



EASA

European Aviation Safety Agency

Workshop RMT.0281(MDM.082)

‘New training methods and new teaching technologies’

NPA 2014-22

Cologne, 22nd September 2014

Name: Mladen Hanževački

Title: Regulations Officer – Continuing Airworthiness

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Outline

NPA 2014-22 – Introduction, agenda, overview, impact

NPA 2014-22 – Proposed changes to Part-66

NPA 2014-22 – Proposed changes to Part-147

NPA 2014-22 - Questions & Answers session



NPA 2014-22 - Agenda

TIME	TITLE, SPEAKER
08:00 H – 09:00 H	REGISTRATION OF PARTICIPANTS AND WELCOME COFFEE
09:00 H – 09:10 H	Welcome and introduction Mr Juan ANTON, Maintenance Regulations Section Manager, EASA
09:10 H – 09:20 H	RMT.0281 WG meetings/methods/outcomes – speech by the Chairman of the WG Mr Carlos UNGER, Embraer S.A. Customer Training – Commercial Aviation
09:20 H – 09:30 H	The role of the European Aviation Maintenance Training Committee (EAMTC) Mr Ian WILLIAMS, President of EAMTC
09:30 H – 10:30 H	NPA 2014-22 - RMT.0281: New training methods and new teaching technologies Proposed amendments to Part-66 (Implementing rule, AMC/GM) Mr Mladen HANŽEVAČKI, Regulations Officer - Continuing Airworthiness, EASA
10:30 H – 11:00 H	COFFEE BREAK
11:00 H – 12:30 H	NPA 2014-22 - RMT.0281: New training methods and new teaching technologies Proposed amendments to Part-66 / Part-147 (Implementing rule, AMC/GM) Mr Mladen HANŽEVAČKI, Regulations Officer - Continuing Airworthiness, EASA
12:30 H – 13:30 H	LUNCH BREAK (LUNCH BUFFET IN THE HOTEL)
13:30 H – 15:00 H	NPA 2014-22 - RMT.0281: New training methods and new teaching technologies Proposed amendments to Part-147 (Implementing rule, AMC/GM) Mr Mladen HANŽEVAČKI, Regulations Officer - Continuing Airworthiness, EASA
15:00 H – 15:30 H	COFFEE BREAK
15:30 H – 16:30 H	Questions and workshop conclusions Mr Juan ANTON, Maintenance Regulations Section Manager, EASA Mr Mladen HANŽEVAČKI, Regulations Officer - Continuing Airworthiness, EASA
16:30 H	Closure of the workshop



RMT.0281New training methods or new teaching technologies (Part-66/Part-147)

Working Group Members:

BRUNEL, Jean Pierre	ASD/Airbus
BUDEANU, Dragos	EASA
HOTHERSALL, Colin	Thomson Airways Ltd
KLUG, Sebastian	Austro Control (ACG)
LEALE, Nicholas	UK CAA
LOTTER, Hans-Joerg	infoWERK multimedia GmbH
MAYER, Hans	Lufthansa Technik AG
MUR, Frederic	EASA
UNGER, Carlos	Embraer S.A., Chairman
Secretary:	
HANŽEVAČKI, Mladen	EASA



RMT.0281 New training methods or new teaching technologies (Part-66/Part-147)

Applicability	
Affected regulations and decisions:	Annex III (Part-66) and Annex IV (Part-147) to Regulation (EC) No 2042/2003 Decision No 2003/19/RM
Affected stakeholders:	Maintenance organisations, Training organisations, air operators, Personnel/Licence and certificate holders, NAAs, EASA
Driver/origin:	Level playing field
Reference:	N/A

Process map	
Concept Paper:	No
Terms of Reference:	19 Nov 2012
Rulemaking group:	Yes
RIA type:	Light
Technical consultation during NPA drafting:	Yes
Duration of NPA consultation:	3 months
Review group:	Yes
Focussed consultation:	Yes/Workshop
Publication date of the Opinion/Decision:	2016/Q1

2014.

January	February	March	April	May	June	July	August	September	October	November	December
	6 th meeting 18-20.02.'14	NPA drafting			Legal + RPS		NPA publishing	Public comment period			
								Workshop			

2015.

January	February	March	April	May	June	July	August	September	October	November	December
Review of comments / CRD drafting		1 th meeting Review group		2 nd meeting Review group	Final draft CRD/Opinion		Legal + RPS		CRD/Opinion publishing		Buffer



NPA 2014-22 - Introduction

This Notice of Proposed Amendment (NPA):

- addresses **safety, economic and social** issues related to the introduction of the new training methods and teaching technologies into the basic knowledge and aircraft type training of the maintenance certifying staff.
- proposes a **regulatory framework** to ensure the legitimacy of the new training methods and teaching technologies
- expects to fulfil the industry's needs for the **efficient and cost-effective training** of the maintenance certifying staff, while maintaining or increasing the safety level.



NPA 2014-22 – ‘Better regulation’

‘Better regulation’ principles observed:

- right balance between Implementing Rules and AMCs,
- detailed provisions on new training and teaching tools, methods and techniques at the level of AMCs and GM,
- ensuring ‘resilience’ of the new rules in times where progress in digital communications, computer science, and other disciplines open the way to a wide range of technical alternatives,
- flexibility provided to MTOs to meet or exceed the safety objectives defined at Implementing Rules level, depending on their particular organisation, business model, infrastructures, and type of training provided
- specific safeguards determined in line with performance-based principles.



NPA 2014-22 - Impacts

Safety impact:

- Positive impact on safety based on interactivity, effectiveness and quality of training, higher motivation and engagement of the students in the learning process.
- Level playing field and higher level of standardisation and harmonisation.
- Legitimacy and framework of new methods and technologies will avoid any misuse of them.
- Conformity with the technological development of the aircraft, parts, tools and equipment.
- Reduced hazards connected with aircraft visits during practical training, as it could be performed in a more safe environment.



NPA 2014-22 - Impacts

Economic impact (For AMTOs):

- Less hours spent for teaching in the classroom environment by blending the classical teaching methods with distance learning, e-learning or web-based training.
- Cost savings resulting from reduced aircraft visits and aircraft availability; liability and insurance issues reduced,
- Potential increase in revenue due to more time and resources remaining for additional courses.



NPA 2014-22 - Impacts

Economic impact (for AMOs):

- Benefit in the reduction of the duration and the costs of training,
- Higher availability of the employees for the regular job tasks,
- Lower expenses for travel, accommodation and daily allowances.

Economic impact (for individuals):

- Reduction of training expenses and the duration of the training,
- Faster return of their training investment and increase of their earning potential,
- Reduction of the time spent for learning.



NPA 2014-22 - Impacts

Economic impact (for training equipment providers):

- Increase of revenue by selling more products based on increased market demand,
- Increased rate of training technology development,
- Positive impact on market prices of the devices and software due to expected growth of the industry and increased competition.

Economic impact (for NAAs):

- Increased administrative burden,
- Additional implementation costs expected due to: procedures adaptation, training of the personnel to new competences required, possible employment of additional staff.



NPA 2014-22 - Impacts

Social impact:

- Attractiveness of the new methods and technologies leads to higher motivation and engagement of the students for learning.
- Convenience to learn from home, or any place and any time.
- Instructors and NAAs staff will acquire new competences.
- The training could become more affordable for maintenance staff.



NPA 2014-22 - Impacts

ICAO prediction:

- *“In the next 20 years, airlines will have to add 25,000 new aircraft to the current 17,000-strong commercial fleet.*
- *By **2026**, we will need **480,000** new technicians to maintain these aircraft”. (150.000 in Europe?)*

Proposed amendments contribute to the overall objectives:

- To reduce the length of the training;
- To make the aeronautical field more attractive.

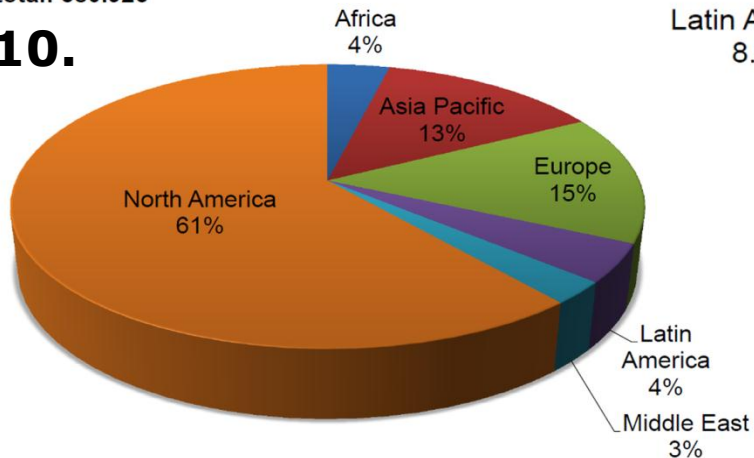


NPA 2014-22 - Impacts

Geographical distribution of maintenance personnel

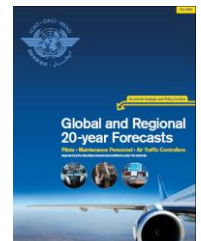
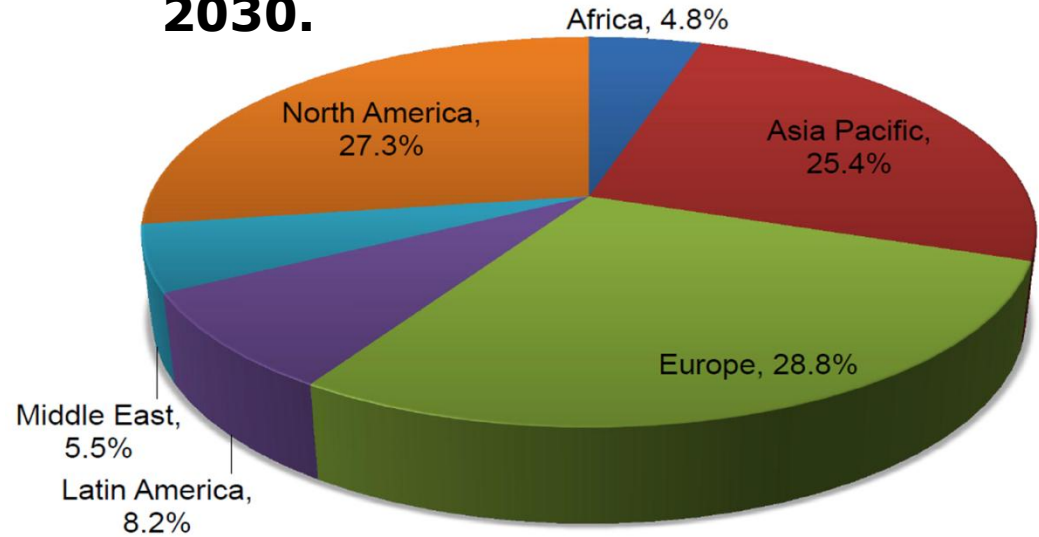
World total: 580.926

2010.



World total: 1.055.185

2030.



Source: Global and Regional 20-year Forecasts – ICAO Doc 9956



NPA 2014-22 - Impacts

Maintenance personnel populations and associated training needs: 2010–2030

	Maintenance personnel needed: 2030	Annual (Attrition: 5% per annum)		
		Training needs	Training capacity	Shortage/surplus
Africa	58 635	3 769	600	-3 169
Asia/Pacific	289 510	19 010	4 265	-14 745
Europe	330 522	22 977	14 625	-8 352
Latin America	101 226	6 881	1 315	-5 566
Middle East	59 905	4 107	2 045	-2 062
North America	325 171	13 586	29 410	15 824
World	1 164 969	70 331	52 260	-18 071

Source: Global and Regional 20-year Forecasts – ICAO Doc 9956



Proposed amendments will create “SPACE” training:

S - safe / suitable

P - productive / paperless

A - attractive / affordable

C - cost-effective / convenient

E - efficient / effective / economic



Outline

NPA 2014-22 – Introduction, agenda, overview, impact

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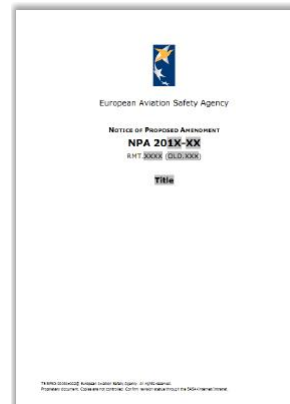
NPA 2014-22

Proposed changes to Part-66

New procedure has been added to Section B, Subpart B:

66.B.135 Procedure for the approval of Multimedia Based Training (MBT) courses

The competent authority shall ensure the aircraft basic training and aircraft type training comply with Appendix I and Appendix III whenever approving courses based on MBT methods, student-centred or blended training methods, either in a physical or a virtual environment. Such procedure shall take into account the principles and criteria described in Appendix VII to this Annex (Part-66) 'Assessment method for Multimedia-Based Training (MBT) systems'.





NPA 2014-22

Proposed changes to Part-66

A new Appendix VII has been added as follows:

Appendix VII

Assessment method for Multimedia-Based Training (MBT) systems

The general structure for the various sections shall be the following:

(a) Product identification

(b) Category 'academic quality'
Information reliability
Information relevance

(d) Category 'didactic quality'

(c) Category 'pedagogical quality'
Pedagogical formulation
Pedagogical construction
Pedagogical strategies

(e) Category 'technical quality'
Design
Browsing

Assessment table of the quality of a digital learning resource			
Identification of the product:			
Name:	Author:	Version:	SCORE (0-5)
Category 'academic quality'			
Information reliability	1. Is the information presented reliable?		
Information relevance	2. Is the information presented relevant?		
Category 'pedagogical quality'			
Pedagogical formulation	3. Is the quality of the resource simplification good?		
	4. Does the educational resource present overviews and summaries?		
Pedagogical construction	5. Is the resource clearly structured? (summaries, plans)		
	6. Does the structure promote its use in the pedagogical context?		
Pedagogical strategies	7. Are the objectives stated?		
	8. Does the resource include stimuli to promote learning?		
	9. Does the resource present activities creating interactions between student and instructor?		
	10. Is active mental engagement of the student favoured?		
	11. Is learning based on student-centredness?		
	12. Are there any problem-solving tasks fostering constructive learning?		
	13. Does the resource present activities creating interactions between students?		
	14. Is the student able to see his/her learning progress?		
Assessment method	15. Does the resource provide a self-assessment procedure?		
Category 'didactic quality'			
Learning activities	16. Do activities refer to real problems which the student will possibly face outside of the classroom?		
Learning content	17. Is there a match between audience, content and the objectives?		
Category 'technical quality'			
Design	18. Is browsing between different elements of the product easy?		
Browsing	19. Are multimedia techniques effectively supporting information and pedagogy?		
Technological aspects	20. Do multimedia techniques promote information and pedagogy?		
Final Score:			



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Proposed changes to Part-66

Assessment table of the quality of a digital learning resource		
Identification of the product:		
Name:	Author:	Version:
		SCORE (0-5)
Category 'academic quality'		
Information reliability	1. Is the information presented reliable?	
Information relevance	2. Is the information presented relevant?	
Category 'pedagogical quality'		
Pedagogical formulation	3. Is the quality of the resource simplification good?	
	4. Does the educational resource present overviews and summaries?	
Pedagogical construction	5. Is the resource clearly structured? (summaries, plans)	
	6. Does the structure promote its use in the pedagogical context?	
Pedagogical strategies	7. Are the objectives stated?	
	8. Does the resource include stimuli to promote learning?	
	9. Does the resource present activities creating interactions between student and instructor?	
	10. Is active mental engagement of the student favoured?	
	11. Is learning based on student-centredness?	
	12. Are there any problem-solving tasks fostering conductive learning?	
	13. Does the resource present activities creating interactions between students?	
	14. Is the student able to see his/her learning progress?	
Assessment method	15. Does the resource provide a self-assessment procedure?	
Category 'didactic quality'		
Learning activities	16. Do activities refer to real problems which the student will possibly face outside of the classroom?	
Learning content	17. Is there a match between audience, content and the objectives?	
Category 'technical quality'		
Design	18. Is browsing between different elements of the product easy?	
Browsing	19. Are multimedia techniques effectively supporting information and pedagogy?	
Technological aspects	20. Do multimedia techniques promote information and pedagogy?	
		Final Score:



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Proposed changes to Part-66

The following rating intervals show the Quality level for each assessed learning resource:

- | | |
|-----------|--------------------------------------------------------------------------------------------------------------------------|
| 100 – 81: | Excellent educational resource. It offers different functionalities and meets the required quality criteria. |
| 80 – 61: | The learning resource meets the required quality criteria despite some weaknesses. |
| 60 – 41: | The learning resource does not allow a sufficiently worthy educational use. It can be used for 'informal' training only. |
| 40 – 0: | The learning resource is below the average. It does not meet several required quality criteria. |

Although the overall rating level may fulfil the required criteria, it shall be checked if there is no single rating within the categories that is equal or below 3.

In this case an alternative learning process shall be considered or a product update which fulfils the required quality level(s) shall be requested.



NPA 2014-22

Proposed changes to Part-66

Appendix I 'Basic knowledge requirement's and Appendix III 'Aircraft type training requirements are amended as follows:

...

3. Basic knowledge training standard *(new added)*

3. Aircraft type training standard *(amended)*

...

An appropriate training method shall be determined for the entire course or for each module or sub-module thereof, with regard to the scope and objectives of each training phase and with consideration to the benefits and limits of the available training methods.

Multimedia Based Training (MBT) methods may be used in order to achieve the training objectives either in a physical or in a virtual controlled environment and is subject to the acceptance of the competent authority approving the training course.

Note: *The above text is deleted from Appendix III point 3.1.(f) and inserted at the beginning of point 3.*



NPA 2014-22

Proposed changes to Part-66

AMC to Paragraph 3. of Appendix I and III to Part-66 “Basic knowledge requirements”

Basic knowledge training standard (*new*)

Training methods are categorised as “instructor centered”, “student centered” and “blended training”.

The actual training method and the training tools should be adapted to the complexity or the criticality of the learning subject, and be chosen with consideration to their intrinsic characteristics such as, but not limited to, their efficiency and the pedagogical benefits of the method/tool.

A complex or critical subject should normally not be taught through a student centred method unless provisions are in place to verify the actual and progressive acquisition of knowledge, skills and attitude by the student.

*Note: same in AMC to Paragraph 3. of **Appendix III** to Part-66 “Aircraft Type Training and Examination Standard. On-the-Job Training”*



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Proposed changes to Part-66

GM to Paragraph 3. of Appendix I to Part-66 “Basic knowledge requirements”

Basic knowledge training standard (*new*)

A combination of several training methods/tools is recommended in order to take benefit of the advantages of each of the methods and to consequently increase the overall efficiency of the training.

Simulation can not be an eligible training tool for teaching basic hand skills such as wiring, welding, drilling, filing, wire locking, riveting, bonding or any other where competence can only be achieved by performing hands-on physical activity.

The following table identifies the combination of training methods and tools in reference to training elements and learning objectives and indicate their benefits and limits to be taken in to account when selecting the actual training method(s) for basic knowledge training.

*Note: same in GM to Paragraph 3. of **Appendix III** to Part-66 “Aircraft Type Training and Examination Standard. On-the-Job Training” (except the *green text*)*



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Proposed changes to Part-66

Training methods and tools reference table — Basic knowledge training								
Training method	Training tool (Code)	Theoretical elements			Practical elements	Learning objectives		
		Level 1	Level 2	Level 3		Knowledge	Skills	Attitude
Theoretical training	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	x	x	x		x		
Lecturing (instructor-led /face to face)	1,2,3,5,6,7,8,9,10,11,12,13,14	x	x	x	x	x	x	x
Assisted learning (mentoring)	1,2,3,5,6,7,8,9,10,11,12,13,14,15	x	x	x	x	x	x	x
e-learning	1,2,3,4,5,8,12,14,15	x	x	x ⁽¹⁾	x ⁽¹⁾	x	x ⁽¹⁾	
Computer-based Training	1,2,3,4,5,8,12,14,15	x	x	x	x	x	x	
Multimedia-based Training	1,2,3,4,5,8,12,13,14,15	x	x	x	x ⁽¹⁾	x	x ⁽¹⁾	
M-learning	1,2,3,4,5,12,15	x	x	x ⁽¹⁾	x ⁽¹⁾	x	x ⁽¹⁾	
Distance learning synchronous	1,2,3,4,5,8,15	x	x	x ⁽¹⁾	x ⁽¹⁾	x	x ⁽¹⁾	
Distance learning asynchronous	1,2,3,4,5,8	x	x	x ⁽¹⁾		x		
Practical training	1,2,3,4,6,7,8,9,10,11,12,13,14,15 ⁽¹⁾				x		x	x
Demonstration	1,2,3,5,6,7,8,9,10,11,12,13,14,15	x	x	x ⁽¹⁾	x	x	x	x ⁽¹⁾
Simulation	1,3,4,6,7,8,9,10,12,14,15 ⁽¹⁾	x	x	x ⁽¹⁾	x	x	x	x
This table relates a given training method to a list of acceptable training tools (code), oriented to deliver the theoretical elements or practical elements associated to their specific learning objectives.								
(1) Limited functionality. It means that the respective training method can be used but with limited results, thus requiring the support of a complementary training method to fulfil the learning objectives.								



NPA 2014-22

Proposed changes to Part-66

Training Methods and Tools Reference Table - Type Training									
Training Method	Training Tool (Code)	Theoretical Elements			Practical Elements	On-Job-Training	Learning Objectives		
		Level 1	Level 2	Level 3			Knowledge	Skills	Attitude
Theoretical training	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	x	x	x			x		
Lecturing (Instructor Led /Face to face)	1,2,3,5,6,7,8,9,10,11,12,13,14	x	x	x	x	x	x	x	x
Assisted Learning (Mentoring)	1,2,3,5,6,7,8,9,10,11,12,13,14,15	x	x	x	x	x	x	x	x
e-Learning	1,2,3,4,5,8,12,14,15	x	x	x ⁽¹⁾	x ⁽¹⁾		x	x ⁽¹⁾	
Computer Based Training	1,2,3,4,5,8,12,14, 15	x	x	x	x		x	x	
Multimedia Based Training	1,2,3,4,5,8,12,13, 14,15	x	x	x	x ⁽¹⁾		x	x ⁽¹⁾	
M-Learning	1,2,3,4,5,12,15	x	x	x ⁽¹⁾	x ⁽¹⁾		x	x ⁽¹⁾	
Distance Learning Synchronous	1,2,3,4,5,8,15	x	x	x ⁽¹⁾	x ⁽¹⁾		x	x ⁽¹⁾	
Distance Learning Asynchronous	1,2,3,4,5,8	x	x	x ⁽¹⁾			x		
Practical training	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15 ⁽¹⁾				x	x		x	x
Demonstration	1,2,3,5,6,7,8,9,10,11,12,13,14,15	x	x	x ⁽¹⁾	x		x	x	x ⁽¹⁾
Simulation	1,3,4,6,7,8,9,10,12,14, 15 ⁽¹⁾	x	x	x ⁽¹⁾	x		x	x	x
On the Job Training	2,3,4,10,11,12,13				x	x		x	x
This table relates a given Training Method to a list of acceptable Training Tools (Code), oriented to deliver the Theoretical Elements, Practical Elements or On The Job Training associated to their specific Learning Objectives.									
(1)- Limited functionality. It means that the respective Training Method can be used but with limited results, thus requiring the support or a complementary Training Method to fulfil the Learning Objectives.									



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Proposed changes to Part-66

[Table 2]

Training Method	Description	Instructor Centred	Student centred	Blended Training (1)
Assisted Learning (Mentoring)	Assisted Learning or mentorship represents an on-going, close relationship of dialog and learning between an experienced/ knowledgeable instructor and a less experienced/knowledgeable student in order to develop experience/knowledge of students.	X		X
Computer Based Training	CBT is any interactive means of structured training using a computer to deliver a content.	X	X	X
Demonstration	A method of teaching by example rather than simple explanation.	X		
Distance Learning Asynchronous	Distance Learning reflects training situations in which instructors and students are physically separated. It is asynchronous if the teacher and his students do not interact at the same time.		X	
Distance Learning Synchronous	Distance Learning reflects training situations in which instructors and students are physically separated. It is synchronous if the teacher and his students interact at the same time.	X		
e-Learning	Training organised around learning events, which may be led by instructors (e-tutors), via a network or electronic means.	X	X	X
Lecturing (Instructor Led/Face to face)	Practice of face-to-face delivery of training and learning material between an instructor and students, either individuals or groups.	X		
M-Learning	Any sort of learning that happens when the student is not at a fixed, predetermined location, using mobile	X	X	X

Multimedia Based Training (2)	Any combined use of different training media.	X	X	X
On the Job Training	OJT refers to gaining competence and experience, it may or may not use structured learning process and is usually peer to peer. It takes place on aircraft, on component, or at the workplace (environment) and involves actual work performance.	X		X
Practical training	Practical training refers to gaining competence, using structured learning process, instructor-led, in a classroom, simulation, on aircraft or in shops environment. It does not necessarily result in physical maintenance actions on real aircraft (Removal/Installation).	X		X
Simulation	Any type of training that uses a simulator imitating a real world process or system.	X	X	X
Theoretical training	Teaching the knowledge element of the aircraft/system.	X	X	X

Note: The purpose of this table is to provide guidance giving a short definition for each associated Training Method and relate it to the focus of the learning. It is not meant to comprehensively explore and identify the capabilities of each Training Method herein elected.

(1) Blended training includes different instructional methods and tools, different delivery methods, different scheduling (synchronous / asynchronous) or different levels of guidance. Blended training allows the integration of a range of learning opportunities.

(2) Multi Media Training by definition uses various media to achieve its objective thus none of the single media listed is per se a complete solution for a training.



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Proposed changes to Part-66

[Table 3]

Training Tools	Description	Code
Slide show presentation	A structured presentation of slides.	1
Manuals	Comprehensive and controlled publication of a particular topic.	2
Computer (Desktop PC)	An electronic processing device that can hold and display information in various media.	3
Mobile devices (such as, but not limited to tablets, mobile phones, laptops, ...)	A mobile electronic processing device that can hold and display information in various media.	4
Videos	Electronic media for broadcasting moving visual images.	5
MSTD - Maintenance Simulation Training Device	Device that is intended to be used in the maintenance training, examination, assessment for a system or an entire aircraft. The MSTD may consist of hardware and software elements.	6
Mock-up	A scaled or full size replica of a component, system or entire aircraft that preserves the (i.e. is an exact replica of) geometrical, operational or functional characteristics of the real component, system or entire aircraft for which maintenance training is delivered with the use of such a replica.	7
Virtual Reality	A computer generated three-dimensional (3D) environment which can be explored and interacted with a person.	8
MTD - Maintenance Training Device	Maintenance Training Device is any training device other than a MSTD used for maintenance training and/or examination and/or assessment. It may include mock-ups.	9
Real Aircraft	A suitable aircraft whose condition allows teaching a selection of maintenance task that are representative of the particular aircraft or of the aircraft category. "Suitable" means an aircraft of the type for Type Training, or an aircraft representative of the licence category for Basic Training, and excludes "virtual aircraft". "Condition" means that the aircraft is equipped with its main components and that the systems can be activated/operated when this is required by the learning objectives.	10

Aircraft Components	A suitable aircraft component used to teach specific maintenance tasks off-the-wing. This may include, but not limited, to tasks such as boroscope inspections, minor repairs, testing, or the assembly/disassembly of sub-components. "Suitable" means that the condition of the component should fit the learning objectives of the tasks, and when appropriate may feature existing defects or damages.	11
Augmented Reality	An enhancement (modification, enrichment, alteration or manipulation) of one's current perception of reality elements of a physical, real-world environment following users inputs picked up by sensors transferred to rapid streaming computer images (By contrast, virtual reality replaces the real world with a simulated one).	12
Embedded Training	A maintenance training function that is originally integrated into the aircraft component's design.	13
Classroom	An physical, appropriate location where learning takes place.	14
Virtual Classroom	An virtual, appropriate location where synchronous learning takes place.	15
Note: The purpose of this table is to provide guidance giving a short definition for each associated training tool. It is not meant to comprehensively explore and identify the capabilities of each Training Tool herein elected.		



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Proposed changes to Part-66

New point 7. in AMC to Section 1 explains how Maintenance Simulation Training Devices (MSTD) and Maintenance Training Devices (MTD) should be integrated and used in theoretical and practical elements of aircraft type training.

It defines **MSTD** as maintenance training, examination and assessment tool for components, systems or an entire aircraft and gives a detailed description of different types of MSTD depending on the level of accuracy and their capability of simulation, which could be limited or accommodate interactive simulation including some troubleshooting scenarios.

Flight Simulation Training Devices (FSTD) may also be used as MSTD whenever their characteristics and capabilities are considered appropriate and supportive for the purpose of the delivery of the respective maintenance training element.

A **Maintenance Training Device (MTD)** is defined as any training device other than MSTD used for maintenance training, examination or assessment. Mock-Ups or the aircraft may be considered as MTD.



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Proposed changes to Part-66

...

AMC to Paragraph 3.1(d) of Appendix III to Part-66 “Aircraft Type Training and Examination Standard. On-the-Job Training”

Training Needs Analysis for the Theoretical Element of the Aircraft Type Training

...

4. In order to approve a **reduction of such minimum duration**, the evaluation done by the competent authority should be performed on a case-by-case basis appropriate to the aircraft type **and to the training methods and tools proposed**.

Examples added:

- b) use of an MSTD (i.e. Flat Panel Trainer) comprising actual aircraft software may result in the duration of the training being reduced due to a more effective transfer of knowledge.
- c) using the Multimedia Based Training (or Blending the training methods) may improve the efficiency of training and consequently contribute to a reduction of the overall time needed to achieve the learning objectives.



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Proposed changes to Part-66

5. When developing the TNA the following should be considered:

...

g) The TNA should:

...

- Describe the following:
 - The instructional methods and ~~equipment~~ tools, as well as their blended application, ~~teaching methods and blending of the teaching methods~~ in order to ensure the effectiveness of the training;
- j) The minimum participation time for the trainee in order to meet the objectives of the course should not be less than 90 % of the tuition hours or 95% of the content in case of the student-centred methods of the theoretical training course.



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Proposed changes to Part-66

AMC to Paragraph 4.1 of Appendix III to Part-66 “Aircraft Type Training and Examination Standard. On-the-Job Training”

Type training examination and assessment standard *(new)*

Written examinations may be computer or hard copy based, or a combination of both as approved by the competent authority. Refer to AMC 147.A.135.

AMC to Section 6 of Appendix III to Part-66 “Aircraft Type Training and Examination Standard. On-the-Job Training”

On-the-Job Training (OJT)

1. ...
2. ...
3. The use of ~~simulators~~ **MSTD and MTD** for OJT should not be allowed.
4. ...
5. ...



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Proposed changes to Part-66

Appendix III to Part-66 “Aircraft Type Training and Examination Standard. On-the-Job Training”, point 3.1(e) Theoretical element: Content of the syllabus

- Errors in 21A and 31A corrected
- ATA 47 – Nitrogen Generation System added

Chapters / Levels	Aeroplanes		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
Licence Category	B1	C	B1	C	B1	C	B1	C	B2
Airframe Systems:									
21A Air Supply	3	1	3	1	13	31	3	1	2
31A Instrument Systems	3	1	3	1	3	1	13	31	3
47 Nitrogen Generation System	3	1	--	--	--	--	--	--	2



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Proposed changes to Part-66

Appendix III to Part-66 “Aircraft Type Training and Examination Standard. On-the-Job Training”, point 3.2(b) Practical element: Content of the syllabus

- Corrections made in ATA 49 and ATA 71
- ATA 47 – Nitrogen Generation System added

Chapters		B1/B2	B1					B2				
		LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
47	Nitrogen Generation System	X/X	X	X	X	X	X	X	X	X	X	X
49	Auxiliary Power Units (APUs)	X/X	X	X	-	X	X	X	X	-	-	-
71	Power Plant	X/X	X	X	-	-	-	-	X	-	-	-



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Proposed changes to Part-147

147.A.100 Facility requirements *(new added point (j))*

...

- (j) By derogation to paragraphs (a) through (d), in the case of distance learning performed at a location where the Part-147 organisation has no control over the environment where the student is located, the Part-147 organisation shall brief the student and raise his/her awareness regarding the suitability of his/her learning location.

This derogation applies only to distance learning and not to the corresponding examination and/or assessment.

In addition, smaller text adaptation performed in points (b), (f) and (h).



NPA 2014-22

Proposed changes to Part-147

AMC 147.A.105 (f) Personnel requirements

Any person currently accepted by the competent authority in accordance with the national aviation regulations in force prior to Part-147 coming into force may continue to be accepted in accordance with 147.A.105 (f).

Paragraph 3 of Appendix III to AMC to Part-66 provides criteria to establish the qualification of assessors.

The instructors should be trained in the subject matter they are delivering, including the appropriate training methods and tools, as applicable.



NPA 2014-22

Proposed changes to Part-147

GM 147.A.105 (f) Personnel requirements *(new)*

The instructor (e-tutor/tele-tutor/tele-trainer) should be trained in coaching, guiding and assisting of e-learning students. It is important that the instructor understands the electronically based distance learning process, has the competence to evaluate learning behavior over the distance and is able to support the learning process of e-students proactively.

The following structure should give an overview about such an instructor training:

- Changes and tendencies of today's training
- Fundamentals in methodology and didactics
- Basics and theory of e-learning and tele-tutoring
- Virtual communication
- The changed role of learners and instructors
- Competence profile of a tele-tutor
- Practical guide to support learning processes
- Assessment of learners performance
- The Learning Management System



NPA 2014-22

Proposed changes to Part-147

147.A.115 Instructional equipment *(amended)*

(a) Each classroom shall have appropriate presentation equipment of a standard that ensures students can easily read presentation text/drawings/diagrams and figures from any position in the classroom.

In case of virtual training environment, training content must be presented in such design to assist students in their understanding of the particular subject matter, ensuring students can easily read presentation text/drawings/diagrams and figures.

Presentation equipment ~~shall~~ **may** include representative ~~synthetic training devices~~ **Maintenance Simulation Training Devices (MSTDs)** to assist students in their understanding of the particular subject matter where such devices are considered beneficial for such purposes.



NPA 2014-22

Proposed changes to Part-147

AMC 147.A.115(a) Instructional equipment *(new)*

If the organisation transfers theoretical knowledge by a virtual controlled environment (e.g. Computer Based Training (CBT) or Multimedia Based Training (MBT)), the organisation should ensure that appropriate computer system requirements are available to the end user.

The organisation should ensure that the student's activities are tracable, documented and recorded.

If the organisation uses the computer systems of third party providers, a written agreement between both parties should be established covering the terms of delivery including the data security and data integrity.



NPA 2014-22

Proposed changes to Part-147

GM to 147.A.115(a), (d) Instructional equipment *(replaced)*

1. Refer to GM to Paragraph 3. of Appendix III to Part 66 for description and to point 7. of the AMC to Section 1 of Appendix III to Part 66 for definition.
 2. It is acknowledged that instances could exist where the size and complexity of such MSTD and/or MTD may require a dedicated infrastructure. Such instances shall be acceptable provided that student access to and usage of the respective MSTD/MTD are appropriately ensured.
-
- ~~1. Synthetic training devices STDs are working models of a particular system or component and include computer simulations.~~
 - ~~2. A synthetic training device STD is considered beneficial for complex systems and fault diagnostic purposes.~~



NPA 2014-22

Proposed changes to Part-147

147.A.120 Maintenance training material *(new point (c) added)*

(a) ...

(b) ...

(c) Access to the maintenance training material relevant to basic or type training courses can be given in any media (hard copy or electronic) provided the student has the appropriate means of accessing such material at any given time during the entire course duration.



NPA 2014-22

Proposed changes to Part-147

147.A.135 Examinations *(new point (d) added)*

(a) ...

(b) ...

(c) ...

(d) The examination shall be performed in a controlled environment by a Part-147 organisation and described in the MTOE.

For examination purposes, a controlled environment is one in which the identity of the students, the conduct of the examination process, the integrity of the examination and the security of the examination material shall be established, verified and guaranteed.



NPA 2014-22

Proposed changes to Part-147

147.A.145 Privileges of the maintenance training organisation

(a) ...

(b) Training, knowledge examinations and practical assessments may only be carried out at the locations identified in the approval certificate and/or at any location specified in the maintenance training organisation exposition.

Training and knowledge examination location may include URL (Universal Resource Locator) address, provided the virtual environment is clearly described in the MTOE.



NPA 2014-22 – Proposed changes (Part-147)

147.A.200 The approved basic training course *(new point (g) added)*

(a) ...

...

(f) The duration of basic training courses shall be in accordance with Appendix I.

(g) Notwithstanding point (f), in order to benefit from changes in training technology and methods (Theoretical Training), the number of hours as established in Appendix I (Basic Training Course Duration) may be amended providing the syllabus content and schedule describe and justify the proposed change. A procedure in the MTOE shall be provided to justify these changes.



NPA 2014-22 – Proposed changes (Part-147)

AMC 147.B.10 (b) Competent authority

1. ...

1.7. knowledge of maintenance training standards including training methods and technologies.



NPA 2014-22 – Proposed changes (Part-147)

AMC 147.A.105 Personnel requirements

1. ~~The larger~~ Any maintenance training organisation ~~(an organisation with the capacity to examine or assess provide training for 50 students or more within a 12-month period~~ should appoint a training manager with the responsibility of managing the training organisation on a day-to-day basis. Such person could also be the accountable manager. In addition, the organisation should appoint a quality manager with the responsibility of managing the quality system as specified in paragraph 147.A.130(b) and an examination manager with the responsibility of managing the relevant Part-147 Subpart C or Subpart D examination system. Such person(s) may also be an instructor and/or examiner.
2. ~~The smaller~~ Any maintenance training organisation ~~(an organisation with the capacity to provide training for examine or assess less than 50 students) within a 12-month period~~ may combine any or all of the subparagraph (1) positions subject to the competent authority verifying and being satisfied that all functions can be properly carried out in combination.



NPA 2014-22 – Comments

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Status	MS JAA FAA	DES C	MO C	U M P R	PER A	Task numbers	Title	Number	Affected rules & codes	Commenting / Reaction period (yyyy-mm-dd)	
										Begin	End
						RMT.0456	Integrated Modular Avionics (IMA ETSO-2C153)	NPA 2014-23	CS-ETSO	2014-09-10	2014-12-10
						RMT.0281 (MDM.082)	New training methods and new teaching technologies	NPA 2014-22	Part-147 Part-147 AMC/GM Part-66 Part-66 AMC/GM	2014-09-09	2014-12-09
						RMT.0591	Update of CS ADR-DSN.D.260 Taxiway minimum separation distance	NPA 2014-21	CS-ADR	2014-09-03	2014-11-03
						RMT.0593 RMT.0594	Technical requirements and operational procedures for the provision of data for airspace users for the purpose of air navigation	NPA 2014-20	CR-ANSP (IR) Part-21 AMC/GM Part-DAT SO ATM/ANS (IR)	2014-08-11	2014-10-31
						RMT.0132 & RMT.0515 (27829.027)	Helicopter Height-Velocity (H-V) limitations	NPA 2014-19	CS-29 Part-CAT Part-CAT AMC/GM	2014-07-25	2014-11-27
						RMT.0232 (MDM.031(a)) RMT.0233 (MDM.031(b))	Commercial air transport aeroplane operations at night or in IMC using single-engined turbine aeroplane	NPA 2014-18	Part-ARO Part-CAT Part-SPA	2014-07-17	2014-10-17
						RMT.0411 (OPS.094)	Crew resource management (CRM) training	NPA 2014-17	Part-ARO AMC/GM Part-CC AMC/GM Part-ORO AMC/GM Part-SPA AMC/GM	2014-06-26	2014-09-26
						RMT.0223 (MDM.024) RMT.0224 (MDM.025)	High-intensity radiated fields (HIRF) and lightning	NPA 2014-16	AMC-20 CS-23 CS-25 CS-27 CS-29	2014-06-25	2014-09-25
						RMT.0469 RMT.0470	Assessment of changes to functional systems by service providers in ATM/ANS and the oversight of these changes by competent authorities	NPA 2014-13	CR-ANSP (IR) SO ATM/ANS (IR)	2014-06-24	2014-09-24
						RMT.0097 (145.024)	Functions and responsibilities of B1 and B2 support staff — link with sign-off	NPA 2014-11	Part-145 Part-145 AMC/GM	2014-05-13	2014-09-30



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Thank you for your attention

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