European Aviation Safety Agency

Notice of Proposed Amendment 2018-11

Certification Specifications and Guidance Material for maintenance certifying staff type rating training

RMT.0106 (21.039E)

EXECUTIVE SUMMARY

The objective of this Notice of Proposed Amendment (NPA) is to improve the level of safety related to the minimum syllabus of maintenance certifying staff (MCS) type rating training (TRT), enabling design approval holders (DAHs) that comply with Annex I (Part 21) of Regulation (EU) No 748/2012 to identify the technical elements necessary to be addressed for the purpose of training of maintenance certifying staff involved in the maintenance of their products.

In addition, the intent is to ensure an adequate minimum syllabus standard at organisations that comply with Annex IV (Part-147) to Regulation (EU) No 1321/2014.

This NPA proposes:

— the first issue of Certification Specification on MCS data (CS-MCSD) and the associated Guidance Material (GM);
— the amending text for the GM to Part 21 applicable to Operational Suitability DATA (OSD)-MCSD that establishes guidance for the classification of changes to OSD-MCSD in accordance with Part 21.A.

These proposals are expected to enhance safety and mitigate risk related to maintenance errors due to inadequate training and to establish a TRT minimum standard.

Action area:	Human factors and competence of personnel		
Affected rules:	Guidance material (GM) to Part-21, Annex III (Part-66) and Annex IV (Part-147) to Regulation (EU) No 1321/2014.		
Affected stakeholders:	Type certificate holders (TCHs), restricted TCHs (RTCHs), supplemental type certificate holders (STCHs), Part-147 approved maintenance training organisations (ATMOs), national aviation authorities (NAAs), Part-66 license holders.		
Driver:	Safety	**Rulemaking group:**	Yes
Impact assessment:	Light	**Rulemaking Procedure:**	Standard

Table of contents

1. About this NPA

1.1. How this NPA was developed

The European Aviation Safety Agency (EASA) developed this NPA in line with Regulation (EC) 216/2008 (now repealed and replaced by (EU) 2018/1139[1], which will be hereinafter referred to as the 'Basic Regulation') and the European Plan for Aviation Safety (EPAS)[2]. This rulemaking activity is included in the EASA 5-year Rulemaking Programme[3] under rulemaking task (RMT).0106. The text of this NPA has been developed by EASA based on the input of the Rulemaking Group (RMG) RMT.0106 and the outcome of the experience matured using the certification memo on maintenance certifying staff data CM-MCSD-01. It is hereby submitted to all interested parties[4] for consultation.

1.2. How to comment on this NPA

Please submit your comments using the automated **Comment-Response Tool (CRT)** available at **http://hub.easa.europa.eu/crt/**[5].

The deadline for submission of comments is **18 December 2018.**

1.3. The next steps

Following the closing of the public commenting period, EASA will review all comments.

Based on the comments received, EASA will develop a decision:

— issuing CS-MCSD and the associated GM; and

— amending GM 21.A.91 'Classification of changes to type certificate' of EDD 2012/020/R (amended by EDD 2016/007/R).

The comments received and the EASA responses to them will be reflected in a comment-response document (CRD). The CRD will be annexed to the decision.

---

1 Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1535612134845 &uri=CELEX:32018R1139)

2 EASA is bound to follow a structured rulemaking process as required by Article 115(1) of Regulation (EU) 2018/1139. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure).

3 https://www.easa.europa.eu/document-library/general-publications?publication_type%5B%5D=2467

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

5 In case of technical problems, please contact the CRT webmaster (crt@easa.europa.eu).

2. In summary — why and what

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

Article 5 'Airworthiness' of Regulation (EC) 216/2008 requires that TCHs provide the minimum syllabus for the type training of the MCS.

NOTE: Regulation (EC) 216/2008 has been repealed by Regulation (EU) 2018/1139 ('Basic Regulation'). Art. 140 of the Basic Regulation requires the implementing rules adopted on the basis of Regulation (EC) No 216/2008 to be adapted no later than 12 September 2023. Art.139(2) of the Basic Regulation establishes that the references to the repealed Regulation (EC) No 216/2008 shall be construed as references to the Basic Regulation and, where appropriate, read in accordance with the correlation table in Annex X. Regulation (EU) No 748/2012, as amended by (EU) No 69/2014[6], requires that OSD be included in the application for a TC or RTC for an aircraft.

The OSD comprehends, among other data, the minimum syllabus of maintenance certifying staff type rating training, including the determination of type rating.

Consequently, there is a need to develop the CS-MCSD and, at the same time, it is necessary to develop guidance for classification of changes to the MCSD in accordance with Part 21.A.91.

This minimum syllabus, together with the requirements contained in Appendix III to Annex III (Part-66) to Commission Regulation (EU) No 1321/2014[7], form the basis for the development and approval of Part-66 type training courses.

A full regulatory impact assessment (RIA) on the OSD concept was carried out in 2009 within NPA 2009-01[8]. However, it did not focus in detail on the OSD for maintenance.

2.2. What we want to achieve — objectives

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

The specific objectives are to:

— improve the level of safety related to the minimum syllabus of maintenance certifying staff type rating training, enabling Part 21 DAHs to identify the technical elements necessary to train maintenance certifying staff involved in the maintenance of their products; and

— ensure an adequate minimum syllabus standard at EASA Part-147 organisations level.

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

The draft CS-MCSD occupies an intermediate position among the options discussed for the RMT.0106. This intermediate proposal is mainly based on the CM-MCSD-01, used and tested in the ongoing OSD applications and trimmed as appropriate, according to lessons learned on field. This balanced option

[6] Commission Regulation (EU) No 69/2014 of 27 January 2014 amending Regulation (EU) No 748/2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations Text with EEA relevance (OJ L 23, 28.1.2017, p.12) https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1473428990522&uri=CELEX:32014R0069

[7] Commission Regulation (EU) No 1321/2014 of 26 November 2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks (OJ L 362, 17.12.2014, p.1) https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L:2014:362:FULL&from=EN

[8] https://www.easa.europa.eu/sites/default/files/dfu/NPA%202009-01.pdf The related opinion can be found here: https://www.easa.europa.eu/sites/default/files/dfu/Opinion%2007-2011%20-%20OSD.pdf

would leave enough room to Part-147 AMTO to develop the training according to their capacity/ability. The selection of the training organisational elements are left to AMTO (e.g. training objectives, training levels, duration, tuition hours per day, didactical material, computer-based training, simulator devices).

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

This proposal would enhance safety and mitigate the risk related to maintenance errors due to an inadequate training. Furthermore, the proposal would:

— establish the same level of standard for the concerned TRT among the Part-147 (AMTO);

— facilitate the approval of the TRT by NAAs;

— provide appropriate content and references for an easy integration with Appendix III to Part-66;

— leave enough room to end-users Part-147 AMTO to develop the final TRT according to their local organisation capability; and

— give TCHs the opportunity to voluntarily provide more training elements as recommendations.

For the impact assessment of alternative options, please refer to Chapter 4.

3. Proposed amendments and rationale in detail

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

— deleted text is ~~struck through~~;

— new or amended text is highlighted in grey;

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

3.1. Proposed amendments to guidance material to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

1. GM 21.A.91 'Classification of changes to type certificate' is amended as follows:

GM 21.A.91 Classification of changes to type certificate

[…]

3.5 Complementary guidance on the classification of changes to OSD

[…]

(e) Maintenance certifying staff data (MCSD)

~~Reserved~~

The following constitutes a guidance to the classification of changes to the MCSD, which can be either related to a change to the type design or stand-alone.

Stand-alone changes are not related to a type design change. They may be triggered either by the introduction of data at the request of the applicant after type certification (e.g. when some ICA become available at a later stage), or by reported occurrences or in-service experience related for example, but not limited to, to the following areas:

— maintainability issues;
— non-compliance with required maintenance procedures;
— maintenance errors;
— human factors issues;
— fleet reliability data.

A change to the MCSD should be classified as major, in particular but not only, when it modifies:

— the aircraft maintenance configuration; or
— the minimum list of practical tasks; or
— the maintenance area of special emphasis (MASE).

as defined in the certification specification CS-MCSD.

[…]

2. GM No 1 to 21.A.93(c) 'Interaction of changes to the type design and changes to operational suitability data (OSD)' is amended as follows:

GM No 1 to 21.A.93(c) Interaction of changes to the type design and changes to operational suitability data (OSD)

[…]

Table 1: Examples of major type design changes and their expected impact on OSD constituents

Discipline	Example of major type design change	Expected impact on OSD constituent			
		FCD	SIMD	CCD	MCSD
Structure	(i) Changes such as a cargo door cut-out, fuselage plugs, change to dihedral, addition of floats.	No	No	No	~~Tbd~~ Yes
	(ii) Changes to material, processes or methods of manufacture, or to primary structural elements such as spars, frames and critical parts.	No	No	No	~~Tbd~~ Yes
	(iii) Changes that adversely affect fatigue or damage tolerance or life limit characteristics.	No	No	No	~~Tbd~~ No
	(iv) Changes that adversely affect aeroelastic characteristics.	No	No	No	~~Tbd~~ No
	(v) Aircraft weight changes such as maximum zero fuel weight (MZFW) changes or reduction in maximum take-off weight (MTOW) for operational considerations.	No	No	No	No
Cabin safety	(i) Changes which introduce a new cabin layout of a sufficient extent to require a reassessment of the emergency evacuation capability, or which adversely affect other aspects of passenger or crew safety in aeroplanes with more than 19 passenger seats.	No	No	Yes, potential impact	No
	ii) Changes which introduce new cabin layout of a sufficient extent to require a reassessment of the emergency evaluation capability, or which adversely affect other aspects of passenger or crew safety in aeroplanes with 19 or less passenger seats.	No	No	No (unless assessment identifies need for CCD).	No
	iii) Installation of observer seat.	No	No	Yes, potential impact	No
Flight	(i) Software changes that do not affect the pilot interface.	No	No	No	No
	(ii) Software changes that affect the pilot interface.	Yes, potential impact	~~No~~ Yes, potential impact	No	No

Discipline	Example of major type design change	Expected impact on OSD constituent			
		FCD	**SIMD**	**CCD**	**MCSD**
Systems	(i) Updating the aircraft cockpit voice recorder (CVR) or flight data recorder (FDR) to meet a later standard.	No	No	No	No
	(ii) Change of AC or DC generators with different specifications (KVA, Hz,...).	No	No	No	Yes
	(iii) Modification of the airframe or engine fire/smoke detection/extinction system;	No	No	No	Yes
	(iv) Changes to hydraulic system, e.g.: — motor driven generator change; — hydraulic fluid pressure limit change; — flight controls hydraulic actuation; — power transfer unit logic change; — new reservoir; — new accumulator; — new type of actuators — new system layout	Yes, potential impact	Yes, potential impact	No	Yes
	(v) Modification of the ice protection/detection system;	Yes, potential impact	Yes, potential impact	No	Yes
	(vi) Change to landing gear system, e.g.: — emergency floats installation; — modification of the landing gears shock absorber assembly; — parking brake system improvement; — introduction of a new retraction actuator; — introduction of new pressure gauge & procedure to determine enhanced landing gear shock absorber serviceability; — introduction of carbon brakes instead of steel brakes; — antiskid system installation; — change from tricycle to skids.	Yes	Yes, potential impact	No	Yes
	(vii) Change to the O2 system: — replacement of the chemical system with gaseous oxygen and vice versa;	No	No	Yes, potential impact.	Yes
	(viii) Change to the bleed system: — introduction of the new engine bleed air system and/or overheat detection system;	No	Yes, potential impact	No	Yes
	(ix) Change of APU;	No	No	No, if the functionality remains unchanged	Yes
	(x) Change to the thrust reverser system;	Yes, potential	Yes	No	Yes

Discipline	Example of major type design change	Expected impact on OSD constituent			
		FCD	**SIMD**	**CCD**	**MCSD**
		impact			
	(xi) Modification on fan cowl latch configuration;	No	No	No	Yes
Propellers	(i) Changes to: — diameter, — aerofoil, — planform, — material, and — blade retention system.	No	Yes, potential impact	No	~~No~~ Yes, Potentially.
Engines	(i) Power limit change	No	Yes, potential impact	No	No
	(ii) Change of engine.	Yes	Yes	No	Yes
Rotors and drive systems	~~[Reserved]~~ (i) Modification to the main gear box (MGB), tail gear box (TGB), intermediate gear box (IGB);	Yes, potential impact	Yes, potential impact	No	Yes
	(ii) Change of tail rotor;	Yes, potential impact	Yes	No	Yes
	(iii) Modification to the vibration and noise analysis system;	No	No	No	Yes
Environment	(i) A change that introduces either an increase in the noise certification level(s) or a reduction in the noise certification level(s) for which the applicant wishes to take credit.	No	No	No	No
Power plant installation	(i) Modifications to the fuel system and tanks (number, size, or configuration).	Yes, potential impact	Yes, potential impact	No	~~tbd~~ Yes
Avionics	Comprehensive flight deck upgrade, such as conversion from entirely-federated, independent electromechanical flight instruments to highly-integrated and combined electronic display systems with extensive use of software and/or complex electronic hardware	Yes	Yes, potential impact	No	~~tbd~~ Yes
On-board Maintenance Information system	Change/modification of the on-board information system;	No	No	No	Yes

[…]

3.2. Draft for new certification specifications for maintenance certifying staff data (CS-MCSD) **and associated guidance material (Draft EASA decision)**

SUBPART A — GENERAL

CS MCSD.050 Scope

These certification specifications for maintenance certifying staff data (CS-MCSD) address:

(a) the determination of a maintenance certifying staff type rating:

(1) to assign a maintenance licence type rating endorsement for a candidate aircraft.

(2) to establish if a candidate aircraft is recognised as variant or requires a type rating different from an existing aircraft;

(b) the minimum syllabus of maintenance certifying staff type rating training.

GM1 MCSD.050 Scope

Any reference to maintenance certifying staff type rating training in this document should include all type training courses trainees (i.e. attending a B1 or B2 or C approved type rating training course as applicable to Part-66 maintenance license holders) notwithstanding their status of certifying staff or support staff or just maintenance licence holder and the associated privileges in their aircraft maintenance organisation.

GM2 MCSD.050 Scope

(a) The aircraft maintenance type ratings or variants as well as the maintenance licence endorsement designation are listed in Appendix I to AMC to Part-66.

(b) This list is periodically updated by the Agency.

CS MCSD.100 Applicability

These certification specifications are applicable to all aircraft for which an individual maintenance type rating is required according to Part-66.

CS MCSD.105 Definitions

Within the scope of these certification specifications, the following definitions apply:

(a) *Applicant* means an applicant for, or a holder of, a type certificate (TC), change approval or supplemental type certificate (STC), applying for the approval by the Agency of the related operational suitability data (OSD) for maintenance certifying staff.

(b) *Base aircraft* (or *Baseline aircraft*) means an aircraft model, as identified in the type certificate data sheet, taken as a reference to compare differences with a candidate aircraft.

(c) *Candidate aircraft* means another aircraft model or a certified model configuration subject to the OSD-MCS evaluation process.

(d) *Maintenance areas of special emphasis (MASE)* means any element considered by the applicant as having a degree of novelty, specificity or uniqueness relevant to the maintenance of its aircraft. This could be a technical or operational feature that maintenance personnel need to be aware of and take into consideration.

(e) *Part 21* means Annex I to Commission Regulation (EU) No 748/2012 - Initial Airworthiness - laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations.

(f) *Part-66* means Annex III to COMMISSION REGULATION (EU) No 1321/2014 of 26 November 2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks.

(g) *Part-147* means Annex IV to COMMISSION REGULATION (EU) No 1321/2014 of 26 November 2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks.

(h) *Type rating (TR)* means an aircraft type for which a maintenance type rating training is requested before endorsing the type rating on the aircraft maintenance licence. An engine type is always associated to the type rating and the type rating may cover several variants.

(i) *Variant* means an aircraft model or a certified configuration of a particular model that, although it differs from the base aircraft, requires the same maintenance type rating.

CS MCSD.106 Abbreviations

AFCS	auto flight control system
ALS	airworthiness limitation section
AMC	acceptable means of compliance
AML	aircraft maintenance license
AMM	aircraft maintenance manual
ASM	aircraft schematic manual
ATA	Air Transport Association
BITE	built-in test equipment
CDCCL	critical design configuration control limitation
CDL	configuration deviation list
CMR	certification maintenance requirement
CPCP	corrosion prevention and control program
CS	certification specification
DVI	detailed visual inspection
ETOPS	extended-range twin-engine operational performance standard
EWIS	electrical wiring interconnection system
EZAP	enhanced zonal analysis procedure

FIM	fault isolation manual
FRM	fuel tank flammability reduction means
GM	guidance material
GVI	general visual inspection
HUMS	health usage monitoring systems
ICA	instruction for continued airworthiness
IMA	integrated modular avionics
IPC	illustrated parts catalogue
MCS	maintenance certifying staff
MMEL	master minimum equipment list
MRBR	maintenance review board report
MSTD	maintenance simulation training devices
NDT	not destructive techniques
RVSM	reduced vertical separation minima
SDI	special detailed inspection
SPM	standard practice manual
SRM	structural repair manual
SSEPMS	solid-state electrical power management system
STC	supplemental type certificate as defined in Part 21
TC	type certificate as defined in Part 21
TCDS	type certificate data sheet
TCH	type certificate holder
TEM	tools and equipment manual
TNA	training needs analysis
TSM	troubleshooting manual
VHM	vibration health monitoring
WDM	wiring diagram manual

CS MCSD.110 Status of provided data

CS-MCSD specifies data required from the applicant and data provided at the request of the applicant. Approved OSD-MCS are presented as mandatory or non-mandatory for the end user.

(a) Data required from the applicant and mandatory for the end user (Box 1 as per GM1 MCSD.110): CS MCSD.400

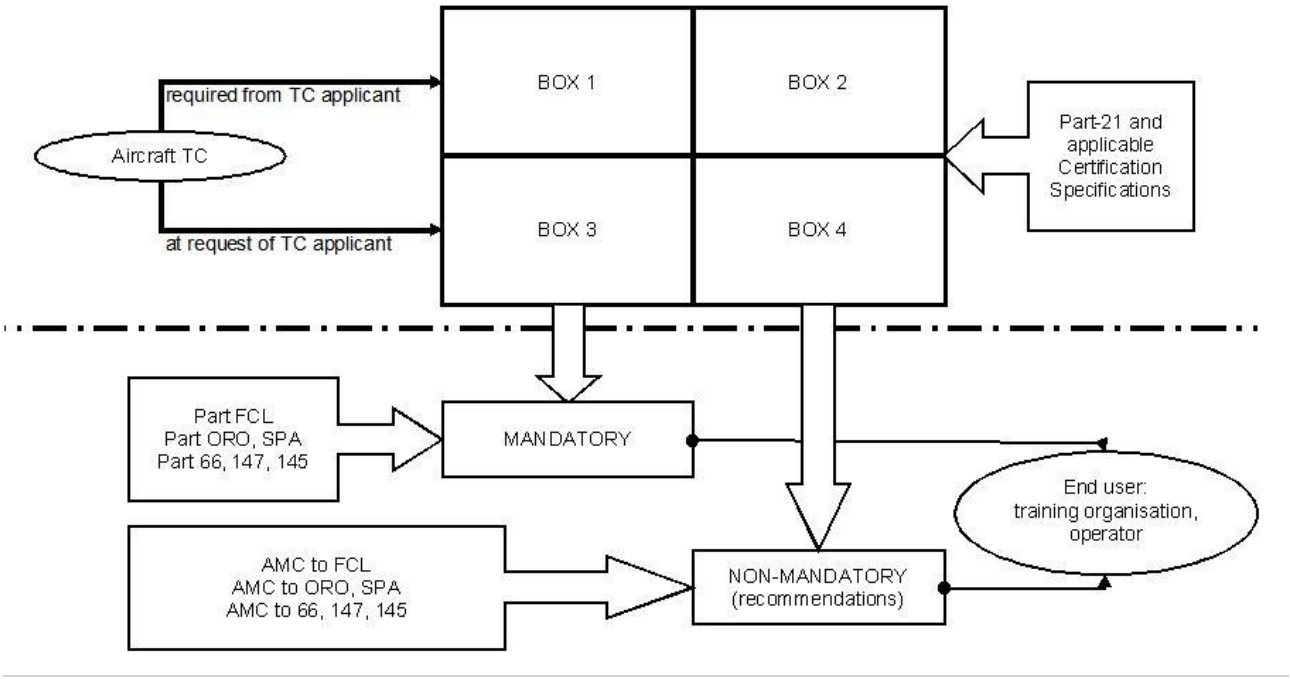
(b) Data required from the applicant and non-mandatory for the end user (Box 2 as per GM1 MCSD.110): CS MCSD.500

(c) Data at request of the applicant and mandatory for the end user (Box 3 as per GM1 MCSD.110): CS MCSD.600

(d) Data at request of the applicant and non-mandatory for the end user (Box 4 as per GM1 MCSD.110): CS MCSD.700

GM1 MCSD.110 Status of provided data - OSD box concept

OSD BOX CONCEPT DIAGRAM



Box 1: required from the applicant; mandatory for end users

Box 2: required from the applicant; non-mandatory (recommendations) for end users

Box 3: at request of the applicant; mandatory for end users

SUBPART B — DETERMINATION OF THE MAINTENANCE TYPE RATING

CS MCSD.200 Type rating determination process

The type rating proposed by the applicant and evaluated by EASA is the type rating for the purpose of EASA Part-66 aircraft maintenance licence (AML) endorsement.
The type rating shall address all the variants included and identify the airframe/engine combinations.

GM1 MCSD.200 TR Determination process

The Type Rating endorsement should be representative of the variants and the approved airframe/engine combinations covered by the type rating.
The type rating endorsement embraces two components:
(a) the Airframe Identifier and

(b) the Engine Identifier

The resultant binomial nomenclature is: **Airframe Identifier (Engine Identifier)**.

Type rating endorsement			
Airframe Identifier		**(Engine Identifier)**	
Manufacturer name (*)	Model, or series, or commercial designation (*)	Manufacturer name (*)	Model, or series (*)

The type rating name may be simplified to avoid lengthy designations.
Some component(s) of the Airframe/Engine Identifier may be omitted, for sake of simplicity, if it does not generate ambiguities.
(*) In some circumstances the official name can be replaced by the popular name.

CS MCSD.210 Determination of a different type rating

The following criteria determine when the candidate aircraft shall have a different type rating compared to the base aircraft:

(a) the candidate aircraft has a different type certificate; or

(b) the candidate aircraft has a different airframe/engine combination; or

(c) the analysis of the candidate aircraft systems results in a substantial difference; or

(d) such a recommendation is made by the applicant and accepted by the Agency.

GM1 MCSD.210 Determination of a different type rating

A comparison between base and candidate aircraft systems should be carried out. A new type rating endorsement may be considered for the candidate aircraft if the analysis identifies differences in more than 30 % of the maintenance significant systems, in terms of:
— MASE
— architecture

— functionality
— purpose
— interrelation between systems
— installed components/equipment/units (function, location)
— materials used (with different physical characteristics, e.g. composites in the place of metallic)
— maintenance practices/procedures
— technologies

The analysis is to be supported by a qualitative assessment of what system should be considered 'significant' for that specific aircraft type.
In general, maintenance significant systems are ATA 21, 22, 24, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 42 through 46, 47, 51 through 57, 61 through 67, and 71 through 85.
The applicant should generate a 'differences table' (similar to the table in Appendix I) in order to identify and justify the systems differences between the base and the candidate aircraft.

GM2 MCSD.210 Determination of a different type rating

A new variant should be considered whenever the comparison between base and candidate aircraft systems does not justify a new type rating because the competence required to technicians can be reached through a difference training between variants (for example, the candidate is the stretched fuselage version of the base aircraft).

SUBPART C — MINIMUM SYLLABUS CONTENT

CS MCSD.300 General

The minimum syllabus content applies to the type rating training of the base aircraft and its variants.

CS MCSD.400 Box 1 Content

The Box 1 content is constituted by:

(a) Aircraft maintenance configuration;
(b) Minimum list of practical tasks;
(c) Maintenance areas of special emphasis (MASE).

CS MCSD.410 Aircraft maintenance configuration

The aircraft maintenance configuration is a list of chapters which describe the aircraft and its systems.
It shall be detailed at aircraft subsystem level and at component/unit level in cases when the novelty or other characteristics of the component justify/require such a detail.
The list is in accordance with the aircraft type design and shall be covered by the type rating training.

GM1 MCSD.410 Aircraft maintenance configuration

The maintenance configuration should be detailed according to the method used by the TCH when providing the instructions for the continuing airworthiness. ATA 100 is a standard accepted by the Agency as it contains the reference to the ATA numbering system which is a common referencing standard for all commercial aircraft documentation. ATA 100 (or S1000D) is preferred also for an optimal integration with Part-66 Appendix III.

The list of subjects should be detailed to ATA component level in cases when the novelty or other characteristics of the component justify/require such a level of detail.

The certificated aircraft maintenance configuration so detailed should cover the complete base aircraft configuration relevant to maintenance type rating training.

The list of subjects and topics may come from the Aircraft Maintenance Manual (AMM) and other design processes documents, as applicable:

— SRM: Structural Repair Manual
— TSM/FIM: Trouble Shooting Manual/Fault Isolation Manual
— NDT: Not Destructive Techniques
— MRBR: Maintenance Review Board Report
— TEM: Tools and Equipment Manual
— WDM: Wiring Diagram Manual
— IPC: Illustrated Parts Catalogue
— ASM: Aircraft Schematic Manual
— SPM: Standard Practice Manual
— MMEL associated maintenance procedures
— CDL associated maintenance procedures
— Additional specific dispatch documentation (if any).

CS MCSD.420 Minimum list of practical tasks

The minimum list of practical tasks is a list of maintenance tasks that are relevant to the aircraft type and important for practical training purposes. These tasks should address training information that cannot adequately be explained by theoretical training alone.
The tasks shall be representative of the aircraft and systems both in complexity and in the technical input required to complete that task. While relatively simple tasks may be included, other more complex tasks should also be incorporated and undertaken as appropriate to the aircraft type.
Practical task selection shall also take into consideration the MASE.

GM1 MCSD.420 Minimum list of practical tasks

The objective of the practical tasks training is to gain the required competence in performing safe maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks. It includes training on the use of all technical literature and documentation for the aircraft, the use of specialist/special tooling and test equipment for performing removal and replacement of components and modules unique to type.
The list may encompass:

— Location of systems, subsystems, units and components;
— Operation, Control and Indicating: normal/abnormal/emergency conditions.
— Removal & Installation procedure (Open/close of accesses, Deactivation/Reactivation, Use of Test-Support Equipment, Use of safety devices, Cleaning, Flushing)
— Inspection/Checks (GVI, DVI, SDI-NDT)
— Aircraft groundhandling (Storage, Parking, Mooring, Lifting, Jacking, Shoring, Towing…)
— Servicing (Lubrication, Hydraulic/Oil/Gas replenishing, Gas charging/discharging, preserving/depreserving, data loading, fuelling/defuelling, de-icing/anti-icing, fluid draining…)
— Testing (Operational, Functional, BITE…)
— Fault Isolation/Trouble Shooting
— Job Set-up/Close-up
— MMEL maintenance dispatch conditions.

The practical task shall be representative of the MASE.
The practical tasks selection shall be complemented with clear instructions for appropriate integration with the requirements of Appendix III to Part-66.

CS MCSD.430 Maintenance areas of special emphasis (MASE)

MASE are elements considered by the applicant as having a degree of novelty, specificity or uniqueness relevant to the maintenance of its product. These could be technical or operational features that maintenance personnel need to be aware of and to take into consideration.
MASE are also knowledge, training and assessment areas that the applicant considers necessary to highlight because it is type-related and safety-related.

GM1 MCSD.430 MASE

In order to identify the MASE, the applicant should give consideration to (as applicable to the type uniqueness):

(a) Criticality and safety impact of the maintenance task and procedure on the aircraft and personnel;

(b) Difficulty – depending on how difficult it is to perform the tasks/procedures (e.g. if it is necessary to use a complex tool; special coordination between people; complex maintenance instructions; specific interpretation skills);

(c) Novelty – Relating to special features derived from new or unusual design related to system or subsystem (e.g. not covered by Appendices I and III to Part-66):

- New materials or combination of materials;
- New manufacturing processes;
- New or unusual aircraft configuration and/or system architecture;
- Novel reconfiguration of systems;
- New interface or interaction with other parts or systems;
- Unusual location of a part of a system or unusual construction;
- New functions;
- New kind of operations;
- The potential for new failure modes;
- Introduction of a new threat (for example, new threats regarding fire, fuel, hydrogen, energy storage device) or a new prevention/detection/mitigation method;
- New maintenance techniques;
- Novel operating conditions or limitations;
- New human-machine interface;

(d) Frequency – Depending on the frequency with which the maintenance task or procedure will be performed or the item be replaced. Maintenance tasks to be performed very rarely or very often, could deserve particular cautions and attentions.

(e) Human Factor – Relating to the human factor issues associated to the system, subsystem, components and/or tasks. (e.g. accessibility during maintenance, effect of volume/ weight on the humans physical limitations, lightness conditions, interfaces with the machine, complexity of the instructions)

(f) Special tests and tools/equipment

The applicant shall identify and put in place adequate methods and processes to capture the MASE.

Appendix II reports an example of a checklist that can help to identify the MASE correlated to the CS-25 and CS- 29 requirements.

CS MCSD.500 Box 2 Content

The logical training sequence is the timewise order of imparting training elements of the minimum syllabus.

References (literature) to new technology. In case of designs including new technologies, materials and system not covered by the basic training, the applicant should provide the relevant information necessary to develop training and fill the gap.

GM1 MCSD.500 Box 2 Content

The logical training sequence (i.e. the logical presentation of the aircraft systems and specific design to trainees) shall not necessarily be sequenced in ATA chapter order and may vary according to the aircraft's systems and their logical interface (e.g. ATA 29 training on hydraulic system(s) configuration should precede ATA27 training on flight controls actuation).

CS MCSD.600 Box 3 Content

Any element that, in addition to those grouped in Box 1, the applicant considers that should be part of the mandatory syllabus of the TRT.

GM1 MCSD.600 Box 3 Content

Examples:

(a) Student's prerequisites (knowledge, experience, qualification) for the particular a/c type training, such as:

(1) a previous exposure to and type of a/c maintenance experience;

(2) aircraft type maintenance related elements for composite repair and bonding and appropriate knowledge, experience, and awareness in accordance with AMC 20-29, SAE AIR 5719.

(3) an introductory course on a generic or specific information technology

(b) Minimum syllabus for customer options corresponding the type rating.

(c) Logical training sequence when the TCH considers that there is no-alternate means to comply with.

(d) Any element that is considered necessary by the applicant to cover the minimum syllabus differences between the base aircraft and another aircraft (variant or type) of the same manufacturer. A gap analysis shall be carry out and the result presented in a tabular format (like that reported in APPENDIX I) in order to assess the minimum syllabus commonality and difference.

CS MCSD.700 Box 4 Content

Any other additional elements (i.e. in addition to and beyond the Box1, Box2 and Box3 content) which the type certificate holder recommends to the OSD-MCS user.

GM1 MCSD.700 Box 4 Content

Examples:

(a) Training levels and learning objectives for the Part-66 AML subcategories (B1, B2 and C).

(b) Type rating training course instructional duration (i.e. consolidated per the whole course and/or segregated per elements of the minimum syllabus);

(c) Potential practice of specific maintenance simulation training devices (MSTD) to be used in imparting some of the type training minimum syllabus elements;

(d) Outlines of any other supplemental courses, e.g. specialized training on:

(1) structure inspections and repairs, SRM practices, damage assessment, composite repairs…;

(2) advanced troubleshooting;

(3) systems tests procedures, components adjustments and rigging;

(4) in-depth use of wiring diagrams, schematics and engineering data;

(5) fuel leaks detection and repairs;

(6) fuel tank inerting system;

(7) critical design configuration control list (CDCCL);

(8) electrical wiring interconnection systems (EWIS);

(9) cabin interior and emergency equipment;

(10) engine run-up;

(11) groundhandling;

(12) taxiing;

(13) ramp and transit;

(14) cargo loading;

(15) base maintenance specific training;

(16) recurrent training.

(e) Maintenance training syllabus for special operations (ETOPS, RVSM, CAT II/III…).

APPENDICES TO CS-MCSD

Appendix I to CS-MCSD – Minimum Syllabus template

It is recommended to use a tabular format for the minimum syllabus for a proper implementation of the end-user training needs analysis (TNA).
A possible template is represented in the table below:

ATA[1]	SUBJECT	PRACTICAL TASK[2]	MASE?[3]	Variant Applicability
04-00	**AIR VEHICLE AIRWORTHINESS LIMITATIONS**			
05-00	**TIME LIMITS/ MAINTENANCE CHECKS**			
05-10	Time Limits			
05-20	Scheduled Maintenance Checks			
05-50	Unscheduled Maintenance checks			
06-00	**DIMENSIONS AND AREAS**			
07-00	**LIFTING & SHORING**			
07-10	Jacking			
07-20	Shoring			
08-00	**LEVELING & WEIGHING**			
08-10	Weighing and Balancing			
08-20	Levelling			
09-00	**TOWING & TAXIING**			
09-10	Towing			
09-20	Taxiing			
10-00	**PARKING, MOORING, STORAGE & RETURN TO SERVICE**			
10-10	Parking/storage			
10-20	Mooring			
10-30	Return to service			
11-00	**PLACARDS AND MARKINGS**			
11-10	Exterior Colour Schemes and Markings			
11-20	Exterior Placards and Markings			
11-30	Interior Placards			
12-00	**SERVICING**			
12-10	Replenishing			
12-20	Scheduled Servicing			
12-30	Unscheduled Servicing			
18-00	**VIBRATION AND NOISE ANALYSIS (HELICOPTER ONLY)**			
18-10	VIBRATION ANALYSIS (Helicopter Only)			
18-20	NOISE ANALYSIS (Helicopter Only)			
20-00	**STANDARD PRACTICES-AIRFRAME**			
21-00	**AIR CONDITIONING**			
21-10	Compression			
21-20	Distribution			
21-30	Pressurization Control			
21-40	Heating			
21-50	Cooling			
21-60	Temperature Control			
21-70	Moisture/Air Contaminant Control			

ATA[(1)]	SUBJECT	PRACTICAL TASK[(2)]	MASE?[(3)]	Variant Applicability
22-00	**AUTO FLIGHT**			
22-10	Autopilot			
22-20	Speed Attitude Correction			
22-30	Auto Throttle			
22-40	System Monitor			
22-50	Aerodynamic Load Alleviating			
23-00	**COMMUNICATIONS**			
23-10	Speech Communications			
23-15	SATCOM			
23-20	Data Transmission and Automatic Calling			
23-30	Passenger Address, Entertainment and Comfort			
23-40	Interphone			
23-50	Audio Integrating			
23-60	Static Discharging			
23-70	Audio & Video Monitoring			
23-80	Integrated Automatic Tuning			
24-00	**ELECTRICAL POWER**			
24-10	Generator Drive			
24-20	AC Generation			
24-30	DC Generation			
24-40	External Power			
24-50	AC Electrical Load Distribution			
24-60	DC Electrical Load Distribution			
25-00	**EQUIPMENT/FURNISHINGS**			
25-10	Flight Compartment			
25-20	Passenger Compartment			
25-30	Galley			
25-40	Lavatories			
25-50	Additional Compartments			
25-60	Emergency			
25-70	Available			
25-80	Insulation			
25-90	Aerial delivery (Rescue Hoist, Cargo Hook, Bambi bucket)			
26-00	**FIRE PROTECTION**			
26-10	Detection			
26-20	Extinguishing			
26-30	Explosion Suppression			
27-00	**FLIGHT CONTROLS**			
27-10	Aileron & Tab			
27-20	Rudder & Tab			
27-30	Elevator & Tab			
27-40	Horizontal Stabilizer			
27-50	Flaps			
27-60	Spoiler, Drag Devices and Variable Aerodynamic Fairings			
27-70	Gust Lock & Dampener			
27-80	Lift Augmenting			
28-00	**FUEL**			
28-10	Storage			

ATA[(1)]	SUBJECT	PRACTICAL TASK[(2)]	MASE?[(3)]	Variant Applicability
28-20	Distribution			
28-30	Dump			
28-40	Indicating			
29-00	**HYDRAULIC POWER**			
29-10	Main			
29-20	Auxiliary			
29-30	Indicating			
30-00	**ICE AND RAIN PROTECTION**			
30-10	Airfoil			
30-20	Air Intakes			
30-30	Pitot and Static			
30-40	Windows, Windshields and Doors			
30-50	Antennas and Radomes			
30-60	Propellers/Rotors			
30-70	Water Lines			
30-80	Detection			
31-00	**INDICATING/RECORDING SYSTEMS**			
31-10	Instrument & Control Panels			
31-20	Independent Instruments			
31-30	Recorders			
31-40	Central Computers			
31-50	Central Warning Systems			
31-60	Central Display Systems			
31-70	Automatic Data Reporting Systems			
32-00	**LANDING GEAR**			
32-10	Main Gear and Doors			
32-20	Nose Gear and Doors			
32-30	Extension and Retraction			
32-40	Wheels and Brakes			
32-50	Steering			
32-60	Position Indication and Warning			
32-70	Supplementary Gear			
33-00	**LIGHTS**			
33-10	Flight Compartment			
33-20	Passenger Compartment			
33-30	Cargo and Service Compartments			
33-40	Exterior			
33-50	Emergency Lighting			
34-00	**NAVIGATION**			
34-10	Flight Environment Data			
34-20	Attitude & Direction			
34-30	Landing and Taxiing Aids			
34-40	Independent Position Determining			
34-50	Dependent Position Determining			
34-60	Flight Management Computing			
35-00	**OXYGEN**			
35-10	Crew			
35-20	Passenger			
35-30	Portable			

36-00	**PNEUMATIC**			
36-10	Distribution			
36-20	Indicating			
37-00	**VACUUM**			
37-10	Distribution			
37-20	Indicating			
38-00	**WATER/WASTE**			
38-10	Potable			
38-20	Wash			
38-30	Waste Disposal			
38-40	Air Supply			
41-00	**WATER BALLAST**			
41-10	Storage			
41-20	Dump			
41-30	Indication			
42-00	**Integrated Modular Avionics (IMA)**			
44-00	**CABIN SYSTEMS**			
44-10	Cabin Core System			
44-20	Inflight Entertainment System			
44-30	External Communication System			
44-40	Cabin Mass Memory System			
44-50	Cabin Monitoring System			
44-60	Miscellaneous Cabin System			
45-00	**CENTRAL MAINTENANCE SYSTEM (CMS)**			
46-00	**INFORMATION SYSTEMS**			
46-10	Airplane General Information Systems			
46-20	Flight Deck Information Systems			
46-30	Maintenance Information Systems			
46-40	Passenger Cabin Information Systems			
46-50	Miscellaneous Information Systems			
47-00	**NITROGEN GENERATION SYSTEM**			
49-00	**AIRBORNE AUXILIARY POWER**			
49-10	Power Plant			
49-20	Engine			
49-30	Engine Fuel and Control			
49-40	Ignition/Starting			
49-50	Air			
49-60	Engine Controls			
49-70	Indicating			
49-80	Exhaust			
49-90	Oil			
50-00	**CARGO AND ACCESSORY COMPARTMENTS**			
50-10	Cargo Compartments			
50-20	Cargo Loading Systems			
50-30	Cargo Related Systems			
50-40	Available			
50-50	Accessory			
50-60	Insulation			
51-00	**STANDARD PRACTICES, GENERAL**			
51-10	Investigation, Clean up and Aerodynamic Smoothness			
51-20	Processes			

51-30	Materials			
51-40	Fasteners			
51-50	Support of Airplane for Repair and Alignment Check Procedures			
51-60	Control Surface Balancing			
51-70	Repairs			
51-80	Electrical Bonding			
52-00	**DOORS**			
52-10	Passenger/Crew			
52-20	Emergency Exit			
52-30	Cargo			
52-40	Service and Miscellaneous			
52-50	Fixed Interior			
52-60	Entrance Stairs			
52-70	Monitoring and Operation			
52-80	Landing Gear			
53-00	**FUSELAGE**			
53-xx	thru (As Required) Fuselage Sections			
54-00	**NACELLES/PYLONS**			
54-10	thru (As Required) Nacelle Section			
54-50	thru (As Required) Pylon			
55-00	**STABILIZERS**			
55-10	Horizontal Stabilizer or Canard			
55-20	Elevator			
55-30	Vertical Stabilizer			
55-40	Rudder			
56-00	**WINDOWS**			
56-10	Flight Compartment			
56-20	Passenger Compartment			
56-30	Door			
56-40	Inspection and Observation			
57-00	**WINGS**			
57-10	Central Wing			
57-20	Outer Wing			
57-30	Wing Tip			
57-40	Leading Edge and Leading Edge Devices			
57-50	Trailing Edge Trailing Edge Devices			
57-60	Ailerons, Elevons and Flaperons			
57-70	Spoilers			
57-80	Wing Folding System			
60-00	**STANDARD PRACTICES PROPELLER/ROTOR**			
61-00	**PROPELLERS/PROPULSION**			
61-10	Propeller Assembly			
61-20	Controlling			
61-30	Braking			
61-40	Indicating			
61-50	Propulsor Duct			
62-00	**ROTOR(S)**			
62-10	Rotor blades			
62-20	Rotor head(s)			
62-30	Rotor Shaft(s)/Swashplate Assy(ies)			
62-40	Indicating			

63-00	**ROTOR DRIVE(S)**			
63-10	Engine/Gearbox couplings			
63-20	Gearbox(es)			
63-30	Mounts, attachments			
63-40	Indicating			
63-50	Rotor brake			
63-60	Drain lines			
64-00	**TAIL ROTOR**			
64-10	Rotor blades			
64-20	Rotor head			
64-30	Available			
64-40	Indicating			
65-00	**TAIL ROTOR DRIVE**			
65-10	Shafts			
65-20	Gearboxes			
65-30	Available			
65-40	Indicating			
66-00	**FOLDING BLADES/PYLON**			
66-10	Rotor blades			
66-20	Tail pylon			
66-30	Controls and Indicating			
67-00	**ROTORS FLIGHT CONTROL**			
67-10	Rotor			
67-20	Antitorque Rotor control (Yaw control)			
67-30	Servocontrol System			
70-00	**STANDARD PRACTICES ENGINES**			
71-00	**POWER PLANT**			
71-10	Cowling			
71-20	Mounts			
71-30	Fireseals			
71-40	Attach Fittings			
71-50	Electrical Harness			
71-60	Air Intakes			
71-70	Engine Drains			
72-00	**ENGINE TURBINE/TURBO PROP DUCTED FAN/UNDUCTED FAN**			
72-10	Reduction Gear, Shaft Section (TurboProp and/or Front Mounted Gear Driven Propulsor)			
72-20	Air Inlet Section			
72-30	Compressor Section			
72-40	Combustion Section			
72-50	Turbine Section			
72-60	Accessory Drives			
72-70	Bypass Section			
72-80	Propulsor Section (Rear Mounted)			
73-00	**ENGINE FUEL AND CONTROL**			
73-10	Distribution			
73-20	Controlling			
73-30	Indicating			
74-00	**IGNITION**			
74-10	Electrical Power			
74-20	Distribution			

74-30	Switching			
75-00	**AIR**			
75-10	Engine Anti-Icing			
75-20	Cooling			
75-30	Compressor Control			
75-40	Indicating			
76-00	**ENGINE CONTROLS**			
76-10	Power Control			
76-20	Emergency Shutdown			
77-00	**ENGINE INDICATING**			
77-10	Power			
77-20	Temperature			
77-30	Analyzers			
77-40	Integrated Engine Instrument Systems			
78-00	**EXHAUST**			
78-10	Collector/Nozzle			
78-20	Noise Suppressor			
78-30	Thrust Reverser			
78-40	Supplementary Air			
79-00	**OIL**			
79-10	Storage			
79-20	Distribution			
79-30	Indicating			
80-00	**STARTING**			
80-10	Cranking			
81-00	**TURBINES**			
81-10	Power Recovery			
81-20	Turbo Supercharger			
82-00	**WATER INJECTION**			
82-10	Storage			
82-20	Distribution			
82-30	Dumping and Purging			
82-40	Indicating			
83-00	**ACCESSORY GEARBOXES**			
83-10	Drive Shaft Section			
83-20	Gearbox Section			
84-00	**PROPULSION AUGMENTATION**			
84-10	Jet Assist Take-off			
85-00	**RECIPROCATING ENGINE**			
85-10	Fuel Cell Stack			
95-00	**CREW ESCAPE AND SAFETY**			
95-50	Global survival kits			
95-60	Impact protection and floatation			
97-00	**IMAGE RECORDING**			
97-50	Video cameras			

(1) At component/unit level if necessary
(2) Typical practical tasks are:

- ❑ removal & installation (open/close of accesses, deactivation/reactivation, job set-up/close-up, use of test-support equipment, use of safety devices, cleaning, flushing...)
- ❑ inspection/checks (GVI, DVI, SDI-NDT)

- ❑ servicing (lubrication, hydraulic replenishing…)
- ❑ testing (operational, functional, BITE…)
- ❑ fault isolation/troubleshooting
- ❑ defect rectification (leakage repair…)
- ❑ MMEL maintenance dispatch conditions (M).

(3) This field should be used to insert any relevant information that maintenance personnel need to be aware and take into consideration. Rationale for MASE could be explained (but not limited to) in terms of:

- ❑ Criticality;
- ❑ Difficulty executing the associated maintenance procedures;
- ❑ Novelty of the system/subsystem;
- ❑ Special tools to be used;
- ❑ Frequency of the associated maintenance;
- ❑ Human Factors (heavy component, narrow access, pour illumination, colour identification...);
- ❑ In-Service Experience;
- ❑ Other

The text should help the instructor to acquire an adequate understanding of the MASE, in order to transfer the correct information to the student.

Appendix II to CS MCSD – MASE identification checklist

Subject	Description	ATA (*)	Reasons for MASE	Reference
ICA Format	Any significant information to be emphasized regarding: a) The content, **the form**, the **format**, the **organization** and **access** to the ICA (Instructions for the Continued Airworthiness).	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25/29 Appendix H25.2/A29.2
Maintenance General (Rem/Inst)	Any significant information to be emphasized regarding: a) Information describing the order and **method of removing and replacing** products and parts with any necessary precautions to be taken.	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25/29 Appendix H25.3/A29.3
Maintenance General (ETOPS)	Any significant information to be emphasized regarding: a) **ETOPS maintenance significant systems** and operational procedures	21 26 36 49 7x …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25.1535 ETOPS Design approval — AMC 20-6 ETOPS Certification and Operation
Maintenance General (**Accessibility**)	Any significant information to be emphasized regarding: a) Means **to allow inspection** (including inspection of principal structural elements and control systems), b) **Replacement of parts** normally requiring replacement, adjustment, and lubrication as necessary for continued airworthiness. c) **Practicability for the inspection** d) **Use of Non-destructive inspection aids**. e) Diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided. f) Means must be provided to allow for **inspection of EWIS** and the replacement of its components as necessary for continued airworthiness.	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25.611 Accessibility provisions — CS 25/29 Appendix H25.3/A29.3 — CS 25.1719 and AMC EWIS Accessibility Provisions. — CS 29.901.
Time Limits (ALS)	Any significant information to be emphasized regarding: a) The **Airworthiness Limitations**, mandatory replacement times, structural inspection intervals, and related structural inspection procedure. b) Mandatory replacement time of EWIS components.	05 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25/29 Appendix H25.4/A29.3 and AMC

Subject	Description	ATA (*)	Reasons for MASE	Reference
Time Limits (CMR)	Any significant information to be emphasized regarding: a) The **Certification Maintenance Requirements** (CMR)	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25.1309 and AMC Equipment, systems and installations — AMC 25-19 Certification Maintenance Requirements
Time Limits (EWIS)	Any significant information to be emphasized regarding: a) Maintenance and **inspection requirements** for the Electrical Wiring Interconnection System (**EWIS**) developed with the use of an enhanced zonal analysis procedure (EZAP).	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— AMC to Appendix H, H25.5 — AMC 20-23 Development of Electrical Standard Wiring Practices documentation — AMC 20-21 Programme to enhance aeroplane (EWIS) maintenance — AMC 20-21 Programme to enhance aeroplane (EWIS) maintenance — MRBR
Scheduled Maintenance	Any significant information to be emphasized regarding: a) Scheduling information for each part of the aeroplane and its engines, auxiliary power units, propellers, accessories, instruments, and equipment that provides the recommended periods at which they should be: — **cleaned,** — **inspected,** — **adjusted,** — **tested,** — **lubricated,** — the **degree of inspection** (GVI, DVI, DET, SDI,..) — the applicable **wear tolerances**,…	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25/29 Appendix H25.3/A29.3 Maintenance Review Board Report (**MRBR)**
Scheduled Maintenance (Metallic)	Any significant information to be emphasized regarding: a) Methods and procedure of **inspection of the critical structures** b) To apply **protective treatments** to the structure after inspection c) A **corrosion prevention and control** programme (**CPCP**) d) Basic corrosion inspection task, task areas, defined corrosion levels, e) information needed to apply protective treatments to the structure after inspection f) Corrosion removal and cleaning procedures and reference allowable limits. g) Reports of findings. …	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25.571 — AMC 25.571(a), (b) and (e) Damage Tolerance and Fatigue Evaluation of Structure – Inspection Program Damage-tolerance and fatigue evaluation of structure — AMC 20-20 Continuing Structural Integrity Programme

Subject	Description	ATA (*)	Reasons for MASE	Reference
Scheduled Maintenance (**Composites**)	Any significant information to be emphasized regarding: a) **Maintenance Practice** b) **Damage Detection**, c) Inspection, d) Repair, e) Documentation and Reporting	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25.603 Materials — AMC No.1 to CS 25.603 Composite Aircraft Structure — AMC 20-29 Composite Aircraft Structure no-growth design concept — CS 29.573
Unscheduled Maintenance. (**Trouble-shooting**)	Any significant information to be emphasized regarding: a) Troubleshooting information describing probable malfunctions, **how to recognise those malfunctions, and the remedial action** for those malfunctions.	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25/29 Appendix H25.3/A29.3
Unscheduled Maintenance (**Volcanic Ash**)	Any significant information to be emphasized regarding: a) The **recommended inspections** associated with operations in volcanic cloud contaminated airspace and to/from volcanic ash-contaminated aerodromes b) The **susceptibility of aeroplane features to the effects of volcanic cloud hazards**.	7x …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25/29.1593 Exposure to volcanic cloud hazards — AMC 25/29.1593 Exposure to volcanic cloud hazards
Unscheduled Maintenance (General)	Any significant maintenance information to be emphasized in case of conditional inspections. Here are some examples: a) hard landing b) overweight taxiing c) bird/hail strike d) aborted take-off e) high energy stop f) wheel bearing failure g) exceeding max NLG steering angle h) MLG shimmy/vibrations i) lightning strike/HIRF j) tail strike k) winglet strike l) severe turbulence/extreme high winds m) airframe vibrations n) ice/snow conditions o) flight control down overspeed p) hot air duct rupture q) relief pressure panels open r) mercury spillage s) galley spill t) hydraulic fluid reaction with titanium u) cabin overpressure v) fuel imbalance exceedance w) smoke/fumes in cabin x) abnormal doors operations y) ferry flight maintenance z) other	05 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— No specific reference

Subject	Description	ATA (*)	Reasons for MASE	Reference
Aircraft **jacking, shoring, levelling, weighing, balancing**	Any significant information to be emphasized regarding: a) General procedural instructions including procedures for system testing during ground running, symmetry checks, weighing and determining the centre of gravity, lifting and shoring, and storage limitations.	06 07 08 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25 /29Appendix H25.3/A29.3.
Towing	Any significant information to be emphasized regarding: a) the nose-wheel steering system, **towing attachment(s)**, and associated elements b) the **protections** by appropriate means such that during ground manoeuvring operations effected by means independent of the aeroplane c) Preclusion of damages affecting the safe operation of the nose-wheel steering system d) Any specific **combinations of towbarless towing vehicle(s)** e) **Limitations** to be specified f) Aircraft braking, while the aircraft is under tow during normal towbarless towing. g) Appropriate information to inspect the affected structure should aircraft braking occur, for example in an emergency situation.	09 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25.745 and AMC Nose-wheel steering — CS 25.509 and AMC Towing Loads Towbarless towing
Placards and Markings	Any significant information to be emphasized regarding: a) The labelling, identification, function or operating limitations, b) EWIS components and identification.	11 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25.1301 Function and installation — AMC 25.1301(a)(2) — CS 25.1711 and AMC EWIS Component identification — CS 29.1541, 29-1557.
Servicing	Any significant information to be emphasized regarding: a) Servicing information regarding: — **servicing points**, — **capacities of tanks, reservoirs,** — **types of fluids to be used,** — **pressures applicable to the various systems,** — **location of access panels for inspection and servicing,** — **locations of lubrication points,** — **lubricants to be used,** — **equipment required for servicing**	ALL	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25/29 Appendix H25.3/A29.3.
Autoflight	Any significant information to be emphasized regarding: a) Critical design configuration with respect to the integration of AFCS and Stabilization system with reference to control of all the flight conditions b) Visible means of identifying critical features of the design (e.g., colour-coding of wire to identify separation limitation). c) protective features incorporated to prevent faulty operation	22	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	No specific.

Subject	Description	ATA (*)	Reasons for MASE	Reference
Electrical	Any significant information to be emphasized regarding: a) Critical design configuration with respect to the integration of SSEPMS b) Visible means of identifying critical features of the design (e.g., colour-coding of wire to identify separation limitation). c) protective features incorporated to prevent faulty operation	24	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other	No specific
Flight Controls General (**Cables Inspection**)	Any significant information to be emphasized regarding: a) Provisions for visual inspection of **fairleads, pulleys, terminals, and turnbuckles**.	27 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25.689 (f) Cable systems — CS 29.685
Fuel Tank ignition prevention (**CDCCL**)	Any significant information to be emphasized regarding: a) Critical design configuration control limitations (CDCCL), inspections b) Visible means of identifying critical features of the design (e.g., colour-coding of wire to identify separation limitation) c) protective features incorporated to prevent a catastrophic fuel tank ignition	28 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25.981 (d) and AMC Fuel tank ignition prevention
Fuel Tank ignition prevention (FRM)	Any significant information to be emphasized regarding: a) The hazards to be considered during maintenance of the fuel system and of the FRM (**Fuel Tank Flammability Reduction Means**). These procedures are included in the instructions for continued airworthiness (ICA).	28 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25 APPENDIX M M25.4 Fuel Tank Flammability Reduction Means - FRM Airworthiness limitations and procedures
Indicating/ Recording System	Any significant information to be emphasized regarding: a) Electronic Flight Deck Displays b) Software uploading/downloading procedures.	31 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— AMC 25-11§9 Electronic Flight Deck Displays
Standard Practices Airframe	Any significant information to be emphasized regarding: a) Details for the application of **special inspection techniques** including radiographic and ultrasonic testing where such processes are specified. b) Information needed to apply protective treatments to the structure after inspection. c) All data relative to **structural fasteners** such as identification, discard recommendations, and torque values. d) **Special tools** needed.	51 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25/29 Appendix H25.3/A29.3.

Subject	Description	ATA (*)	Reasons for MASE	Reference
Power Plant	Any significant information to be emphasized regarding: a) The **installation** and operating the Engine. b) Definition of the physical and **functional interfaces** with the aircraft and aircraft equipment c) **Limitations**, and **specifications** for the Engine Control System. d) Engines **airworthiness limitations**, procedures required for the **Engine Critical Parts**, e) **Mandatory action or limitation for in-service maintenance** and repair f) Mandatory **post-flight inspections** and maintenance actions. g) Description/**control of the Engine** and its components, systems and installations. h) **Handling instructions**, including proper procedures for un-crating, de inhibiting, acceptance checking, lifting and attaching accessories, with any necessary checks. i) Information describing the **methods of starting, running, testing and stopping** the Engine or its components and systems including any special procedures and limitations that apply. j) **Servicing information** that covers details regarding servicing points, capacities of tanks, reservoirs, **types of fluids** to be used, pressures applicable to the various systems, locations of lubrication points, lubricants to be used and equipment required for servicing. k) **Troubleshooting** information describing probable malfunctions**, how to recognise those malfunctions and the remedial action** for those malfunctions. l) Information describing the order and method of **removing the Engine** and its parts and replacing parts, the order and method of disassembly and assembly, with any necessary precautions to be taken. Instructions for proper ground handling, crating and shipping must also be included. m) **Cleaning** and inspection instructions that cover the material and apparatus to be used and methods and precautions to be taken. n) Details of **repair methods** for worn or otherwise non-serviceable parts and components along with the information necessary to determine when replacement is necessary. Details of all relevant fits and clearances. o) Instructions for **testing** including test equipment and instrumentation. p) Instructions for **storage** preparation, including any storage limits. q) A list of the **tools** and equipment necessary for maintenance and directions as to their method of use.	7x …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— CS 25/29.901(b)(1) Powerplant installation
Thrust Reverser	Any significant information to be emphasized regarding: a) Identification of all **maintenance tasks critical** to continued safe flight. b) The **complexity of lock-out procedures** and appropriate verification.	78 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— AMC to 25.933(a)(1) Unwanted in-flight thrust reversal of turbojet thrust reverser

Subject	Description	ATA (*)	Reasons for MASE	Reference
Thrust Reverser **(Propellers)**	Any significant information to be emphasized regarding: a) The **criticality of the control system** b) Need to emphasize the maintenance and maintainability	78 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— AMC to 25.1155§7 Reverse Thrust and Propeller Pitch Settings
Helicopter Vibration health monitoring (**VHM**)	Any significant information to be emphasized regarding the rotorcraft health usage monitoring systems (HUMS) such as: a) Installation of the VHM system. b) Line maintenance of the VHM system (including VHM system fault-finding, any calibration necessary). c) Use of the VHM System during Line maintenance to monitor the rotorcraft, including the data transfer, interface with data analysis, response to Alerts and Alarm processing, rotorcraft fault-finding and other Line diagnostic actions. d) Necessary system administration functions, covering operational procedures relating to data transfer and storage, recovery from failed down loads and the introduction of hardware and software modifications. e) Any data analysis and reporting functions that are expected to be performed by the operator.	18 …	☐ Criticality ☐ Difficulty ☐ Novelty ☐ Special tools ☐ Frequency of maintenance ☐ Human Factor ☐ In-Service Experience ☐ Other…	— AMC 29.1465 Vibration health monitoring

(*) ATA chapters usually involved.

4. Impact assessment (IA)

4.1. What is the issue

The issue analysis has already been included in Section 2.1.

4.1.1. Who is affected

— All applicants for a new TC or RTC, requiring a maintenance type rating (Group 1 a/c as per GM 66.A.45);

— RTC holder who is voluntarily applying for the OSD-MCSD evaluation for an aircraft which is not in Group 1 or for an already certificated aircraft;

— EASA Part-147 ATMOs; and

— the competent authorities nominated by the EASA member states to approve the type rating trainings.

4.1.2. How could the issue/problem evolve

The maintenance TRT is elaborated by the Part-147 AMTO according to the generic requirements contained in Appendix III to the Part-66 plus, if available, the OSD elements established in accordance with Part 21.

Without the specific elements provided by the RTC holder in the maintenance minimum syllabus, the relevant information of the aircraft type may be missing in the final type rating course. This gap may have a negative impact on the safety of the aircraft operation, resulting in incidents/accidents caused by maintenance errors due to an inadequate training. However, it is quite difficult to determine precisely which accidents/incidents occurred due to underqualification of the personnel on the aircraft type as a consequence of inadequate minimum syllabus level.

The type training would not capture the manufacturer's best knowledge and experience on the a/c type, therefore a uniform and high level of standard for maintenance training standard cannot be reached.

4.2. What we want to achieve — objectives

The objectives have already been included in Section 2.2.

4.3. How it could be achieved — options

The discussions in the RMT.0106 'Certification specifications and guidance material for maintenance certifying staff type rating training' have been controversial due to different ideas/interests concerning the OSD-MCS. Diverse and scattered positions emerged from RMT.0106 on the definition of the minimum syllabus, i.e. the content of the 4 boxes OSD concept (mandatory and not-mandatory content). This provided input for the two principal options:

— 'Light OSD' (minimalist approach): RTCH provides only a minimal contribute, limited to the identification of a/c areas of maintenance special emphasis (MASE).

— 'Large OSD' (full type rating training): OSD-MCS shall be, de facto, the type rating training.

In parallel, CM-MCSD-01, the certification memo tested in the few ongoing OSD applications, suggested another balanced and intermediate option. This option would leave enough room to

Part-147 AMTO to develop the training according to their capacity/ability. Selection of the training organizational elements are left to AMTO (e.g. training objectives, training levels, duration, hours per day, didactical material, computer bases training, simulator devices).

In summary, the options selected were:

Table 1: Selected policy options

Option No	**Title**
0	No policy change (no change to the rules; risks remain as outlined in the issue analysis).
1	Light OSD (minimalist OSD content)
2	Balanced OSD (compromise option)
3	Large OSD (full type training course)

Option 0 has been included in order to allow a clear comparison of options proposed with baseline scenario. However, option 0 as such is not viable as it has already been decided that a regulatory action should be taken to this regard. Indeed, the Basic Regulation 216/2008 introduced new provisions in article 5(5)(e) tasking the Commission to issue measures supplementing article 5 by stipulating conditions for the issuance of certificates for products, including the minimum syllabus of maintenance certifying staff TRT.

NOTE: Regulation (EC) 216/2008 has been repealed by the Basic Regulation. Art.140 of the Basic Regulation requires the implementing rules adopted on the basis of Regulations (EC) No 216/2008 to be adapted no later than 12 September 2023. Art.139.2 of the Basic Regulation establishes that the references to the repealed Regulation (EC) No 216/2008 shall be construed as references to the Basic Regulation and, where appropriate, read in accordance with the correlation table in Annex X. Regulation (EU) No 748/2012, as amended by (EU) No 69/2014[9], requires that OSD be included in the application for a TC or RTC for an aircraft.

4.4. What are the impacts

4.4.1. Safety impact

Option 0

Relevant information of the aircraft type may be missing in the final type rating course. This could lead to negative impact on the safety of the aircraft operation, resulting in incidents/accidents caused by maintenance errors due to an inadequate training.

Option 1

The only MASE would not be sufficient to address different TRT. It would be very difficult or, in some cases, impossible to identify the differences between a 'base' aircraft and a 'candidate' aircraft.

For 'conventional' a/c the MASE identified would not have any safety benefit. In addition, there is a risk of disconnection between OSD and Parts-66/147 if the level of details for the MASE is poor.

[9] Commission Regulation (EU) No 69/2014 of 27 January 2014 amending Regulation (EU) No 748/2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations Text with EEA relevance (OJ L 23, 28.1.2017, p.12) https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1473428990522&uri=CELEX:32014R0069

This option might mitigate slightly the safety risks of option 0 therefore some minor safety positive impacts expected.

Option 2

The risk of AMTO missing some aircraft system would be very limited. In addition, RTCH can voluntarily provide more elements as recommendations. Therefore, this option would almost fully mitigate the potential risks incurred as a result of option 0. Medium/high positive impacts.

Option 3

Risks highlighted in option 0 would be mitigated. Therefore, high positive impacts.

4.4.2. Economic impact

Option 0

No impacts expected.

Option 1

No relevant impacts expected for the affected stakeholders.

Option 2

TCHs who hold a Part-147 AMTO might face a low negative impact as their Part-147 competitors would have an easier access to the type training know how.

NAAs may reduce the cost sustained to verify compliance of the final TRT.

Part-147 AMTO may reduce the time and cost to develop the final TRT.

Option 3

TCHs who hold a Part-147 AMTO might face a medium to high negative impact as their Part-147 competitors would have an easier access to the full type training know how.

NAAs may reduce the cost sustained to very compliance of the final TRT.

Part-147 AMTO may reduce the time and cost to develop the final TRT.

However, a Part-147 AMTO may face extra cost related to:

1. the investment for expensive and specific training devices (e.g. tools, media, simulators as required in the OSD package.
2. limitation of the scope of their training activities for some very particular OSD requirements that they cannot comply with.

Request to stakeholders

Stakeholders are invited to provide:

— quantified justification elements on the possible impacts (e.g. economic, safety) of the options proposed, or alternatively to propose a justified solution to the issue;

— any other information they may find necessary to bring to the attention of EASA; as a result, the relevant parts of the RIA might be modified on a case-by-case basis.

4.5. Conclusion

4.5.1. Comparison of options

The impacts can be summarised as follows:

	Option 0 'No change'	**Option 1 'Light OSD'**			**Option 2 'Balanced OSD'**			**Option 3 'Large OSD'**		
		TCH	NAA	Part-147 AMTO	TCH	NAA	Part-147 AMTO	TCH	NAA	Part-147 AMTO
Safety	0	+			++			+++		
Economic	0	0	0	0	-	+	+	--	+	+/-
TOTAL	**0**	**0/+**			**+**			**-/+**		

Option 2 would be the preferred option. This proposal would enhance safety and mitigate the risk related to maintenance errors due to an inadequate training. Furthermore, the proposal would:

— establish the same level of standard for the concerned TRT among the Part-147 approved training organisations (AMTO);

— facilitate the NAA inspectors' activity in the approval of the TRT;

— provide sufficient hooks for an easy integration with Part-66 Appendix III;

— leave enough room to end-users Part-147 AMTO to develop the final TRT according to their local organisation capability;

— give TCHs the opportunity to voluntarily provide more training elements as recommendations.

4.6. Monitoring and evaluation

Monitoring is a continuous and systematic process of data collection and analysis about the implementation of a rule. It generates factual information for future possible evaluations and impact assessments and helps identifying actual implementation problems. With respect to this proposal, EASA would suggest to monitor:

What to monitor	**How to monitor**	**Who should monitor**	**How often to monitor**
Accidents and serious incidents related to maintenance errors due to an inadequate training	ECR	EASA	On a recurrent basis
Feedback from OSD-MCS experts on the use of the CS-MCSD in practical applications.	Check the consistency of the OSD-MCS made available to the end user.	EASA	Every OSD-MCS application and approval process.

5. Proposed actions to support implementation

Focused communication with advisory bodies

6. References

6.1. Affected decisions

— ED Decision 2012/020/R of the Executive Director of the Agency of 30th October 2012 on acceptable means of compliance and guidance material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations ('AMC and GM to Part 21')

— ED Decision 2016/007/R of 25 April 2016 amending acceptable means of compliance and guidance material to Part-21 of Regulation (EU) No 748/2012 'AMC & GM to Part-21 — Issue 2, Amendment 6' 'Changes to operational suitability data (OSD)'

6.2. Other reference documents

Appendix III to Annex III to Commission Regulation (EU) No 1321/2014 and subsequent amendments.