 'Fenestron', 'NOTAR' and 'Tail-rotor vibrations' have been moved to Subject 020 'Aircraft General Knowledge'.
- The knowledge in the LOs about stability and control power has been decreased to the knowledge necessary for a helicopter pilot.

SUBJECT 090 — COMMUNICATIONS (RESERVED)

SUBJECT AREA 100 KSA

- The aim of Area 100 KSA is to clearly develop and elicit a higher level of thinking in future pilots beginning already during their theoretical knowledge training. Student pilots will be challenged to enhance their decision-making skills, their problem-solving ability, and their level of understanding of assimilated knowledge. Furthermore, Area 100 KSA will facilitate the development of their core competencies.
 - As mentioned previously, this new Area 100 KSA is only applicable for courses for the issue of an ATPL, MPL, or CPL licence in the aeroplane or helicopter categories.
 - Area 100 KSA ensures the appropriate integration of various topics from across the theoretical knowledge course while also developing students' core competencies during this training. Therefore, it should be regarded as a concept underlying the whole theoretical knowledge training system — it is a training philosophy and not simply a new subject. This is an area which will be holistically integrated into and throughout the entire training syllabus, and is expected to prepare future pilots not only for the moment of examination, but also for their future career.
 - Area 100 KSA provides the tool which will enhance a student pilot's ability to relate and apply theory to practice as they 'learn by doing'. It promotes practical training and assessment — complementing the assessment method of multiple-choice questions currently in place for the other subjects through the ECQB.
 - This new set of LOs is grouped by the appropriate ICAO core competencies, with the extra addition of 'knowledge'. The inclusion of these LOs does not affect the examination system based on the ECQB, because they are not proposed to be included in the final theoretical knowledge examinations conducted by the competent authorities. However, ATOs should assess a student pilot's ability in each of the Area 100 KSA LOs before they sit their final theoretical knowledge examination. It is proposed that ATOs incorporate the Area 100 KSA LOs into their course design, and that these are covered and assessed during the theoretical knowledge instruction phase through practical training and assessment. This could include planning, scenario-based and simulated exercises, or assessed discussions, interviews, projects, essays, and presentations.
- A new GM1 FCL.310; FCL.515(b); FCL.615(b) 'Theoretical knowledge examination' has been developed to explain the Benjamin Bloom Taxonomy and the verbs used throughout the LO tables.
 - The tables in AMC2 to AMC8 FCL.615(b) 'IR — Theoretical knowledge and flight instruction' have been deleted as their content has been incorporated in the revised AMC1 FCL.310; FCL.515(b); FCL.615(b), which now includes the CB-IR(A) and EIR columns, as appropriate. However, the AMCs to FCL.615(b) will continue to apply until the end of the transition period.
 - GM1 FCL.615(b) has been deleted because it is no longer needed since the CB-IR(A) and EIR syllabi are now included in the table covering all the LOs, in AMC1 FCL.310; FCL.515(b); FCL.615(b). This AMC provides general information on the legislation and standards that are of

relevance to the theoretical knowledge syllabus, including ICAO documents, the EU regulations, and the GSPRM.

- AMC1 FCL.720.A(b)(2)(i) ‘Experience requirements and prerequisites for the issue of class or type ratings — aeroplanes’ has been amended with the updated tables containing the course syllabi for VFR and IFR operations to reflect the revised syllabi and LOs.
- AMC2 FCL.825(d) and GM1 FCL.825(d) ‘En-route instrument rating (EIR)’ have been amended to reflect the amendments made to AMC1 FCL.310, FLC.515(b), FCL.615(b) and AMC1 FCL.615(b).
- AMC1 to Appendix 3 (‘Training courses for the issue of a CPL and an ATPL’) and GM1 to Appendix 5 (‘Integrated MPL training course’) have been amended in the theoretical knowledge paragraphs to include ‘Area 100 KSA’.
- AMC1 and AMC3 to Appendix 6 (‘Modular training courses for the IR’) have been amended to detail various ways of completing classroom training. The lists with the minimum numbers of hours of instruction allocated in various types of theoretical knowledge training courses to each subject were proposed to be deleted in the NPA, but are retained and amended.

Amendments to Annex VII, Subpart ORA:

- AMC1 ORA.ATO.230(a) ‘Training manual and operations manual’ has been amended to include the assessment for ‘Area 100 KSA’.
- New AMC2, AMC3 and AMC4 to ORA.ATO.230(a) have been introduced to cover the theoretical knowledge course design requirements and the training and assessment for ‘Area 100 KSA’.
- New GM1 ORA.ATO.230(a) has been introduced to provide guidance on how student pilots should be assessed on Area 100 KSA.
- New GM2 ORA.ATO.230(a) has been introduced to explain the concept of ‘word pictures’ used for the assessment of the LOs in Area 100 KSA, and to provide assessment indicators.
- New GM3 ORA.ATO.230(a) has been introduced to provide guidelines on the practical exercises to be used for the assessment of Area 100 KSA.
- New GM4 ORA.ATO.230(a) has been introduced to provide guidance on Area 100 KSA instruction and assessment training.
- New GM5 ORA.ATO.230(a) has been introduced to provide guidance on instructional systems design.

2.7. What are the stakeholders’ views

EASA received comments supporting the amendments proposed in NPAs 2016-03(A)(B)(C)(D)(E)(F). Most of the comments were related to the LOs. EASA reviewed all the comments and, based on them, developed the new AMCs/GM that are annexed to this Decision.

2.8. Where are the LO tables published

The LO tables are published as appendices to Annex I to this Decision, as a clean document, to assist ATOs working with them to modify their training materials and courseware.



The LO tables with the marked amendments are published together with the CRDs, and are meant purely as a documentation tool. These marked amendments show deleted text, new or amended text as shown below:

- (a) deleted text is marked with ~~struck through~~;
- (b) new or amended text is highlighted in **grey**.

2.9. What are the benefits and drawbacks

The amendments address non-controversial issues and, as explained above, the amended LOs are necessary to ensure that the applicable theoretical knowledge syllabi remain up to date and relevant, further developing and enhancing the pilots' KSA.

The amendments are considered to be non-controversial. The benefits will be reflected in the new learning methodology which is expected to respond to the new evolving learning styles. Improved theoretical knowledge training will also save airlines and other commercial operators time and money, which is too often spent on repeating training for pilots who have not attained the required level of knowledge or skills by the time they look for employment. The amended AMCs/GM will ensure that the LOs are current and relevant, and that student pilots will be assessed not only on their knowledge of facts and principles, but also on their understanding of these facts and principles, including their ability to apply this knowledge and technical skills effectively. The amended AMCs/GM will contribute to an increased safety performance and facilitate a smooth transition from initial training to an operator.

As for the financial and administrative impacts, these have been analysed and estimated in the light RIA published in the NPA. In order to mitigate the additional costs and the administrative tasks incurred by the implementation of the changes, EASA proposes a transition period spanned over 4 years, with each competent authority having the flexibility to set an expiry date within the second 2 years of the transition period for the old syllabus examinations. The last 2 years of the proposed 4 would allow for an additional 24-month window for competent authorities and ATOs to complete the transition in their own States. The ATOs will be able to use the first 2 years to start preparing for the implementation of changes.

In conclusion, EASA does not expect any drawbacks in the implementation of the above-mentioned AMCs/GM.

2.10. How we monitor and evaluate the rules

EASA will monitor and evaluate the new AMCs/GM through its regular standardisation activities.

EASA recognises that before the new system can be fully implemented, there are several actions that need to be completed first. These include but are not limited to the following:

- EASA to update the ECQB to reflect the amendments made to the LOs. This work will need to include drafting and reviewing questions for the new and revised LOs in sufficient numbers to ensure a robust examination system and recataloguing the existing questions in response to the amendments (deletions, movements, additions) made to the new LOs.
- The competent authorities to train their inspectors for the approval of Area 100 KSA; approve the revised ATO training manuals; prepare their exam delivery system to accommodate the



revised ECQB; migrate the revised ECQB into their examination delivery platform; and translate, where necessary, the questions into the language(s) of the examination.

- The ATOs to update their training course design; amend their training manuals to introduce the new LOs and the new Area 100 KSA; and train the Area 100 KSA assessors.

It is also recognised that commercial organisations providing textbooks and other training material will likely need to update their products to reflect the AMCs/GM published with this Decision.

All these activities will take time to manage effectively and EASA proposes a transition period spanning over 4 years, starting from the publication of this Decision. Of these 4 years, the first 2 will be necessary to update the ECQB with questions based on the new and revised syllabi and LOs, while the last 2 years are envisaged for the competent authorities to implement the updated ECQB and the amendments mentioned above.

In parallel with EASA preparing the update of the ECQB, ATOs should start preparing their new courses and competent authorities should prepare the implementation measures. It would be up to the individual competent authorities to set an expiry date for the old syllabus examinations — this would provide flexibility for each competent authority to choose the date of transition. Complex transitional arrangements for student pilots caught between the old and the new syllabus should, wherever possible, be kept to a minimum. However, special consideration should be given to the examinations where entire topics or subtopics have been moved between various subject areas.

The last 2 years of the 4-year transition period would allow for an additional 24-month window for the competent authorities to complete the transition in their own State.

A more detailed planning from the ECQB team will be published at a later stage on the EASA website to help ATOs with their own planning.

The implementation plan will also have to cover the various dates of applicability of the various LOs, such as the LOs on UPRT or the LOs on PBN.

Monitoring and evaluation

Monitoring is a continuous and systematic process of data collection and analysis about the implementation or application of a rule or activity. It generates factual information for possible future evaluation and impact assessments, and helps identify if there are any implementation issues.

EASA will initiate the process to gather the information identified in the following table. Upon receipt of this information, EASA will endeavour to continuously monitor a set of core indicators that will be used to measure how efficiently this RMT proposal has achieved its objectives. It is proposed that this monitoring be performed in terms of analysing data which may be collected from different sources using the most appropriate tools, e.g. conducting surveys as specified below. The responsible actors for collecting and providing the data are EASA, ATOs and competent authorities.



| Indicator | Sources of information |
|---|---|
| Number of ATOs that update the syllabi and the LOs of Subjects 010 to 090 and that introduce the new Area 100 KSA | <ul style="list-style-type: none"> — EASA continuous monitoring activity — Competent authority data |
| Feedback on the cost impact on training, owing to the introduction of the updated LOs of Subjects 010 to 090 and the new Area 100 KSA | <ul style="list-style-type: none"> — ATO feedback |
| Number of newly updated questions in the ECQB, according to the revised syllabus | <ul style="list-style-type: none"> — ECQB process |
| Rate of student pilots who pass the final TK examination (in the updated training system) | <ul style="list-style-type: none"> — Competent authority data |



3. References

3.1. Related 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)

3.2. Affected decisions

- Decision No 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'
- Decision No 2012/007/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-ORA'

3.3. Other reference documents

N/A



4. Appendix

Appendix to ED Decision 2018/001/R 'Acceptable Means of Compliance and Guidance Material to Part-FCL and Part-ORA of Commission Regulation (EU) No 1178/2011, as amended, as regards the theoretical knowledge syllabi and learning objectives for airline transport pilot licence (ATPL), multi-crew pilot licence (MPL), commercial pilot licence (CPL), and instrument rating (IR) for aeroplanes (A) and helicopters (H) 'AMC/GM to Part-FCL — Amendment 4; AMC/GM to Part-ORA — Amendment 5' — CRDs to NPAs 2016-03(A);(B);(C);(D);(E);(F).

