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1.0 Glossary

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Classroom training	In-person or virtual, instructor-led training, which may include group exercises and interactive instructional sessions.
Computer-based training (CBT)	Any training delivered via the use of a computer or tablet. The training content (e.g. software, lecture) is installed on a computer, therefore internet access may not be required. Computer-based training may encompass the use of data storage medium (e.g. flash drive), self-paced learning, instructor-led, distance learning and digital learning (such as virtual learning and gamification).
Distance learning	A method of learning where trainees and instructors do not meet in a traditional classroom setting. Instead, they use digital communication tools to conduct classes, accomplish tasks and share materials in a synchronous or asynchronous delivery.
Training provider	In the context of these guidelines, organisations and operators providing training to pilots and cabin crew.

2.0 Introduction

The purpose of this document is to provide guidelines to Training Organisations when conducting virtual classroom instruction or distance learning instruction.

3.0 Scope

Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EU) No 2018/1139 of the European Parliament and of the Council:

- LAPL, PPL, CPL, ATPL, modular CPL, ATPL integrated (up to the time allowed by ORA.ATO.305 and AMC1 ORA.ATO.305)
- Class and type rating courses (AMC2 ORA.ATO.125, AMC3 ORA.ATO.125)
- MCC Airplane system training (GM1 FCL.735A) and airline-oriented training
- 100 KSA (may include in suitable portions: classroom, e-learning).
- CC Initial training course and examination (CC.TRA.220, Appendix 1 to Part-CC, AMC 1 Appendix 1 to Part-CC) – *Refer to PEL Notice 93 for hours allowed as virtual training vs physical classroom training*

Regulation (EU) 2015/340 of 20 February 2015 laying down technical requirements and administrative procedures relating to air traffic controllers' licences and certificates pursuant to Regulation (EU) No 2018/1139 of the European Parliament and of the Council, amending Commission Implementing Regulation (EU) No 923/2012 and repealing Commission Regulation (EU) No 805/2011.

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4.0 Virtual classroom and distance learning

When virtual classroom or distance learning training are adopted by a training provider, due consideration should be given to the risks introduced and the effects on training and learning by the trainees. The training provider should consider the knowledge and skills to be addressed, as well as the trainees' experience, to determine whether distance learning or virtual classroom are the most suitable methods for delivering a specific part of the training programme. For instance, competencies related to KSA 100 or those requiring group interaction, such as most of the CRM training (except when already foreseen in the regulation for certain type of CRM) typically necessitate face-to-face facilitation. Similarly, requirements outlined in the Operational Suitability Data (OSD) established under Annex I (Part 21) to Commission Regulation (EU) No 748/2012 may mandate in-person delivery for certain training elements. Physical presence and direct interpersonal interaction are crucial for developing collaborative skills and integrating CRM elements such as teamwork, effective communication and coordination.

4.1 Virtual classroom

(a) Virtual classroom training is generally considered an alternative to face-to-face classroom training, provided that it is delivered with appropriate tools that support real-time audio and video interaction.

(b) Virtual classroom should achieve the same training objectives and quality compared to face-to-face classroom instruction.

NOTE: *Virtual classroom instruction is referred as a* ***synchronous*** *instructor-led training. Asynchronous methods of instruction like recorded lessons, are not considered to meet the requirement of classroom instruction.*

(c) The training provider should demonstrate to TMCAD that trainees make satisfactory academic progress, also by maintaining updated and reliable records for the attendance and completion of the training.

(d) Creating positive learning environment, engaging trainees and encouraging active participation are essential for achieving the learning objective. Instruction in a synchronous virtual classroom can only be successful with the active participation and engagement of the trainees.

(e) Multiple studies and research are available about the trade-offs related to the use of virtual classroom compared to more traditional face-to-face classroom training. Some of the key points are summarised below:

a. Virtual classroom offers significant flexibility, allowing trainees to attend lessons from any location. This is particularly beneficial for trainees with busy schedules or those in remote areas or anyway not located in proximity of the training provider.

b. Face-to-face classroom settings tend to foster better real-time interaction, immediate feedback and social engagement. Virtual settings limit the visibility of body language, facial expression and other nonverbal cues which are essential for interpreting meaning and building rapport. In addition, multitasking, screen fatigue and the need to interpret the limited cues can increase cognitive load leading to tiredness and a decrease in motivation and participation.

c. Comparative studies of virtual classroom and traditional face-to-face classroom training show similar effectiveness in terms of knowledge acquisition. However, virtual classroom may fall short in developing soft skills like communication and teamwork, which are more naturally cultivated in face-to-face settings.

(f) Virtual classroom effectiveness heavily depends on the availability of reliable internet and digital literacy among trainees and instructors. In addition, appropriate devices and software should be available and used.

(g) A blended approach combining virtual classroom with in-person sessions can leverage the strengths of both methods and provide a more balanced and effective learning experience.

4.1.1 Level of communication

(a) An effective level of real-time communication and interaction should be ensured so to allow training where trainees can actively engage, communicate, view and discuss presentations. An effective level of communication should meet all the following criteria:

a. Live interactive instructor-led sessions in an online learning environment within a shared online space;

b. Continuous active and simultaneous exchange between instructor and trainees: dynamic and two-way flow of communication without delay;

c. Ability to share relevant training material during the session.

(b) To foster engagement, the instructor should encourage participation by posing for example direct questions, conducting tour de tables, perform quiz, etc. This approach should ensure that all trainees, including those who may be less prone to intervene, are encouraged to participate.

(c) Establish a policy for the use of the virtual classroom instructions such as “raise your hand, question submission, etc.”;

(d) Ensure that instructors have tools to present content in different formats, as well as to implement collaborative and individual activities.

(e) The instructor should have the role of facilitator who guides the learning process and supports group activities and discussions. The instructor should adapt the teaching methods to the virtual classroom environment, considering the unique challenges and opportunities it presents, such as the need for clear communication and active trainee engagement.

4.1.2 Appropriate equipment and tools

(a) The equipment and tools should allow the instructor to monitor the engagement of all the trainees at the same time for the whole session. Trainees are expected to always keep their camera on during the session. Hardware or software that do not allow the instructors to view all participants simultaneously, also while sharing content, should be avoided. To support this, multiple or larger screens might be required. If such equipment and tools are not adequate, the number of trainees should be limited accordingly.

Note: The tool should ensure the students identification (visual) and, a continuous assessment of the level of communication with all students. The tool should permit the instructor to achieve similar training objectives and quality of instruction, compared to instruction within actual classroom instruction as defined by the training organisation.

(b) Generally, devices with a small screen (less than approximately 9.5 inches) are not considered adequate for virtual classroom environment. The trainees should be able to view simultaneously on their screens the instructor's video feed and content shared with sufficient clarity.

(c) The use of virtual classrooms does not exempt the training provider from complying with facility requirements specified in the regulations.

4.1.3 Instructor

(a) The training provider should ensure that the instructor delivering virtual classroom instruction:

a. has received appropriate training covering at least learning style, teaching method associated to virtual classroom instruction, such as videoconferencing, and a familiarisation to the adopted virtual classroom instruction system;

b. demonstrates the ability to manage time, training media and equipment and tool to ensure that the training objectives are met;

c. performs any necessary assessment of the trainee(s) including proper identification before the start of each lesson; and

d. caters for longer and more frequent breaks between lessons to allow trainees sufficient time to regain attention and especially to interact amongst themselves. For this reason, it is not considered acceptable to perform lessons longer than 50 minutes without a break.

4.1.4 Trainee

(a) During virtual classroom instruction, while maintaining focus on the session, the trainee should take opportunities to engage with the instructor and fellow trainees using for example the "raise hand" option or the "chat" feature.

(b) Trainees should receive a briefing or instruction on virtual classroom procedures and tools.

4.1.5 Acceptable level of training effectiveness

1. Maximum number of trainees and training planning

(a) The maximum number of trainees should be established considering these guidelines. Where regulations limit the trainee/instructor ratio or the maximum number of trainees, these limits should take into account the total number of trainees, regardless of whether they join face-to-face or remotely.

TMCAD GUIDANCE: Class numbers should not exceed 12 students, unless a risk assessment is conducted where the training organisation demonstrates that a higher number of students would not affect the effectiveness of the training and its objectives by accepting more students.

(b) Training provider should take into account factors such as instructors and trainees possible different time zones, the timeline to complete the training and, if applicable, individual roster and flight time limitations. To ensure effective planning, the training provider should seek in advance such relevant information from participants if not already available.

2. Attendance records

The instructor delivering the virtual classroom instruction should be responsible for the attendance records of the trainees. Adequate procedures should be established and described in the related organisation's manual.

3. Interruption of connection, loss of communication

(a) Interruption of connection and loss of communication amongst individual participants can happen during a virtual classroom session. The training provider should develop a policy on how to progress in such cases (e.g. repetition of instructed training elements, re-involvement of participants affected by the temporary loss of connection).

(b) Non-attendance should be managed in accordance with the "non-attendance" policy as in a face-to-face classroom instruction. If the camera of a trainee is not working or unable to be kept on during the lesson, the trainee should be considered non-attending.

4. Examinations/Evaluations

(a) When examinations or evaluations are conducted in virtual classroom, the training organisation should ensure that robust invigilation procedures are in place. These include verifying positive identification of trainees, open/closed book policy, monitoring of the smartphones, earphones or other devices which can be used by the trainees to cheat the exam.

The procedure shall be approved by TMCAD.

4.1.6 Specific risks

Before implementing virtual classroom instruction, the training provider should assess the following risks, as a minimum:

a. Poor instructor and student proficiency in managing virtual classroom equipment and tools.

b. Unreliable internet connectivity, both in download and upload, for all persons involved in the training, affecting content resolution or audio comprehension.

c. Inadequate equipment and tools to support the planned number of participants, content to be delivered, interaction and cross-platform compatibility.

d. Inadequate teaching techniques and/or training material for the virtual classroom.

e. Misalignment with training objectives (not all the training elements may be effectively achieved in a virtual classroom).

f. Reduced alertness level due trainees participating from different time zones, after insufficient rest or insufficient breaks in training .

g. Low engagement and interaction between instructors and trainees.

h. Communication breakdown due to simultaneous speaking, poor audio quality, background noise, etc.

i. Technical failure of the equipment and tools.

j. Inadequate monitoring of the trainee's engagement by the instructor.

k. Inadequate follow-up on the feedback received by trainees and instructors;

l. Reduced training effectiveness due to limitations in the use of white board, tabletop demonstrations, E6B flight computer, etc.

4.2 Distance learning

Distance learning is covered by provisions in Regulation (EU) No 1178/2011 as below:

- Part-ORA of the Aircrew Regulation, Section III – Additional requirements for training organisations providing specific types of training, already foresees in a chapter for the distance learning course: Chapter 1 – Distance learning course.
- ORA.ATO.300 General states in which cases the training organisation may be approved to conduct modular course programmes using distance learning.
- AMC to Appendix 3 in Part-FCL in relation to CPL and ATPL training courses allows only a limited form of remote learning stating 'suitable proportions of…e-learning', including for the ATP integrated course. This limitation in an integrated course, in contrast to modular course, is intended to ensure that 'theoretical knowledge and flight training in an aircraft or an FSTD will be integrated so that as the flying training exercises are carried out students will be able to apply the knowledge gained from the associated theoretical knowledge instruction and flight training'.

4.2.1 Specific risks

Before implementing distance learning instruction, the training provider should assess the following risks, as a minimum:

a. Poor instructor and student proficiency in managing distance learning equipment and tools.

b. Inadequate access to technology to be used by trainees and, where applicable, instructors.

c. Insufficient acquisition of knowledge by the trainees.

d. Obsolescence of the training content:
   i. Distance learning might become outdated if not subject to regular updates.
   ii. Updates might not always be possible by the training provider due to scarcity of the resources or obsolescence of the technology used in the initial development.

e. Inadequate customisation of the distance-learning content to the specific needs and requirements of the training provider, organisation, operator or trainee. Generic content may not adequately reflect the applicable procedures, operational environment, equipment or approved training programme.

f. Poor satisfaction of the trainees in relation to the training provided.

g. Poor instructor support.

h. Inadequate instructor supervision on the trainee's progress.

i. Inadequate follow-up on the feedback received by trainees and instructors.

j. Poor management of technical problems, also following system failures.

k. Inadequate security measures (e.g. to avoid unauthorized access, issues in user identification, multi-device use, etc.).

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5.0 Application for virtual training

The below is required for the initial application and for adopting the amendments in this PEL Notice:

(a) Change requiring prior approval (including management of change). *Note: The MoC should be kept updated to evaluate if the residual or emerging risks are managed as expected.*

(b) Risk assessment including but not limited to items in 4.1.6 or 4.2.1 as applicable (including any amendments to the hazard log). *Note: The RA should be kept updated to evaluate if the residual or emerging risks are managed as expected.*

(c) Access granted to TMCAD to the virtual platform for an inspection (as applicable).

(d) Amendment to audit plan to include internal audits on virtual classroom and/or distance learning.

(e) Manual amendments including:

1. A process for addressing issues that should be reported by instructors and trainees encountered during virtual classroom and distance learning.

2. Information and procedures for delivering training via virtual classroom and distance learning.

3. A process for establishing and analysing Key Performance Indicators (KPIs) belonging to the training function. These KPIs should benchmark against traditional face-to-face training, if any. The KPIs should include as a minimum evaluation of:

    i. training outcomes such as the pass rate of the trainees, repetitions of the exams, average scores on final and intermediate exams, retraining required, etc. *Note: Data should be able to be used to analyse any improvements to the training system*; and

    ii. trainees' feedback which should be collected anonymously. *Note: feedback on strengths and weaknesses of the training system (training environment, curriculum, assessment/evaluation, time management, opportunity for discussions)*. It is important to acknowledge that evaluations may be influenced by factors unrelated to instructional quality. For instance, trainees may rate virtual classrooms and distance learning more favourably due to convenience, reduced travel time or lower accommodation/transport costs. To account for this potential bias, feedback should be complemented with targeted questions that explicitly assess whether these non-instructional factors influenced the trainee's preferences.

6.0 References

Refer to EASA Document - *Guidance for allowing virtual classroom instruction and distance learning*