



European Union Aviation Safety Agency

Notice of Proposed Amendment 2024-04 (D)

in accordance with Article 6 of MB Decision 01-2022

Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012



Table of contents

| | |
|--|---------------|
| 1. Proposed amendments | 4 |
| GM1 21.A.6 Manuals | 4 |
| GM1 21.A.7(a) Scope of the ICA, their publication format, and typical ICA data | 4 |
| AMC1 21.A.7(c) Completeness and timely availability of the ICA | 5 |
| AMC1 21.A.7(d) Instructions for continued airworthiness | 6 |
| AMC 21.A.15(b) Content of the certification programme | 6 |
| GM14 21.A.15(b)(4) Application | 6 |
| GM No 1 to 21.A.15(d) Application for the approval of operational suitability data – MMEL for ELA1 and ELA2 | 7 |
| GM No 2 to 21.A.15(d) Determination of type or variant | 7 |
| GM No 3 to 21.A.15(d) OSD content | 7 |
| AMC2 21.A.33 Inspections and tests | 8 |
| GM 21.A.35(b)(2) Flight tests Objective and Content of Function and Reliability Testing | 9 |
| GM1 21.A.90C Stand-alone changes to the ICA | 9 |
| GM 21.A.91 Classification of changes to a type certificate (TC) | 9 |
| Appendix A to GM 21.A.91 Examples of Major Changes per discipline | 12 |
| GM 21.A.101 Establishing the certification basis of changed aeronautical products Type-certification basis, operational suitability data certification basis and environmental protection requirements for a major change to a type-certificate | 13 |
| Appendix A to GM 21.A.101 Classification of design changes | 40 |
| Appendix B to GM 21.A.101 Application charts for changed product rule | 46 |
| Appendix C- to GM 21.A.101 A method to determine the changed and affected areas | 48 |
| Appendix D- to GM 21.A.101 Other guidance for affected areas | 50 |
| Appendix E- to GM 21.A.101 Procedure for evaluating material contribution to safety or impracticality of applying latest certification specifications to a changed product | 51 |
| Appendix F- to GM 21.A.101 The use of service experience in the exception process | 56 |
| Appendix G- to GM 21.A.101 Changed product rule (CPR) decision record | 58 |
| Appendix H- to GM 21.A.101 Examples of documenting the proposed certification basis list | 59 |
| Appendix I- to GM 21.A.101 Related documents | 66 |
| Appendix J- to GM 21.A.101 Definitions and terminologies | 66 |
| AMC1 21.A.101(e)(1)(ii) Type-certification basis, operational suitability data certification basis and applicable environmental protection requirements for a major change to a type-certificate | 68 |
| GM No 1 to 21.A.101(g) Establishment of the operational suitability data (OSD) certification basis for changes to type certificates (TCs) | 70 |



GM1 to 21.A.112B Demonstration of capability..... 71

GM1 21.A.133(a) Eligibility—Approval appropriate for showing conformity 77

AMC1 21.A.139(d)(1) Production management system 78

AMC2 21.A.145(a) Resources..... 80

GM 21.A.151 Terms of approval – Scope and categories..... 80

AMC2 21.A.163(c) Completion of EASA Form 1..... 81

AMC1 21.A.239(d)(3) Design management system 82

AMC1 21.A.303(b) Compliance with applicable requirements 83

GM1 21.A.307 The eligibility of parts and appliances for installation 83

GM1 21.A.307(c) The eligibility of parts and appliances for installation 83

AMC1 21.A.606(b) Requirements for the issuance of an ETSO authorisation 84

AMC1 21.A.606(d) Declaration requirements for the issuance of an ETSO authorisation 86

AMC1 21.A.608 Declaration of Design and Performance (DDP)..... 87

GM 21.A.719 Transfer of a permit to fly 91

AMC1 21.A.807(a) Identification of ETSO articles 93

GM 21.B.80 Type-certification basis for a type certificate (TC) or restricted type certificate (RTC)93

GM 21.B.82 Operational suitability data (OSD) certification basis for an aircraft type certificate (TC) or restricted type certificate (RTC) 94

AMC 21.B.100(a) and 21.A.15(b)(6) Level of involvement (LoI) in a certification project for a type certificate (TC), a major change to a TC, a supplemental type certificate (STC), a major repair design or European technical standard order (ETSO) authorisation for an auxiliary power unit (APU) 95

AMC No 2 to 21.B.100(b) Level of involvement (LoI) in European technical standard order authorisation (ETSOA) projects..... 97

GM1 21.B.433(d) Findings and corrective actions; observations 97



1. Proposed amendments

The amendments are arranged as follows to show deleted, new and unchanged text:

- deleted text is ~~struck through~~;
- new text is highlighted in blue;
- an ellipsis, '[...]', indicates that the rest of the text is unchanged.

GM1 21.A.6 Manuals

The term 'manuals', used in 21.A.6, could cover any kind of data/information produced by the design approval holder to demonstrate compliance with the applicable type certification basis, the applicable operational suitability data certification basis and the environmental protection requirements. The data/information can be published as paper or electronic documents or in a format outside the traditional understanding of a document, for example as a series of web pages, as IT tools or in a publishing format linked to tasks or data modules rather than pages.

Certification specifications and their acceptable means of compliance may provide additional guidance for the publication of manuals that are not in paper format (e.g. Appendix 1 'Computerised aeroplane flight manual' to AMC 25.1581).

GM1 21.A.7(a) Scope of the ICA, their publication format, and typical ICA data

(a) [...]

(b) [...]

(c) Instructions for continued airworthiness (ICA) should include part number (P/N) information for removable items/units to enable compliance with the removing and installing instructions required by the certification specifications (e.g. CS-25 Appendix H25.3(b)(3) for Large Aeroplanes, CS-E-25(c)(7) for Engines). It is not enough to provide instructions on 'how' to install a part; it is essential to know 'what' part(s) can be fitted. If certain parts can be replaced with non-identical spare parts, then associated interchangeability information (i.e. which parts can be substituted and under which specific conditions), if any, should be provided as ICA in accordance with the associated approved design data.

Manuals such as illustrated parts catalogue (IPC) and relevant section(s) of the structural repair manual, or their supplements, are usually considered part of the ICA if they are the means of part identification and if this information is not already contained in another ICA (e.g. the aircraft maintenance manual (AMM) or an equivalent document).

Typically, the AMM uses index numbers to refer to the IPC for P/N and interchangeability information, if applicable, and the P/N is not directly provided in the AMM.

If the P/N information is provided in a form other than an IPC or supplement, then this document or these documents should be considered ICA.



If different documents are provided by the design approval holder to keep P/N information in line with the type design (e.g. via service bulletins or temporary revisions in addition to regular revisions of the IPC), clear implementation instructions need to be established by the design approval holder on how this information should be consolidated to allow correct P/N identification and possible interchangeability by the end user.

The ICA status then ensures the update and publication of P/N information for stakeholders such as operators/owners in accordance with point 21.A.7(b).

- (d) The requirement for ICA is not intended to ensure that all products or articles may be restored to an airworthy condition. A certain level of deterioration may require a product or an article to be permanently withdrawn from service, and restoration may not be reasonably achievable. Notwithstanding the above, the existence of an MRBR task other than 'Discard (DS or DIS)' should be a clear indication of the necessity/obligation to produce a corresponding ICA.

Certain deteriorations or levels of deterioration may require specific instructions (e.g. inspection or restoration) that will only be developed and provided on a case-by-case basis, as needed, for a given product or article, and as such, will not be included in the ICA.

In some exceptional cases, product ICA may ultimately instruct the user to contact the DAH in order to define the specific instructions on a case-by-case basis. This typically happens when the definition of generic instructions covering all possible cases is not possible. For example, following an aircraft hard landing, a detailed analysis may have to be carried out by the DAH to determine the specific instructions to be followed, which depends on the touchdown loads, recalculated postflight, based on recorded flight data.

AMC1 21.A.7(c) Completeness and timely availability of the ICA

COMPLETENESS AND TIMELY AVAILABILITY OF THE ICA FOR TYPE-CERTIFICATE (TC) AND RESTRICTED TYPE-CERTIFICATE (RTC) APPLICANTS

- (a) [...]

~~(b) — Completeness and timely availability of changes to the ICA (TC/RTC)~~

~~Point 21.A.7(d) regulates the distribution of changes to the ICA required from the TC/RTC holder. Those changes to the ICA could result from the design change process (minor and major changes), in-service experience, corrections, and others.~~

~~For an EU TC/RTC holder/applicant, a programme showing how changes to the ICA are distributed is part of the respective procedures (e.g. design organisation procedures, or alternative procedures used to demonstrate capabilities). For changes to the ICA triggered by design changes, typically these procedures follow the same principles as those available for TC/RTC, Options 1 to 3, while taking into account the relevant privileges, e.g. that a DOA may approve minor changes in accordance with point 21.A.263(c)(2).~~



AMC1 21.A.7(d) Instructions for continued airworthiness

CHANGES TO THE ICA

Completeness and timely availability of changes to the ICA (TC/RTC)

Point 21.A.7(d) regulates the distribution of changes to the ICA required from the TC/RTC holder. Those changes to the ICA could result from the design change process (minor and major changes), in-service experience, corrections and other factors.

For an EU TC/RTC holder/applicant, the process for making changes to the ICA and distributing these changes should be documented (e.g. in design organisation procedures or alternative procedures used to demonstrate capabilities). For changes to the ICA triggered by design changes, typically these procedures follow the same principles as those available for TCs/RTCs, in AMC1 21.A.7(c), options 1–3, while taking into account the relevant privileges (e.g. that a design organisation approval (DOA) holder may approve minor changes in accordance with point 21.A.263(c)(2)).

AMC 21.A.15(b) Content of the certification programme

[...]

The proposed certification basis should include applicable certification specifications, proposed special conditions, proposed equivalent safety findings, as well as a proposed 'elect to comply' and proposed deviations, as applicable.

Note: When proposing special conditions, the applicant should review the special conditions already published by EASA and establish their applicability to its product.

21.A.15(b)(5) 'a proposal for a breakdown of the certification programme into meaningful groups of compliance demonstration activities and data, hereinafter referred as "compliance demonstration items" (CDIs), including references to their proposed means of compliance and related compliance documents'

[...]

GM14 21.A.15(b)(4) Application

~~SCOPE OF OPERATIONAL SUITABILITY DATA FOR DIFFERENT TYPES OF OPERATIONS~~

~~In the application for the approval of operational suitability data, the applicant may apply for the certification approval of different types of operations. If the aircraft is certified for different certain types of operations (e.g. ETOPS, RNP, LVO), the impact on the OSD certification basis of each operation constituents of 21.A.15(d) should be addressed.~~

~~The five defined OSD constituents are listed in paragraph (2)(k) of Article 1 of Regulation (EU) No 748/2012. As explained in GM No 1 to 21.A.15(d), they may not all be applicable to all aircraft types. The content of each OSD constituent is defined in the relevant certification specification (CS) and will be approved under a type certificate (TC), supplemental type certificate (STC) or change to those~~



1. Proposed amendments to the AMC and GM to Annex I
(Part 21) to Commission Regulation (EU) No 748/2012

~~certificates. As explained in GM No 3 to 21.A.15(d), each OSD constituent can have a part that is mandatory for the end user (operator, training organisation, etc.) and a part that is not mandatory (recommendation) for the end user. However, both the mandatory and the non-mandatory part together are the OSD constituent. Furthermore, the OSD constituent always includes the element required from the TC/STC applicant, as specified in the CS, and may include additional elements at the request of the TC/STC applicant, but still as defined in the CS.~~

~~GM No 1 to 21.A.15(d) Application for the approval of operational suitability data – MMEL for ELA1 and ELA2~~

~~For ELA1 and ELA2, the applicant may develop a list of the required equipment to be included in the TCDS and/or AFM/POH. This list, in combination with the equipment required for the flight by the applicable implementing rules for a given type of operations, establishes the list of equipment that must be operative for all flights. The list of the other installed equipment that may be inoperative constitutes the MMEL.~~

~~GM No 2 to 21.A.15(d) Determination of type or variant~~

~~The criteria for the determination whether an aircraft with a new type certificate (TC) is considered a new type or is a variant with reference to another aircraft type from the same TC holder for the purpose of the specific OSD constituent are provided in the applicable certification specifications for maintenance-certifying staff data, flight crew data and cabin crew data.~~

~~GM No 3 to 21.A.15(d) OSD content~~

~~The OSD will typically consist of elements that are required to be included by the TC applicant and elements that can be added at the request of the TC applicant. (See also GM No 4 to 21.A.15(d)).~~

~~Both the required elements and the additional elements will have a part that is mandatory to be used by the operator or training organisation (status of rule) and a part which is not mandatory to the operator or training organisation (status of AMC). For illustration of this concept, Figure 1 below is included.~~



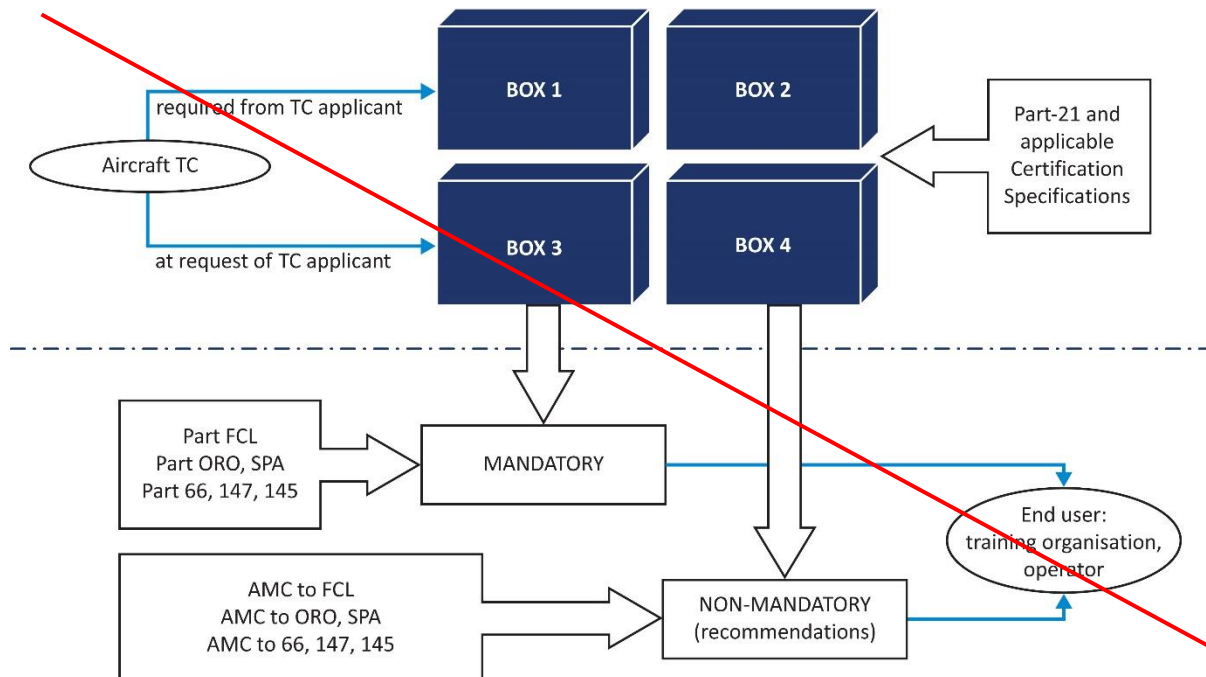
1. Proposed amendments to the AMC and GM to Annex I
(Part 21) to Commission Regulation (EU) No 748/2012

Figure 1: OSD boxes concept

Box 1: required from TC holder; mandatory for end-users.

Box 2: required from TC holder; not mandatory (recommendations) for end-users.

Box 3: at request of TC holder; mandatory for end-users.

The TC applicant may wish to apply for the approval of differences training between variants or types to reduce training, checking or currency requirements for operations of more than one type or variant. This is regarded as an optional element in addition to the required elements of Box 1 and 2.

Box 4: at request of TC holder; not mandatory (recommendations) for end-users.

The exact content of the four boxes in the above figure is determined by the certification specification that is applicable to the specific OSD constituent or the special condition in case of an 'other type-related operational suitability element'.

The status the data will have on the side of the operator or training organisation should be indicated in the OSD by segregating the data in a section called 'Mandatory' and a section called 'Non-mandatory (recommendations)'.

AMC2 21.A.33 Inspections and tests

USE OF INDUSTRY STANDARDS

Compliance with the testing requirements in 21.A.33 may be demonstrated by the use and application of the industry standards contained in the ASD-STAN technical reports TR 9250, *Test Organisations – General requirements for test process and capabilities*, edition P1, dated 31 August 2022, and TR 9251, *Flammability Test Organisations Qualification Standard*, edition P1, dated 31 August 2022, as relevant.

The above-mentioned industry standards may also support the demonstration of compliance with points 21.A.5 (record-keeping), 21.A.20(c) (compliance documents) and 21.A.239(d)(3) (subcontractors) when performing testing activities.



Note: TR 9251 complements TR 9250 for flammability test organisations.

GM 21.A.35(b)(2) Flight tests ~~Objective and Content of Function and Reliability Testing~~

OBJECTIVE AND CONTENT OF FUNCTION AND RELIABILITY TESTING

1. OBJECTIVE

The objective of this testing is to expose the aircraft to the variety of uses, including training and operational suitability flights, representative of operations that are likely to occur when the aircraft is in routine service to provide an assurance that it performs its intended functions to the standard required for certification and should continue to do so in service.

2. CONTENT OF FUNCTION AND RELIABILITY TESTING

[...]

GM1 21.A.90C Stand-alone changes to the ICA

Changes to the ICA are considered ~~to be~~ stand-alone changes when they are not directly prepared together with a change to the type design. Stand-alone changes to the ICA are usually prepared and issued, for example, for the purpose of making corrections, or improvements, to include feedback from users, or to provide alternatives.

Also, when the ICA are completed after the product (or change to the product) was approved, this is considered ~~to be~~ a stand-alone change to the ICA.

When a non-ALS ICA change is triggered by a change to the type design, this does not affect the overall classification of the type certificate change as per point 21.A.91.

Stand-alone changes to the ICA are usually straightforward changes, and are not considered to require additional work in order to show compliance. However, they must be managed in accordance with a process accepted by EASA under points 21.A.239 and 21.A.265(h) or under point 21.A.14(b), for discharging the obligation to keep the ICA up to date.

Examples of changes that may require additional activities in order to show compliance are changes to the CDCCL, ~~and~~ EWIS ICA and specific inspection procedures after hard landing.

GM 21.A.91 Classification of changes to a type certificate (TC)

1. [...]
2. [...]
3. ASSESSMENT OF A CHANGE FOR CLASSIFICATION



3.1 [...]

3.2 [...]

3.3 [...]

3.4 Complementary guidance for classification of changes

[...]

Note 1: A change previously classified as minor and approved prior to the airworthiness directive issuance decision needs no reclassification. However, EASA retains the right to review the change and reclassify/reapprove it if found necessary.

Note 2: The conditions listed in (a) through (g) above are an explanation of the criteria noted in 21.A.91.

Note 3: Under condition (a) above, the special conditions published on the EASA website need to be considered.

For an understanding of how to apply the above conditions, it is useful to take note of the examples given in Appendix A to GM 21.A.91

3.5 Complementary guidance on the classification of changes to OSD

[...]

(a) Master minimum equipment list (MMEL)

(1) [...]

(2) A change to the MMEL is judged not to have an 'appreciable effect on the operational suitability of the aircraft' and, therefore, should be classified as minor, in particular but not only when one or more of the following conditions are met:

Modifications to an existing item when:

- (i) the change only corresponds to the applicability of an item for configuration management purposes;
- (ii) the change corresponds to the removal of an item;
- (iii) the change corresponds to the increase in the number of items required for dispatch; and
- (iv) the change corresponds to a reduction in the rectification interval of an item.

Addition of a new item when:

- (v) it is considered as non-safety-related (refer to CS-MMEL, GM2 MMEL.110); or
- (vi) it is indicated as eligible for minor change classification in **Appendix 1 to GM1 CS-MMEL-145;** or

(vii) it does not meet any condition for major classification as per paragraph 3.5 of (a)(1) above and does not introduce a relief for an item required by Regulation (EU) 2018/1139 and its delegated and implementing acts.

(b) [...]



(c) [...]

(d) [...]

(e) [...]

3.6 Complementary guidance for the classification of changes to aircraft flight manuals (AFMs)

The following changes to the AFM are deemed to be minor:

(a) [...]

(b) revisions to the AFM that are not associated with changes to the type design (also identified as stand-alone revisions) which fall into one of the following categories:

(1) changes to limitations or procedures that remain within already certified limits (e.g. weight, structural data, ~~noise~~, etc.);

(2) consolidation of two or more previously approved and compatible AFMs into one, or the compilation of different parts taken from previously approved and compatible AFMs that are directly applicable to the individual aircraft (customisation); ~~and~~

(3) the introduction into a given AFM of compatible and previously approved AFM amendments, revisions, appendices or supplements; ~~and~~

(4) changes to parts of the AFM or AFM supplement that do not require approval by EASA;

(c) administrative revisions to the AFM, defined as follows:

(1) for the AFMs issued by the TC holder:

(i) editorial revisions or corrections to the AFM;

(ii) ~~(Reserved) changes to parts of the AFM that do not require approval by EASA;~~

(iii) conversions of previously Federal Aviation Administration (FAA)- or EASA-approved combinations of units of measurement added to the AFM in a previously approved manner;

(iv) the addition of aircraft serial numbers to an existing AFM where the aircraft configuration, as related to the AFM, is identical to the configuration of aircraft already covered by that AFM;

(v) the removal of references to aircraft serial numbers no longer applicable to that AFM; and

(vi) the translation of an EASA-approved AFM into the language of the State of design or State of registration;

(2) for AFM supplements issued by STC holders:

(i) editorial revisions or corrections to the AFM supplement;

(ii) ~~(Reserved) changes to parts of the AFM supplement that are not required to be approved by EASA;~~

(iii) conversions of previously FAA- or EASA-approved combinations of units of measurement added to the AFM supplement in a previously approved manner;



[...]

[...]

Appendix A to GM 21.A.91 Examples of Major Changes per discipline

[...]

1. Structure

- (i) changes such as a cargo door cut-out, fuselage plugs, change of dihedral, addition of floats;
- (ii) changes to materials, processes or methods of manufacture of critical parts that impact the critical characteristics ~~primary structural elements, such as spars, frames and critical parts~~. Note: This does not apply to engine critical parts; these are addressed in Section 6 'Engines' below (CS-E 515);
- (iii) changes to materials, processes or methods of manufacture of primary structural elements that impact mechanical properties or characteristics, such as strength, fatigue, corrosion resistance and stiffness;
- (iv) changes that adversely affect fatigue or damage tolerance ~~or life limit~~ characteristics or that are beneficial for fatigue and damage tolerance and for which credit is sought, such as extension of an approved life limit or inspection interval. Note: This does not apply to engine critical parts; these are addressed in Section 6 'Engines' below (CS-E 515);
- (v) changes that adversely affect aeroelastic characteristics.

2. Cabin Safety

- (i) changes which introduce a new cabin layout of sufficient change to require a re-assessment of emergency evacuation capability or which adversely affect other aspects of passenger or crew safety.

Items to consider include, but are not limited to:

- changes to or introduction of dynamically tested seats.
- changes to the pitch between seat rows.
- changes of distance between seat and adjacent obstacle like a divider.
- changes to cabin ~~lay-outs~~ layout that affect evacuation path or access to exits.
- installations of new galleys, toilets, wardrobes, etc.
- installations of new types of electrically powered galley insert.

- (ii) changes to the pressurisation control system which adversely affect previously approved limitations.

3. [...]

4. [...]



5. [...]

6. [...]

7. Rotors and drive systems

~~Changes that:~~~~(i) adversely affect fatigue evaluation unless the service life or inspection interval are unchanged. This includes changes to materials, processes or methods of manufacture of parts, such as~~~~rotor blades~~~~rotor hubs including dampers and controls~~~~gears~~~~drive shafts~~~~couplings~~

(i) changes to structural parts of the rotors (e.g. blades, hub, control mechanism, hinges, elastomeric bearings) and drive systems (e.g. gears, shafts, bearings and housings), in accordance with the guidance in Section 1 'Structure' above.

~~(ii) affect systems the failure of which may have hazardous or catastrophic effects. The design assessment will include:~~~~cooling system~~~~lubrication system~~~~rotor controls~~

(ii) changes that affect equipment/systems associated with the rotors and rotor drive systems (e.g. cooling and lubrication systems with their associated monitoring means, chip detection systems, rotor brake actuation and monitoring systems, VHM systems), the failure of which may have hazardous or catastrophic effects.

(iii) changes that adversely affect the results of the rotor drive system endurance test, the rotor drive system being defined in CS 27/29.917.

(iv) changes that adversely affect the results of the shafting critical speed analysis required by CS 27/29.931.

8. [...]

9. [...]

10. [...]

[...]

GM 21.A.101 Establishing the certification basis of changed aeronautical products Type-certification basis, operational

suitability data certification basis and environmental protection requirements for a major change to a type-certificate

ESTABLISHING THE CERTIFICATION BASIS FOR CHANGED AERONAUTICAL PRODUCTS

Foreword

~~This guidance material (GM) provides guidance for the application of the ‘Changed Product Rule (CPR)’, pursuant to point 21.A.101, Designation of the applicable certification specifications and environmental protection requirements, and 21.A.19, Changes requiring a new type certificate, for changes made to type-certified aeronautical products.~~

1. INTRODUCTION

1.1. Purpose.

This GM provides guidance for establishing the certification basis for changed aeronautical products pursuant to point 21.A.101, ~~Designation of the applicable certification specifications and environmental protection requirements~~. The guidance is also intended to help applicants and approved design organisations to determine whether it will be necessary to apply for a new type certificate (TC) under point 21.A.19, ~~Changes requiring a new type certificate~~. The guidance describes the process for establishing the certification basis ~~for a change to a TC, for a supplemental type certificate (STC), or for a change to an STC~~, detailing the **steps requirements** (evaluations, classifications, and decisions) throughout the process.

1.2. Applicability.

1.2.1 This GM is for **an applicants that who applies for major changes to TCs and restricted type-certificates** under Subpart D, for **supplemental type-certificates (STCs)**, or **major changes to STCs** under Subpart E, or for changes to European Technical Standard Order Authorisations (ETSOAs) for auxiliary power units (APUs) under Subpart O. This GM is also for approved design organisations that classify changes ~~and approve minor changes~~ under their 21.A.263(c)(1) ~~and (2)~~ privileges.

1.2.2 This GM applies to major changes under point 21.A.101 for aeronautical products certified under Part 21, and **relates to** the certification specifications (CSs) applicable to the changed product (CS-23, CS-25, CS-27, CS-29, CS-MMEL, CS-FCO, CS-CCD, etc.). ~~References to ‘change’ include the change and areas affected by the change pursuant to point 21.A.101.~~

~~1.2.3 Minor changes are within the scope of 21.A.101 and this GM but are automatically considered to not be significant under the ‘does not contribute materially to the level of safety’ provision of point 21.A.101(b).~~

~~1.2.4 This GM also applies to changes to restricted type-certificates.~~

1.2.3 The term ‘aeronautical product’, or ‘product’, means a type-certified aircraft, aircraft engine, or propeller and, for the purpose of this GM, an ETSO **authorised A’d** APU.

1.2.4 ~~6~~ This GM primarily provides guidance for the **establishment designation** of the **applicable type-certification basis and the operational suitability data (OSD) certification basis** for the changed product. ~~However, portions of this GM, as specified in GM1 21.A.101(g), can be applied by analogy to establish the operational suitability data (OSD) certification basis for the changed product.~~ This GM is not intended to be used to determine the applicable environmental



protection requirements (e.g. aircraft noise, fuel venting, and engine exhaust emissions and aeroplane CO₂ emissions requirements) for changed products, as they are designated from the essential requirements in the first subparagraph of Article 9(2) of Regulation (EU) 2018/1139 on the date of application for the approval of the change through point 21.B.85.

~~1.2.5-7 This GM is not mandatory and is not an EU regulation. This GM describes an acceptable means, but not the only means, to comply with point 21.A.101. However, an applicant who uses the means described in this GM must follow it entirely.~~ This GM is to be considered in its entirety.

1.3. Reserved.

1.4. GM Content

This GM contains 5 chapters and 10 appendices.

- 1.4.1 This chapter clarifies the purpose of this GM, describes its content, specifies the intended audience affected by this GM, clarifies which changes are within the scope of this GM, and references the definitions and terminology used in this GM.
- 1.4.2 Chapter 2 provides a general overview of points 21.A.101 and 21.A.19, clarifies the main principles and safety objectives, and directs an applicant to the applicable guidance contained in subsequent chapters of this GM.
- 1.4.3 Chapter 3 contains guidance for the implementation of point 21.A.101(b) to establish the type-certification basis and the OSD certification basis for changed aeronautical products. It describes in detail the various steps for developing the type-certification basis and the OSD certification basis, which is a process that applies to all major changes to aeronautical products. Chapter 3 also addresses the point 21.A.19 considerations for identifying the conditions under which an applicant for a change is required to submit an application for a new TC, and it provides guidance regarding the stage of the process at which this assessment is performed.
- 1.4.4 Chapter 4 provides guidance about products excepted from the requirement of point 21.A.101(a) in accordance with point 21.A.101(c).
- 1.4.5 Chapter 5 contains considerations for:
- design-related operating requirements,
 - defining a baseline product,
 - predecessor standards (see paragraph 5.4),
 - using special conditions under point 21.A.101(d),
 - documenting revisions to the type-certification TC basis,
 - incorporating STCs into the type design,
 - removing changes,
 - determining a type-certification basis and OSD certification basis after removing an approved change, and
 - sequential changes.
- 1.4.6 Appendix A contains examples of typical type design changes for small aeroplanes, large aeroplanes, rotorcraft, engines, and propellers. The European Union Aviation Safety Agency (EASA) has categorised these examples into individual tables according to the classifications of design change: ‘substantial’, ‘significant’, and ‘not significant’.



- 1.4.7 Appendix B contains application charts for applying the point 21.A.101 process, including the reversion ~~excepted~~ process.
- 1.4.8 Appendix C contains one method for determining the change and affected areas.
- 1.4.9 Appendix D contains additional guidance on affected areas that is not discussed in other parts of this GM.
- 1.4.10 Appendix E provides detailed guidance with examples for evaluating the 'impracticality' ~~exception~~ reversion criteria in the rule.
- 1.4.11 Appendix F provides guidance with examples on the use of relevant service experience in the certification process as one way to demonstrate that a later amendment may not contribute materially to the level of safety, allowing the use of earlier certification specifications.
- 1.4.12 Appendix G provides an example of a changed product rule ~~CPR~~ process decision record.
- 1.4.13 Appendix H provides examples of documenting a proposed certification basis list.
- 1.4.14 Appendix I lists the Part 21 points related to this GM.
- 1.4.15 Appendix J ~~lists~~ provides the definitions and of the terminology used in this GM ~~applicable for the application of the rule.~~

1.5. Terms Used in this GM.

~~1.5.1 The following terms are used interchangeably and have the same meaning: 'specifications', 'standards', 'certification specifications' and 'certification standards'. They refer to the elements of the type certification basis for airworthiness or OSD certification basis.~~

~~1.5.2 The term 'certification basis' refers to the type certification basis for airworthiness provided for in point 21.B.80 and the operational suitability data (OSD) certification basis provided for in point 21.B.82.~~

~~For more terms, e~~ Consult Appendix J.

2. OVERVIEW OF POINTS 21.A.19 AND 21.A.101

2.1. Point 21.A.19.

- 2.1.1 Point 21.A.19 requires an applicant to apply for a new TC for a changed product if EASA finds that the change to the design, power, thrust, or mass weight is so extensive that a substantially complete investigation of compliance with the applicable type-certification basis is required.
- 2.1.2 Changes that require a substantial re-evaluation of the compliance findings of the product are referred to as 'substantial changes'. For guidance, see paragraph 3.3 in Chapter 3 of this GM. Appendix A of this GM provides examples of changes that ~~will~~ require a new TC.
- 2.1.3 If EASA determines through point 21.A.19 that a proposed change does not require a new TC, see point 21.A.101 for the applicable requirements of ~~to develop~~ the certification basis for the proposed change. For guidance, see Chapter 3 and the examples in Appendix A of this GM.

2.2. Point 21.A.101.

- 2.2.1 Point 21.A.101(a).



Point 21.A.101(a) requires that a major change to a TC, and the areas affected by the change, ~~to~~ comply with the certification specifications that are applicable to the changed product and that are in effect on the date of application for the approval of the change (i.e. the latest certification specifications ~~standards~~ in effect at the time of application), unless the change meets the criteria for the ~~reversions~~ or exceptions identified in point 21.A.101(b) or (c), or unless an applicant chooses to comply with the certification specifications of later effective amendments* in accordance with point 21.A.101(f). The intent of point 21.A.101 is to enhance safety by incorporating the latest requirements into the type-certification basis and the OSD certification basis for the changed product to the greatest extent practicable.

*NOTE: Certification specifications that were amended after the date of application.

In addition, point 21.A.101(a) requires that the changed product complies with the applicable environmental protection requirements on the date of application for approval of the change (i.e. the latest level of amendment of Volumes I, II and III of ICAO Annex 16 implemented in Article 9(2) of Regulation (EU) 2018/1139).

2.2.2 Point 21.A.101(b).

Point 21.A.101(b) pertains to when an applicant ~~may show~~ requests to demonstrate that a changed product complies with an earlier amendment of a certification specification, provided that the earlier amendment is considered ~~to be~~ adequate and meets the criteria in point 21.A.101(b)(1), (2), or (3). When changes involve features or characteristics that are novel ~~and or~~ unusual in comparison with the certification specification ~~airworthiness standard~~ at the proposed amendment, a more recent certification specification ~~airworthiness standard~~ and/or special conditions will be applied for these features.

Except as provided in point 21.A.101(h), An applicant ~~is considered to may~~ comply with ~~request to revert to~~ the earlier amendment of the certification specifications consistent with point 21.A.101(b), when:

- (a) a change is not significant (see point 21.A.101(b)(1));
- (b) an area, system, part or appliance is not affected by the change (see point 21.A.101(b)(2));
- (c) compliance with a later amendment for a significant change does not contribute materially to the level of safety (see point 21.A.101(b)(3)); or
- (d) compliance with the latest amendment would be impractical (see point 21.A.101(b)(3)).

Earlier amendments may not precede the amendment level of the certification specifications included by reference in the type-certification basis and the OSD certification basis of the identified baseline product.

Points 21.A.101(b)(1)(i), ~~and (ii) and (iii) pertain to changes that meet the~~ include automatic criteria where the change is considered significant.

2.2.3 Point 21.A.101(c).

Point 21.A.101(c) provides an exception from the requirements of point 21.A.101(a) for a change to certain aircraft with less than the specified maximum ~~take-off mass~~ ~~weight~~. An applicant who applies for a major change to an



aircraft (other than rotorcraft) of 2 722 kg (6 000 lb) or less maximum **take-off mass weight**, or to a non-turbine-powered rotorcraft of 1 361 kg (3 000 lb) or less maximum **take-off mass weight**, can ~~show~~ **demonstrate** that the changed product complies with the **certification specifications standards** incorporated by reference in the type certificate. An applicant can also elect to comply or may be required to comply with the later **certification specifications standards**. See paragraph 4.1 of this GM for specific guidance on this provision.

2.2.4 Point 21.A.101(d).

Point 21.A.101(d) provides for the use of special conditions, under 21.B.75 **and the conditions described there**, when the ~~proposed certification basis and any later certification specifications~~ **applicable on the date of the application for the approval of the change** do not provide adequate standards for the proposed change ~~because of a novel or unusual design feature~~.

2.2.5 Point 21.A.101(e).

Point 21.A.101(e) provides the legal basis under which an applicant may propose to certify a change and the areas affected by the change against alternative requirements to the certification specifications established by EASA.

2.2.6 Point 21.A.101(f).

Point 21.A.101(f) requires that if an applicant chooses (elects) to comply with a certification specification or an amendment to the certification specifications that is effective after the filing of the application for a change to a TC, the applicant shall also comply with any other certification specifications that EASA finds are directly related. The certification specifications which are directly related must be, for the purpose of compliance demonstration, considered together at the same amendment level to be consistent.

~~2.2.7 Point 21.A.101(g).~~

~~Point 21.A.101(g) pertains to the designation of the applicable OSD certification basis when the application for a change to a type certificate for an aircraft includes, or is supplemented after the initial application to include, changes to the OSD. It implies that the same requirements of paragraphs (a) and (f) that are applicable to the establishment of the airworthiness type certification basis also apply to the establishment of the OSD certification basis. For specific guidance, see GM1 21.A.101(g).~~

2.2.7 Point 21.A.101(h).

Point 21.A.101(h) restricts the option described in point 21.A.101(b) for reversion to an **earlier amendment of the certification specification**. Refer to **AMC1 21.A.101(h)**.

3. PROCESS FOR ESTABLISHING THE **TYPE-CERTIFICATION BASIS AND THE OSD** CERTIFICATION BASIS FOR CHANGED PRODUCTS

3.1. Overview.

3.1.1 The applicant and EASA both have responsibilities under point 21.A.101(a) and (b). ~~As an~~ **The** applicant for the **approval certification** of a change, ~~the applicant~~ must demonstrate that the change and areas affected by the change comply with the latest applicable certification specifications unless the applicant proposes ~~exception(s)~~ **reversion(s)** under point 21.A.101(b). An applicant proposing



~~exception(s)~~ ~~reversions(s)~~ should make a preliminary classification whether the change is 'significant' or 'not significant', and propose an ~~appropriate~~ **adequate type-certification basis and OSD certification basis**. EASA is responsible for determining whether the applicant's classification of the change, and proposal for the **type-certification basis and OSD certification basis**, are consistent with the applicable rules and their interpretation. The EASA determination does not depend on whether the TC holder or applicant for an STC is originating the change. The **type-certification basis and OSD certification basis** can vary depending on the magnitude and scope of the change. The steps below present a streamlined approach for making this determination.

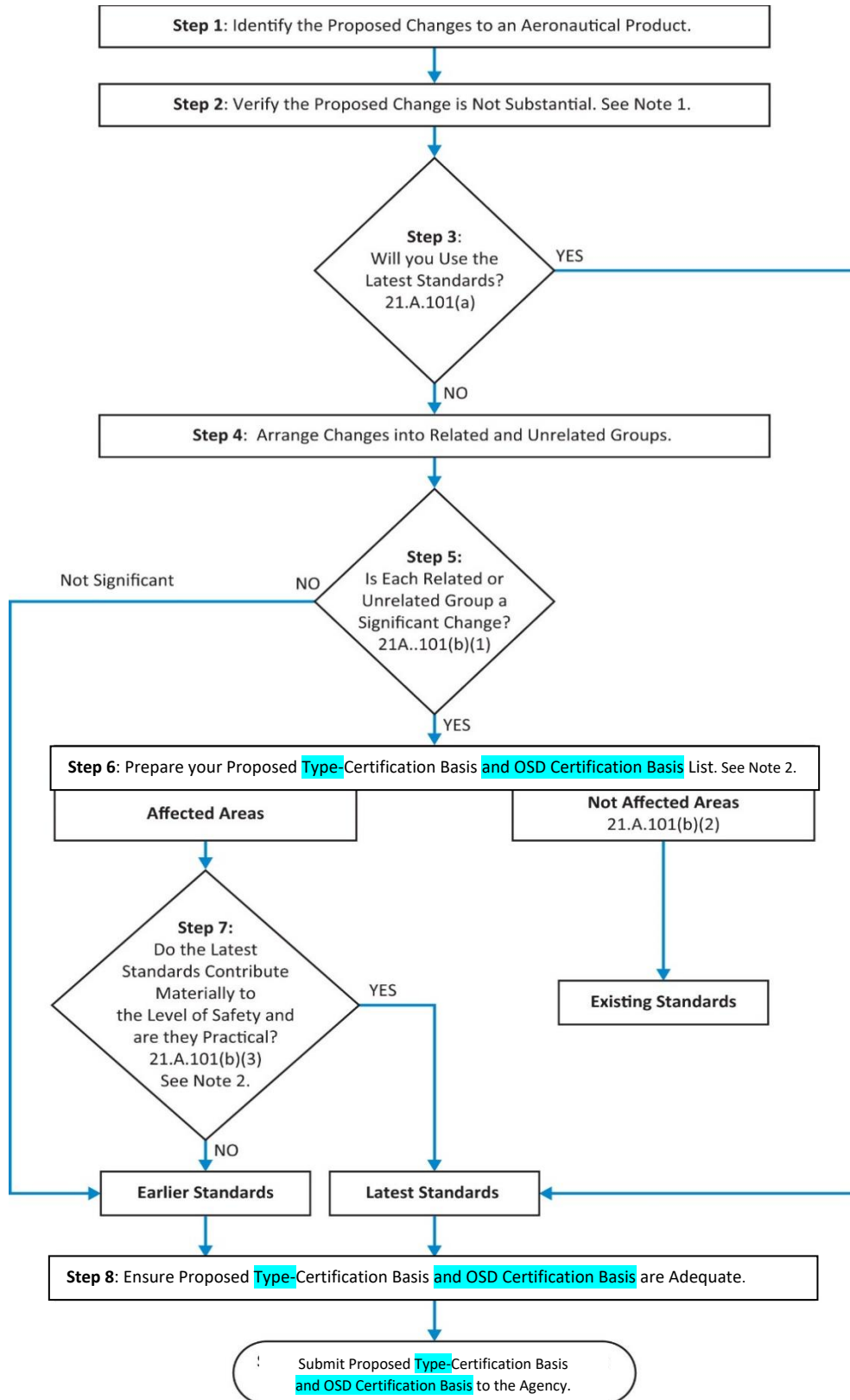
- 3.1.2 The tables in appendix A of this GM are examples of classifications of typical type design changes. See paragraph 3.6.3 of this chapter for instructions on how to use those tables.
- 3.1.3 ~~If~~ **For** a proposed **major** change ~~is not in the examples provided in appendix A~~, the applicant ~~may~~ **should** use the following steps in conjunction with the flow chart in Figure 3-1 of this GM to develop the appropriate **type-certification basis and OSD certification basis** for the change. For clarification, the change discussed in the flow chart also includes areas affected by the change. See paragraph 3.9.1 of this GM for guidance about affected areas.



Figure 3-1. Developing a Proposed Type-Certification Basis and OSD Certification Basis for a Changed Product Pursuant to point 21.A.101



1. Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012



Notes:

1. Changed products that are substantially changed do not follow this flowchart. Refer to 21.A19.
2. Process and propose each applicable standard individually. If Standards are linked together, then they should be assessed together. Consider the exception from reversion in accordance with point 21.A.101(h).



3.2. Step 1. Identify the proposed changes to an aeronautical product.

Identify the type design being changed (the baseline product).

Identify the proposed change.

Use high-level descriptors.

3.2.1 Identify the type design being changed (the baseline product).

Prior to describing the proposed change(s), it is important to clearly identify the specific type design configuration being changed.

Note: For additional guidance on the baseline product, see paragraph 5.3 of this GM.

3.2.2 Identify the proposed change.

3.2.2.1 The purpose of this process step is to identify and describe the change to the aeronautical product. Changes to a product can include physical design changes and functional changes (e.g. operating envelope or performance changes). An applicant must identify all changes and areas affected by the change, including those where they plan to use previously approved data. EASA considers all ~~of~~ these changes and areas affected by the change to be part of the entire proposed type design and they are considered as a whole in the classification of whether the proposed change is substantial, significant, or not significant. The change can be a single change or a collection of changes. In addition to the proposed changes, an applicant should consider the cumulative effect of previous relevant changes incorporated since the last time the **type-certification basis** and **OSD certification basis** ~~was~~**were** upgraded. An applicant for a change must consider all previous relevant changes and the amendment level of the certification specifications in the **type-certification basis** and **OSD certification basis** used for these changes.

3.2.2.2 When identifying the proposed changes, an applicant should consider previous relevant changes that create a cumulative effect, as these may influence the decisions regarding the classification of the change later in the process. By 'previous relevant changes,' EASA means changes where effects accumulate, such as successive thrust increases, incremental ~~weight~~**mass** increases, or sectional increases in fuselage length. An applicant must account for any previous relevant changes ~~s~~ to the area affected by the proposed change that did not involve an upgrade of the **type-certification basis** and **OSD certification basis** in the proposed change.

3.2.2.3 Example:

An applicant proposes a 5 per cent ~~weight~~**mass** increase, but a previous 4 per cent and another 3 per cent ~~weight~~**mass** increase were incorporated into this aircraft without upgrading the existing **type-certification basis** and **OSD certification basis**. In the current proposal for a 5 per cent ~~weight~~**mass** increase, the cumulative effects of the two previous ~~weight~~**mass** increases that did not involve an upgrade of the **type-certification basis** and **OSD certification basis** will now be accounted for as an approximate 12 per cent increase in ~~weight~~**mass**. Note that the cumulative effects the applicant accounts for are only those incremental increases since the last time the ~~airworthiness~~ certification specifications in the type-certification basis and



OSD certification basis applicable to the area affected by the proposed change were upgraded.

3.2.3 Use High-Level Descriptors.

To identify and describe the proposed changes to any aeronautical product, an applicant should use a high-level description of the change that characterises the intent of, or the reason for, the change. No complex technical details are necessary at this stage. For example, a proposal to increase the maximum passenger-carrying capacity may require an addition of a fuselage plug, and as such, a ‘fuselage plug’ becomes one possible high-level description of this change. Similarly, a thrust increase, a new or complete interior, an avionics system upgrade, or a passenger-to-cargo conversion are all high-level descriptions that characterise typical changes to the aircraft, each driven by a specific goal, objective, or purpose.

3.2.4 Evolutionary changes that occur during the course of a certification program may require re-evaluation of the type-certification basis and OSD certification basis, and those changes that have influence at the product level may result in re-classification of the change.

3.3. Step 2. Verify the proposed change is not substantial.

3.3.1 Point 21.A.19 requires an applicant to apply for a new TC for a changed product if the change to design, power, thrust, or mass ~~weight~~ is so extensive that a substantially complete investigation of compliance with the applicable regulations is required. A new TC could be required for either a single extensive change to a previously type-certified product or for a changed design derived through the cumulative effect of a series of design changes from a previously type-certified product.

3.3.2 A ‘substantially complete investigation’ of compliance is required when most of the existing substantiation is not applicable to the changed product. In other words, an applicant may consider the change ‘substantial’ if it is so extensive (making the product sufficiently different from its predecessor) that the design models, methodologies, and approaches used to demonstrate a previous compliance finding could not be used in a similarity argument. EASA considers a change ‘substantial’ when these approaches, models, or methodologies of how compliance was shown are not valid for the changed product.

3.3.3 If it is not initially clear that a new TC is required, appendix A of this GM provides some examples of substantial changes to aid in this classification. A substantial change requires an application for a new TC. See points 21.B.80, 21.B.82, 21.B.85 and 21.A.19. If the change is not substantial, proceed to step 3.

3.4. Step 3. Will the applicant use the latest certification specifications ~~standards~~?

An applicant can use the latest certification specifications for their proposed change and the area affected by the change. If they use the latest certification specifications, they will have met the intent of point 21.A.101 and no further classification (significant or not significant) and justification is needed. Even though an applicant elects to use the latest certification specifications, the applicant will still be able to apply point 21.A.101 for future similar changes, and use the ~~exceptions~~ ~~reversion possibilities~~ under point 21.A.101(b). However, the decision to comply with the latest certification specifications sets a new basis for all future related changes to the same affected area for that amended TC.



If using the latest certification specifications, an applicant should proceed to Step 68 (in paragraph 3.911 of this GM).

If not using the latest certification specifications, an applicant should proceed to Step 4 below.

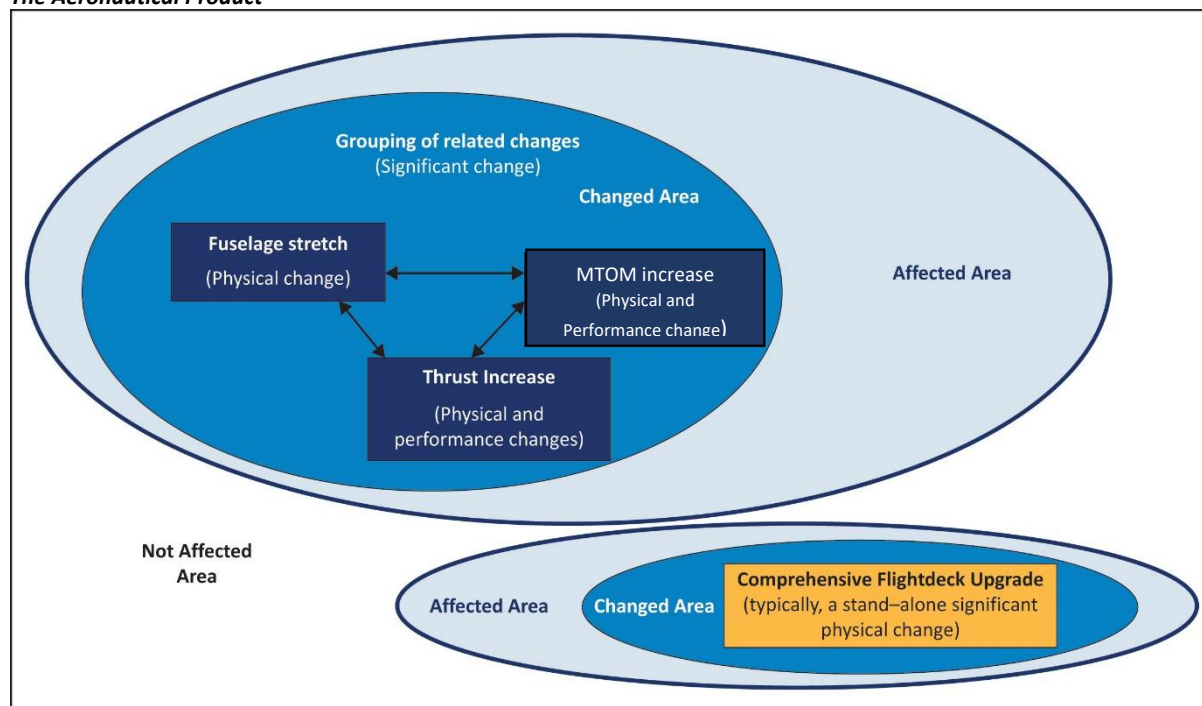
3.5. Step 4. Arrange changes into related and unrelated groups.

3.5.1 An applicant should now determine whether any of the changes identified in Step 1 are related to each other. Related changes are those that cannot exist without another, are co-dependent, or a prerequisite of another. For example, a need to carry more passengers could require the addition of a fuselage plug, which will result in a weight mass increase, and may necessitate a thrust increase. Thus, the fuselage plug, weight mass increase, and thrust increase are all related, high-level changes needed to achieve the goal of carrying more passengers. A decision to upgrade the flight deck to more modern avionics at the same time as these other changes may be considered unrelated, as the avionics upgrade is not necessarily needed to carry more passengers (it has a separate purpose, likely just modernisation). The proposed avionics upgrade would then be considered an unrelated (or a stand-alone) change. However, the simultaneous introduction of a new cabin interior is considered related since occupant safety considerations are impacted by a cabin length change. Even if a new cabin interior is not included in the product-level change, the functional effect of the fuselage plug has implications on occupant safety (e.g. the dynamic environment in an emergency landing, emergency evacuation, etc.), and thus the cabin interior becomes an affected area. Figure 3-2 below illustrates the grouping of related and unrelated changes using the example of increasing the maximum number of passengers.

Note: An applicant who plans changes in sequence over time should refer to the discussion on ‘sequential design changes’ in paragraph 5.13 of this GM.

Figure 3-2. Related and Unrelated Changes for Example of Increasing the Maximum Number of Passengers

The Aeronautical Product



3.5.2 Once the change(s) is (are) organised into groupings of those that are related and those that are unrelated (or stand-alone), an applicant should proceed to Step 5 below.

3.6. Step 5. Is each group of related changes or each unrelated (stand-alone) change a significant change?

3.6.1 The applicant is responsible for proposing the classification of groups of related changes or unrelated changes as 'significant' or 'not significant'. Significant changes are product-level changes that could result from an accumulation of changes, or occur through a single significant change that makes the changed product distinct from its baseline product. The grouping of related and unrelated changes is particularly relevant to EASA's significant Yes/No decision (point 21.A.101(b)(1)) described in Step 1 of Figure 3-1. EASA evaluates each group of related changes and each unrelated (stand-alone) change on its own merit for significance. Thus, there may be as many evaluations for significance as there are groupings of related and unrelated changes. Step 1 of Figure 3-1 explains the accumulation of changes that an applicant must consider. Additionally, point 21.A.101(b)(1) defines a change as 'significant' when at least one of the three automatic criteria applies:

3.6.1.1 Changes where the general configuration is not retained (significant change to general configuration).

A change to the general configuration at the product level is one that distinguishes the resulting product from other product models, for example, performance or interchangeability of major components. Typically, for these changes, an applicant will designate a new product model, although this is not required. For examples, see appendix A of this GM.

3.6.1.2 Changes where the principles of construction are not retained (significant change to principles of construction).

A change at the product level to the materials and/or construction methods that affects the overall product's operating characteristics or inherent strength and would require extensive reinvestigation to demonstrate compliance is one where the principles of construction are not retained. For examples, see appendix A of this GM.

3.6.1.3 Product-level changes that invalidate the assumptions used for certification of the baseline product.

Examples include:

change of an aircraft from an unpressurised to pressurised fuselage,

change of operation of a fixed-wing aircraft from land-based to water-based,
and

operating envelope expansions that are outside the approved design parameters and capabilities.

For additional examples, see appendix A of this GM.

3.6.2 The above criteria are used to determine whether each change grouping and each stand-alone change is significant. These three criteria are assessed at the product level. In applying the automatic criteria and the examples in appendix A of this GM,



an applicant should focus on the change and how it impacts the existing product (including its performance, operating envelope, etc.). A change cannot be classified or reclassified as a significant change on the basis of the importance of a later amendment.

3.6.3 Appendix A of this GM includes tables of typical changes (examples) for small aeroplanes, ~~transport-large~~ aeroplanes, rotorcraft, engines, and propellers that meet the criteria for a significant design change. The Appendix also includes tables of typical design changes that EASA classifies as not significant. The tables can be used in one of two ways:

3.6.3.1 To identify the classification of a proposed design change listed in the table,
or

3.6.3.2 In conjunction with the three automatic criteria, to help classify a proposed design change not listed in the table by comparison to determinations made for changes with similar type and magnitude.

3.6.4 In many cases, a significant change may involve more than one of these criteria and will be obvious and distinct from other product improvements or production changes. There could be cases where a change to a single area, system, component, or appliance may not result in a product-level change. There could also be other cases where the change to a single system or component might result in a significant change due to its effect on the product overall. Examples may include the addition of winglets or leading-edge slats, or a change to primary flight controls of a fly-by-wire system.

3.6.5 If an unrelated (stand-alone) change or a grouping of related changes is classified as —

Significant (point 21.A.101(a)):

You must comply with the latest ~~certification specifications~~ ~~airworthiness standards~~ for ~~the approval certification~~ of the change and areas affected by change, unless you justify use of one of the ~~exceptions reversion criteria~~ provided in point 21.A.101(b)(2) or (3) to ~~show demonstrate~~ compliance with earlier amendment(s). The final ~~type-certification basis and OSD certification basis~~ may consist of a combination of the requirements ~~recorded in the certification basis~~ ranging from the original aircraft ~~type-certification basis and OSD certification basis~~ to the most current regulatory amendments.

Not Significant (point 21.A.101(b)(1)):

You may comply with the existing ~~type-certification basis and OSD certification basis~~ unless the standards in the proposed certification ~~specifications basis~~ are deemed inadequate. In cases where the existing ~~type-certification basis or OSD certification basis~~ is inadequate or no regulatory standards exist, later ~~certification specifications requirements~~ and/or special conditions ~~are will be~~ required. See paragraph 3.11 of this GM for a detailed discussion.

3.6.6 A new model designation to a changed product is not necessarily indicative that the change is significant under point 21.A.101. Conversely, retaining the existing model designation does not mean that the change is not significant. Significance is determined by the magnitude of the change.

3.6.7 EASA determines the final classification of whether a change is significant or not significant. To assist an applicant in its assessment, EASA has predetermined the



classification of several typical changes that an applicant can use for reference, and these examples are listed in appendix A of this GM.

3.6.8 At this point, the determination of significant or not significant for each of the groupings of related changes and each stand-alone change is completed. For significant changes, an applicant that proposes to comply with an earlier certification specification should use the procedure outlined in paragraph 3.7 below. For changes identified as not significant, see paragraph 3.8 below.

3.7. Proposing an amendment level of a certification specification for a significant change.

3.7.1 Without prejudice to the reversion criteria and exceptions provided for in point 21.A.101(b) or (c), if the classification of a group of related changes or a stand-alone unrelated change is significant, all areas, systems, components, parts, or appliances affected by the change must comply with the certification specifications at the amendment level in effect on the date of application for the change, unless the applicant elects to comply with certification specifications that have become effective after that date (see point 21.A.101(a)).

If the design change that triggered the change to the OSD constituent is classified as significant, the change to the OSD constituent should comply with the latest amendment of the applicable certification specifications, unless the applicant proposes to use the reversion criteria of point 21.A.101(b)(3).

When a new OSD constituent is added or required to be added, it should comply with the latest amendment of the applicable certification specifications.

3.7.2 In certain cases, an applicant will be required by EASA to comply with certification specifications that have become effective after the date of application (see point 21.A.101(a)):

3.7.2.1 If an applicant elects to comply with a specific certification specification or a subset of certification specifications at an amendment which has become effective after the date of application, the applicant must comply with any other certification specification that EASA finds is directly related (see point 21.A.101(f)).

3.7.2.2 In a case where the change has not been approved, or it is clear that it will not be approved under the time limit established, the applicant will be required to comply with an upgraded type-certification basis and the OSD certification basis established according to points 21.B.80 and 21.B.82 and 21.B.85 from the certification specifications that have become effective since the date of the initial application.

Note: This also applies to environmental protection requirements.

3.7.3 Except as provided for in point 21.A.101(h), Applicants can may justify the use of one of the exceptions-reversion possibilities in point 21.A.101(b)(2) or (3) to comply with an earlier amendment, but not with an amendment introduced earlier than the existing type-certification basis and OSD certification basis. See paragraphs 3.9 and 3.10 of this GM. Applicants who elect to comply with a specific certification specification or a subset of certification specifications at an earlier amendment will be required to comply with any other certification specification that EASA finds are directly related.

3.7.4 The final type-certification basis and OSD certification basis may combine the latest, earlier (intermediate), and existing certification specifications, but cannot



contain certification specifications preceding the existing type-certification basis and OSD certification basis.

3.8. Proposing an amendment level of a certification specification for a not significant change.

3.8.1 When EASA classifies the change as not significant, the point 21.A.101(b) rule allows compliance with earlier amendments, but not prior to the existing type-certification basis and OSD certification basis. Within this limit, the applicant may propose an amendment level for each certification specification for the affected area. However, each applicant should be aware that EASA will review their proposals for the type-certification basis and OSD certification basis to ensure that the type-certification basis and the OSD certification basis are adequate for the proposed change under Step 8. (See paragraph 3.11 of this GM.)

3.8.2 Even for a not significant change, an applicant may elect to comply with certification specifications which became applicable after the date of application. Applicants may propose to comply with a specific certification specification or a subset of certification specifications at a certain amendment of their choice. In such a case, any other certification specifications of that amendment that are directly related should be included in the type-certification basis and OSD certification basis for the change.

3.9. Step 6. Prepare the proposed type-certification basis and OSD certification basis list.

As part of preparing the proposed type-certification basis and OSD certification basis list, an applicant must identify any areas, systems, parts or appliances of the product that are affected by the change and the corresponding certification specifications associated with these areas. For each group, the applicant must assess the physical and/or functional effects of the change on any areas, systems, parts or appliances of the product. The characteristics affected by the change are not only physical changes, but also functional changes brought about by the physical changes. Examples of physical aspects are structures, systems, parts and appliances, including software in combination with the affected hardware. Examples of functional characteristics are performance, handling qualities, aeroelastic characteristics, and emergency egress. The intent is to encompass all aspects where there is a need for re-evaluation, that is, where the substantiation presented for the product being changed should be updated or rewritten. Appendix H of this GM contains two examples of how to document a proposed type-certification basis and OSD certification basis list.

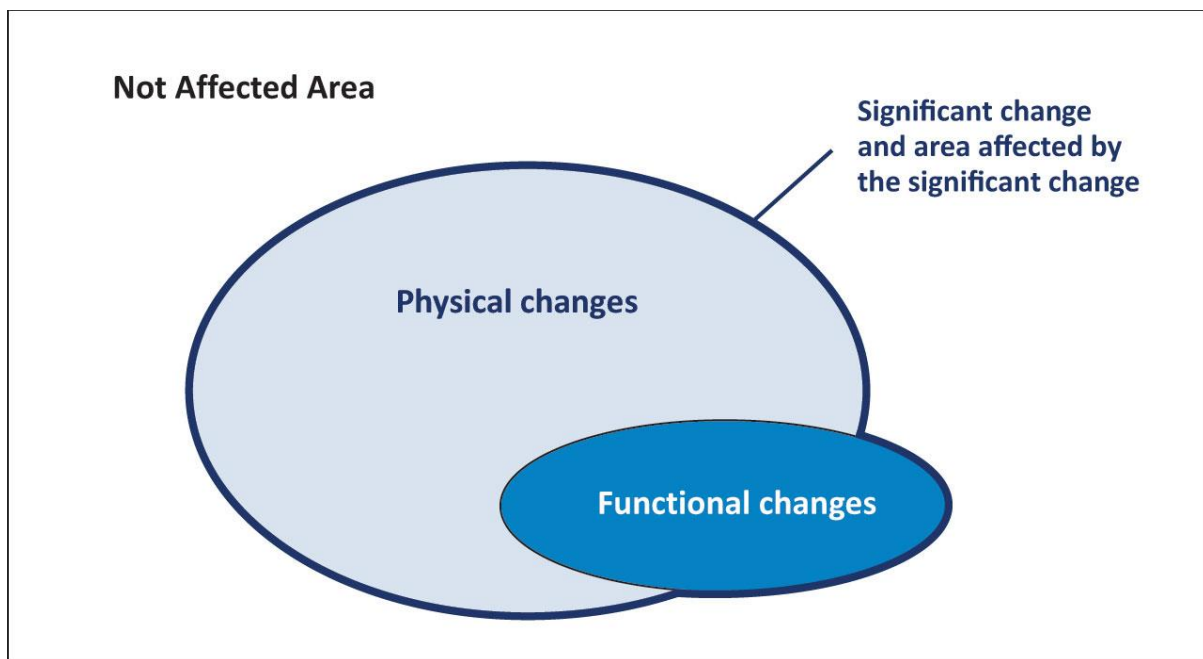
3.9.1 An area affected by the change is any area, system, component, part, or appliance of the aeronautical product that is physically and/or functionally changed.

3.9.2 Figure 3-33 of this GM illustrates concepts of physical and functional changes of an affected area. Appendix C of this GM contains a method used to define the change and areas affected by the change. This Appendix is meant to assist applicants when they propose large, complex changes. For each change, it is important for the applicant to properly assess the effects of such change on any areas, systems, parts or appliances of the product because areas that have not been physically changed may still be considered part of the affected area. If a new compliance finding is required, regardless of its amendment level, it is an affected area.

Figure 3-3. Affected Areas versus Not Affected Areas

The Aeronautical Product





3.9.3 An area not affected by a change can remain at the existing **type-certification basis and OSD certification basis**, provided that the applicant presents to EASA an acceptable justification that the area is not affected.

3.9.4 For sample questions to assist in determining affected areas, see paragraph D.1 of appendix D of this GM.

3.9.5 Consider the following aspects of a change: **Physical aspects**.

The physical aspects include direct changes to structures, systems, equipment, components, and appliances, and may include software/airborne electronic hardware changes and the resulting effects on systems functions.

3.9.5.1 Performance/functional characteristics.

The less obvious aspect of the word ‘areas’ covers general characteristics of the type-certified product, such as performance features, handling qualities, emergency egress, structural integrity (including load carrying), aeroelastic characteristics, or crashworthiness. A product-level change may affect these characteristics. For example, adding a fuselage plug could affect performance and handling qualities, and thus the certification specifications associated with these aspects would be considered ~~to be~~ part of the affected area. Another example is the addition of a fuel tank and a new fuel conditioning unit. This change affects the fuel transfer and fuel quantity indication system, resulting in the aircraft’s unchanged fuel tanks being affected. Thus, the entire fuel system (changed and unchanged areas) may become part of the affected area due to the change to functional characteristics. Another example is changing turbine engine ratings and operating limitations, affecting the engine rotors’ life limits.

3.9.6 All areas affected by the proposed change must comply with the latest certification specifications, unless the applicant shows that demonstrating compliance with the latest amendment of a certification specification would not contribute materially to the level of safety or would be impractical. Step 7 below provides further explanation.



3.9.7 The applicant should document the change and the area affected by the change using high-level descriptors along with the applicable certification specifications and their proposed associated amendment levels. The applicant proposes this change to the **type-certification basis and OSD certification basis** that EASA will consider for documentation in the type certificate data sheet (TCDS) or STC, if they are different from that recorded for the baseline product in the TCDS.

3.10. Step 7. Do the latest **certification specifications standards** contribute materially to the level of safety and are they practical?

Pursuant to point 21.A.101(a), compliance with the latest certification specifications is required. However, **except as provided in point 21.A.101(h), exceptions reversions** may be allowed pursuant to point 21.A.101(b)(3). The applicant must provide justification to support the rationale for the application of earlier amendments for areas affected by a significant change in order to document that compliance with later **certification specifications standards** in these areas would not contribute materially to the level of safety or would be impractical. Such a justification should address all the aspects of the area, system, part or appliance affected by the significant change. See paragraphs 3.10.1 and 3.10.1.4 of this GM.

3.10.1 Do the latest **certification specifications standards** contribute materially to the level of safety?

Applicants could consider compliance with the latest **certification specifications standards** to 'not contribute materially to the level of safety' if the existing type design and/or relevant experience demonstrates a level of safety comparable to that provided by the latest **certification specifications standards**. In cases where design features provide a level of safety greater than **required by** the existing **type-certification basis and OSD certification basis**, applicants may use acceptable data, such as service experience, to establish the effectiveness of those design features in mitigating the specific hazards **addressed** by a later amendment. Applicants must provide sufficient justification to allow EASA to make this determination. An acceptable means of compliance is described in appendix E of this GM. Justification is sufficient when it provides a summary of the evaluation that supports the determination using an agreed evaluation method, such as that in appendix E of this GM. This **reversion exception** could be applicable in the situations described in the paragraphs below.

Note: Compliance with later **certification specifications standards** is not required where the amendment is of an administrative nature and made only to correct inconsequential errors or omissions, consolidate text, or to clarify an existing requirement.

3.10.1.1 Improved design features.

Design features that exceed the safety level of the existing **type-certification basis and OSD certification basis** standards, but do not meet the latest certification specifications, can be used as a basis for granting **an exception reversion** under point 21.A.101(b)(3) since complying with the latest amendment of the certification specifications would not contribute materially to the level of safety of the product. If EASA accepts these design features as justification for **an exception reversion**, the applicant must incorporate them in the amended type design configuration and record them, where necessary, in the **type-certification basis and OSD certification basis**. The description of the design feature would be provided in the TCDS



1. Proposed amendments to the AMC and GM to Annex I
(Part 21) to Commission Regulation (EU) No 748/2012

or STC at a level that allows the design feature to be maintained, but does not contain proprietary information. For example¹, an applicant proposes to install winglets on a Part 25 aeroplane, and part of the design involves adding a small number of new wing fuel tank fasteners. Assuming that the latest applicable amendment of § 25.981 is Amendment 25-102, which requires structural lightning protection, the applicant could propose ~~an exception~~ **reversion** from these latest structural lightning protection requirements because the design change uses new wing fuel tank fasteners with cap seals installed. The cap seal is a design feature that exceeds the requirement of § 25.981 at a previous amendment level, but does not meet the latest Amendment 25-102. If the applicant can successfully substantiate that compliance with Amendment 25-102 would not materially increase the level of safety of the changed product, then this design feature ~~can~~ could be accepted as ~~an exception~~ **reversion to compliance with** ~~from~~ the latest amendment **of the certification specifications**.

3.10.1.2 Consistency of design.

This provision gives the opportunity to consider the consistency of design. For example, when a small fuselage plug is added, additional seats and overhead bins are likely to be installed, and the lower cargo hold extended. These components may be identical to the existing components. The level of safety may not materially increase by applying the latest certification specifications in the area of the fuselage plug. Compliance of the new areas with the existing **type-certification basis and OSD certification basis** may be acceptable.

3.10.1.3 Service experience.

3.10.1.3.1 Relevant service experience, such as experience based on fleet performance or utilisation over time (relevant flight hours or cycles), is one way of showing that the level of safety will not materially increase by applying the latest amendment, so the use of earlier certification specifications could be appropriate. Appendix F of this GM provides additional guidance on the use of service experience, along with examples.

3.10.1.3.2 When establishing the highest practicable level of safety for a changed product, EASA has determined that it is appropriate to assess the service history of a product, as well as the later airworthiness standards. It makes little sense to mandate changes to well-understood designs, whose service experience has been acceptable, merely to comply with new standards. The clear exception to this premise is if the new standards were issued to address a deficiency in the design in question, or if the service experience is not applicable to the new standards.

3.10.1.3.3 There may be cases for rotorcraft and small aeroplanes where relevant data may not be sufficient or not available at all because of the low utilisation and the insufficient amount and type of data available. In such cases, other service history information may provide

¹ This example is taken from the FAA experience gained prior to EASA's start, therefore the references to the FAA sections and amendments are kept.



sufficient data to justify the use of earlier certification specifications, such as: warranty, repair, and parts usage data; accident, incident, and service difficulty reports; service bulletins; airworthiness directives; or other pertinent and sufficient data collected by the manufacturers, authorities, or other entities.

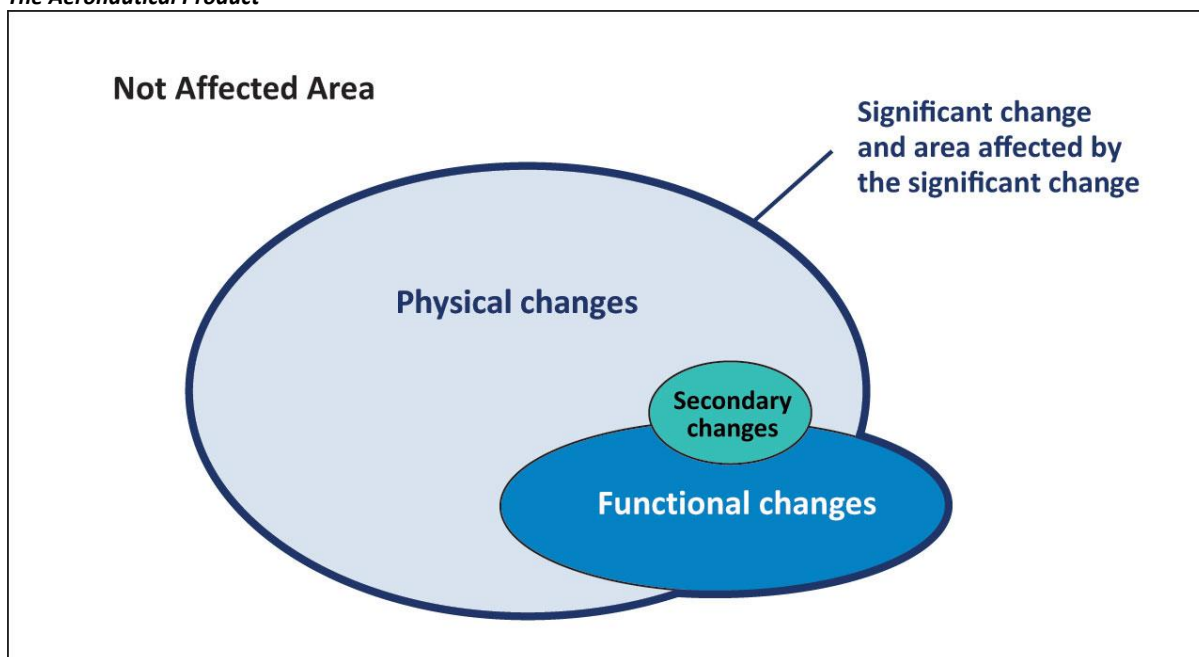
3.10.1.3.4 EASA will determine whether the proposed service experience levels necessary to demonstrate the appropriate level of safety as they relate to the proposed design change are acceptable.

3.10.1.4 Secondary changes.

3.10.1.4.1 The change proposed by the applicant can consist of physical and/or functional changes to the product. See Figure 3-4 below. There may be aspects of the existing type design of the product that the applicant may not be proposing to change directly, but that are affected by the overall change. For example, changing an airframe's structure, such as adding a cargo door in one location, may affect the frame or floor loading in another area. Further, upgrading engines with new performance capabilities could require additional demonstration of compliance for minimum control speeds and aeroplane performance certification specifications. For many years, EASA has required applicants to consider these effects, and this practice is unchanged under the procedures of point 21.A.101.

Figure 3-4. Change-Affected Areas with Secondary Changes

The Aeronautical Product



3.10.1.4.2 For each change, it is important that the effects of the change on other systems, components, equipment, or appliances of the product are properly identified and assessed. The intent is to encompass all aspects where there is a need for re-evaluation, that is, where the substantiation presented for the product being changed should be reviewed, updated, or rewritten.

3.10.1.4.3 In assessing the areas affected by the change, it may be helpful to identify secondary changes. A secondary change is a change to physical and/or functional aspects that is part of, but consequential to, a significant physical change, whose only purpose is to restore, and not add or increase, existing functionality or capacity. The term 'consequential' is intended to refer to:

a change that would not have been made by itself; it achieves no purpose on its own;

a change that has no effect on the existing functionality or capacity of areas, systems, structures, components, parts, or appliances affected by the change; or

a change that would not create the need for: (1) new limitations or would affect existing limitations; (2) a new aircraft flight manual (AFM) or instructions for continued airworthiness (ICA) or a change to the AFM or ICA; or (3) special conditions, equivalent safety findings, or deviations.

3.10.1.4.4 A secondary change is not required to comply with the latest certification specifications because it is considered to be 'not contributing materially to the level of safety' and, therefore, eligible for an exception under point 21.A.101. Determining whether a change meets the description for a secondary change, and is thus eligible for an exception, should be straightforward. Hence, the substantiation or justification need only be minimal. If this determination is not straightforward, then the proposed change is not a secondary change.

3.10.1.4.5 In some cases, a secondary area of change that restores functionality may in fact contribute materially to the level of safety by meeting a later amendment. If this is the case, it is not considered a secondary change.

3.10.2 Are the latest specifications practical?

The intent of point 21.A.101 is to enhance safety by applying the latest certification specifications to the greatest extent practicable. The concepts of contributing materially and practicality are linked. If compliance with the latest certification specifications does contribute materially to the level of safety, then the applicant may assess the incremental costs to see whether they are commensurate with the increase in safety. The additional resource requirements could include those arising from changes required for compliance and the effort required to demonstrate compliance, but excluding resource expenditures for prior product changes. The cost of changing compliance documentation and/or drawings is not an acceptable reason for an exception.

3.10.2.1 Applicants should support their position that compliance is impractical with substantiating data and analyses. While evaluating that position and the substantiating data regarding impracticality, EASA may consider other factors (e.g. the costs and safety benefits for a comparable new design).

3.10.2.2 A review of large aeroplane projects showed that, in certain cases where EASA allowed an earlier amendment of applicable certification specifications, the applicants made changes that nearly complied with the latest amendments. In these cases, the applicants successfully



demonstrated that full compliance would require a substantial increase in the outlay or expenditure of resources with a very small increase in the level of safety. These design features can be used as a basis for granting an ~~exception~~ **reversion** under point 21.A.101(b)(3) on the basis of ‘impracticality.’

3.10.2.3 Appendix E of this GM provides additional guidance and examples for evaluating the impracticality of applying the latest certification specifications to a changed product for which compliance with the latest certification specifications would contribute materially to the level of safety of the product.

3.10.2.3.1 The ~~exception of~~ **reversion on** impracticality is a qualitative and quantitative cost–safety benefit assessment for which it is difficult to specify clear criteria. Experience to date with applicants has shown that a justification of impracticality is more feasible when both the applicant and EASA agree during a discussion at an early stage that the effort (in terms of cost, changes to manufacturing, etc.) required to comply would not be commensurate with a small incremental safety gain. This would be clear even without the need to perform any detailed cost–safety benefit analysis (although an applicant could always use cost analysis to support an appropriate amendment level **of a certification specification**). However, there should be enough detail in the applicant’s rationale to justify ~~exception~~ **reversions**.

— Note: An applicant should not base an ~~exception~~ **reversion** due to impracticality on the size of the applicant’s company or their financial resources. The applicant must evaluate the costs to comply with a later amendment against the safety benefit of complying with the later amendment.

3.10.2.3.2 For example, a complex redesign of an area of the baseline aircraft may be required to comply with a new requirement, and that redesign may affect the commonality of the changed product with respect to the design and manufacturing processes of the existing family of models. Relevant service experience of the existing fleet of the baseline aircraft family would be required to show that there has not been a history of problems associated with the hazard that the new amendment in question was meant to address. In this way, the incremental cost/impact to the applicant is onerous, and the incremental safety benefit realised by complying with the later amendment would be minimal. This would be justified by demonstrated acceptable service experience in relation to the hazard that the new rule addresses.

3.11. Step 8. Ensure the proposed **type-certification basis** and **OSD certification basis** ~~is~~ **are** adequate.

EASA considers a proposed **type-certification basis** and **OSD certification basis** for any change (whether it is significant or not significant) to be adequate when:

- the certification standards provide an appropriate level of safety for the intended change, and



- the change and the areas affected by the change do not result in unsafe design features or characteristics for the intended use.
- 3.11.1 For a change that contains new design features that are novel and unusual for which there are no later applicable certification specifications at a later amendment level, EASA will designate special conditions pursuant to point 21.B.75. EASA will impose later certification specifications that contain adequate or appropriate safety standards for this feature, if they exist, in lieu of special conditions. An example is adding a flight-critical system, such as an electronic air data display on a CS-25 large aeroplane whose existing **type-certification basis** does not cover protection against lightning and high-intensity radiated fields (HIRF). In this case, EASA will require compliance with the certification specifications for lightning and HIRF protection, even though EASA determined that the change is not significant.
- 3.11.2 For new design features or characteristics that may pose a potential unsafe condition for which there are no later applicable certification specifications, new special conditions may be required to address points 21.B.107(a)(3) or 21.B.111(a)(3).
- 3.11.3 In cases where inadequate or no standards exist for the change to the existing **type-certification basis and OSD certification basis**, but adequate standards exist in a later amendment of the applicable certification specifications, the later amendment will be made part of the **type-certification basis and OSD certification basis** to ensure the adequacy of the **type-certification basis and OSD certification basis**.
- 3.11.4 EASA determines the final **type-certification basis and OSD certification basis** for a product change. This may consist of a combination of those standards ranging from the existing **type-certification basis and OSD certification basis** of the baseline product to the latest amendments and special conditions.

4. Excepted Products under point 21.A.101(c)

4.1. Excepted products.

For excepted products as defined in paragraph 4.1.1 below, the starting point for regulatory analysis is the existing **type-certification basis and OSD certification basis** for the baseline product.

4.1.1 Point 21.A.101(c) provides an exception to the compliance with the latest certification specifications required by point 21.A.101(a) for aircraft (other than rotorcraft) of 2 722 kg (6 000 lb) or less maximum **take-off mass weight**, or to a non-turbine rotorcraft of 1 361 kg (3 000 lb) or less maximum **take-off mass weight**. In these cases, the applicant may elect to comply with the existing **type-certification basis and OSD certification basis**. However, the applicant has the option of applying later, appropriate certification specifications.

4.1.2 If EASA finds that the change is significant in an area, EASA may require the applicant to comply with a later certification specification and with any certification specification that EASA finds is directly related. Starting with the existing **type-certification basis and OSD certification basis**, EASA will progress through each later certification specification to determine the amendment appropriate for the change. However, if an applicant proposes, and EASA finds, that complying with the later amendment or certification specification would not contribute materially



to the level of safety of the changed product or would be impractical, EASA may allow the applicant to comply with an earlier amendment appropriate for the proposed change. The amendment may not be earlier than the existing **type-certification basis and OSD certification basis**. For excepted products, changes that meet one or more of the following criteria, in the area of change, are automatically considered significant:

4.1.2.1 The general configuration or the principles of construction are not retained.

4.1.2.2 The assumptions used for certification of the area to be changed do not remain valid.

4.1.2.3 The change contains new features (not foreseen in the existing **type-certification basis and OSD certification basis** and for which appropriate later certification specifications exist). In this case, EASA will designate the applicable certification specifications, starting with the existing **type-certification basis and OSD certification basis** and progressing to the most appropriate later amendment level **of the certification specifications** for the change.

4.1.2.4 The change contains a novel or unusual design feature. In this case, EASA will designate the applicable special conditions appropriate for the change, pursuant to point 21.A.101(d).

4.1.3 The exception for products under point 21.A.101(c) applies to the aircraft only. Changes to engines and propellers installed on these excepted aircraft are assessed as separate type-certified products using point 21.A.101(a) and (b).

5. Other Considerations

5.1. Design-related requirements from other aviation domains.

Some implementing rules in other aviation domains (air operations, ATM/ANS) (e.g. Commission Regulation (EU) No 965/2012 on air operations ~~or Commission Regulation (EU) 2015/640 on additional airworthiness specifications for a given type of operations (Annex I (Part-26))~~) impose airworthiness standards that are not required for the issue of a TC or STC ~~(e.g. CS-26, CS-ACNS, etc.)~~. If not already included in the type-certification basis and OSD certification basis, any such applicable airworthiness standard may be added to the **type-certification basis and OSD certification basis** by mutual agreement between the applicant and EASA. The benefit of adding these airworthiness standards to the **type-certification basis and OSD certification basis** is to increase awareness of these standards, imposed by other implementing rules, during design certification and future modifications to the aircraft. The use of ~~exceptions~~ **reversions** under point 21.A.101(b) is not intended to alleviate or preclude compliance with operating regulations.

5.2. Reserved.

5.3. Baseline product.

A baseline product consists of one unique type design configuration, an aeronautical product with a specific, defined, approved configuration and **type-certification basis and OSD certification basis** that the applicant proposes to change. As mentioned in paragraph 3.2.1 of this GM, it is important to clearly identify the type design configuration to be changed. EASA does not require an applicant to assign a new model name for a changed product. Therefore, there are vastly different changed products with the same aircraft model name, and there are changed products with minimal differences that have



different model names. Since the assignment of a model name is based solely on an applicant's business decision, the identification of the baseline product, for the purposes of point 21.A.101, is, as defined below.

The baseline product is an approved type design that exists ~~on~~ at the date of application and is representative of:

- a single certified build configuration, or
- multiple approvals over time (including STC(s) or service bulletins) and may be representative of more than one product serial number.

Note: The type design configuration, for this purpose, could also be based on a proposed future configuration that is expected to be approved at a later date but prior to the proposed changed product.

5.4. Predecessor standards.

The certification specifications in effect on the date of application for a change are those in CS-22, CS-23, CS-25, CS-27, CS-29, CS-CCD, CS-FCD, CS-MMEL, etc., issued by EASA after 2003. However, the type-certification basis ~~and OSD certification basis~~ of some 'grandfathered' products, i.e. those with a pre-EASA TC deemed to have been issued in accordance with Commission Regulation (EU) No 748/2012 (see Article 3), may consist of other standards issued by or recognised in the EU Member States. These standards may include Joint Aviation Requirements (JARs) issued by the Joint Aviation Authorities (JAA) or national regulations of an EU Member State (e.g. BCARs) or national regulations of a non-EU State of Design with which an EU Member State had concluded a bilateral airworthiness agreement (e.g. US FARs, CARs etc.). Consequently, when using one of the ~~exception reversion~~ routes allowing electing to comply with earlier ~~certification specifications standards~~, the predecessor standards may be applicable. Such predecessor standards are not recognised under point 21.A.101(a), but may be allowed under point 21.A.101(b) or (c). When choosing the amendment level of a ~~predecessor~~ standard, all related ~~predecessor~~ standards associated with that amendment level would have to be included.

5.5. Special conditions, point 21.A.101(d).

Point 21.A.101(d) allows for the application of special conditions, or for changes to existing special conditions, to address the changed designs where neither the proposed ~~type~~ certification basis ~~and OSD certification basis~~ nor any later certification specifications provide adequate standards for an area, system, part or appliance related to the change. The objective is to achieve a level of safety consistent with that provided for other areas, systems, parts or appliances affected by the change by the other certification specifications of the proposed ~~type~~ certification basis ~~and OSD certification basis~~. The application of special conditions to a design change is not, in itself, a reason to classify it as either a substantial change or a significant change. Whether the change is significant, with earlier certification specifications allowed through ~~exceptions reversions~~, or not significant, the level of safety intended by the special conditions must be consistent with the agreed ~~type~~ certification basis ~~and OSD certification basis~~.

5.6. Reserved.

5.7. Reserved.

5.8. Reserved.

5.9. Documentation.



5.9.1 Documenting the proposal.

In order to efficiently determine and agree upon a certification basis with EASA, the following information is useful to understand the applicant's position:

- The current certification basis of the product being changed, including the amendment level **of the certification specifications and environmental protection requirements**.
- The amendment level of all the applicable certification specifications **on** ~~at~~ the date of application.
- The proposed certification basis, including the amendment levels **of the applicable certification specifications and applicable environmental protection requirements**.
- Description of the affected area.
- Applicants who propose a certification basis that includes **certification specifications with** amendment levels earlier than what was in effect **on** ~~at~~ the date of application should include the **exception reversion** as outlined in point 21.A.101(b) and their justification if needed.

Please see ~~a~~ Appendix H for examples of optional tools an applicant can use to document your proposed certification basis.

5.9.2 Documenting the significant/not significant decision.

5.9.2.1 EASA determines whether the changes are significant or not significant, and this decision is documented in the Certification Review Item(s). However, EASA provides an optional decision record for the applicant to make a predetermination to facilitate EASA decision. This form is provided in appendix G of this GM and follows the flow chart in Figure 3-1 of this GM. If it is used, the applicant should submit it along with the certification plan.

5.9.2.2 Changes that are determined to be significant changes under point 21.A.101, the **exceptions reversions**, and the agreement of affected and unaffected areas is typically documented through the Certification Review Item (CRI) A-01 process. An example tool is provided in appendix H of this GM.

5.9.3 Documenting the certification basis.

5.9.3.1 EASA will amend the certification basis for all changes that result in a revision to the product's certification basis on the amended TCDS or STC. In case of a significant change, EASA will document the resulting certification basis in CRI A-01.

5.9.3.2 EASA will document the certification basis of each product model on all STCs, including approved model list STCs.

5.10. Incorporation of STCs into the Type Design.

The incorporation of STCs into the product type design may generate an additional major change when that change is needed to account for incompatibility between several STCs that were initially not intended to be applied concurrently.



5.10.1 If the incorporation of the STC(s) does not generate an additional major change, the incorporation is not evaluated pursuant to point 21.A.101. The existing certification basis should be updated to include the later amendments of the STC(s) being incorporated.

5.10.2 If the incorporation of the STC(s) generates an additional major change, the change must be evaluated pursuant to point 21.A.101, and the existing certification basis should be updated to include the amendments resulting from the application of point 21.A.101.

5.11. Removing changes.

Approved changes may be removed after incorporation in an aeronautical product. These changes will most commonly occur via an STC or a service bulletin kit.

5.11.1 The applicant should identify a product change that they intend at its inception to be removable as such, and should develop instructions for its removal during the initial certification. EASA will document the certification basis for both the installed and removed configuration separately on the TCDS or STC.

5.11.2 If specific removal instructions and a certification basis corresponding to the removed condition are not established at the time of the initial product change **approval** ~~certification~~, the removal of changes or portions of those changes may constitute a significant change to type design. A separate STC or an amended TC may be required to remove the modifications and the resulting certification basis established for the changed product.

5.12. The certification basis is part of the change.

A new change may be installed in a product during its production or via a service bulletin or STC. In terms of point 21.A.101, each of the approved changes has its own basis of certification. If an applicant chooses to remove an approved installation (e.g. an interior installation, avionics equipment) and install a new installation, a new **type**-certification basis **and a new OSD certification basis** may be required for the new installation, depending on whether the change associated with the new installation is considered significant compared to the baseline configuration that the applicant chooses. If the new installation is a not significant change, the unmodified product's **type**-certification basis **and OSD certification basis** may be used (not the previous installation **type**-certification basis **and OSD certification basis**), provided the **type**-certification basis **and OSD certification basis** are **is**-adequate. ~~For example, a large aeroplane is certified in a 'green' configuration. The aeroplane certification basis does not include CS-25.562. An interior is installed under an STC, and the applicant elects to include CS-25.562 (dynamic seats) in the certification basis to meet specific operational requirements. At a later date, the aeroplane is sold to another operator who does not have the same operational requirements. A new interior is installed; there will be no requirement for CS-25.562 to be included in the new certification basis.~~

5.13. Sequential changes — cumulative effects.

5.13.1 Any applicant who intends to accomplish a product change by incorporating several changes in a sequential manner should identify this to EASA up front when the first application is made. In addition, the cumulative effects arising from the initial change, and from all ~~of~~ the follow-on changes, should be included as part of the description of the change in the initial proposal. The classification of the intended product change will not be evaluated solely on the basis of the first application, but rather on the basis of all the required changes needed to



accomplish the intended product change. If EASA determines that the current application is a part of a sequence of related changes, then EASA will re-evaluate the determination of significance and the resulting **type-certification basis and OSD certification basis** as a group of related changes.

5.13.2 Example: Cumulative effects — advancing the **type-certification basis and OSD certification basis**.

The type certificate for aeroplane model X lists three models, namely X-300, X-200, and X-100. The X-300 is derived from the X-200, which is derived from the original X-100 model. An applicant proposes a change to the X-300 aeroplane model. During the review of the X-300 certification basis and the certification specifications affected by the proposed change, it was identified that one certification specification, CS 25.571 (damage tolerance requirements), remained at the same amendment level as **in** the X-100 **existing original**-certification basis (**exception-reversion** granted on the X-200). Since the amendment level for this particular certification specification was not changed for the two subsequent aeroplane models (X-200 and X-300), the applicant must now examine the cumulative effects of these two previous changes that are related to the proposed change and the **damage tolerance requirements** to determine whether the amendment level **of the certification specification** needs to advance.

Appendix A to GM 21.A.101 Classification of design changes

The following tables of ‘substantial’, ‘significant’, and ‘not significant’ changes are adopted by the FAA, Agência Nacional de Aviação Civil (ANAC), the European Aviation Safety Agency (EASA), and Transport Canada Civil Aviation (TCCA) through international collaboration. The classification may change due to cumulative effects and/or combinations of individual changes.

A.1 Examples of Substantial, Significant, and Not Significant Changes for Small Aeroplanes (CS-23).

A.1.1 Table A-1 contains examples of changes that are ‘substantial’ for small aeroplanes (CS-23).

Table A-1. Examples of Substantial Changes for Small Aeroplanes (CS-23)

| Example | Description of Change | Notes |
|---------|---|--|
| 1. | Change to wing location (tandem, forward, canard, high/low). | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 2. | Fixed wing to tilt wing. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 3. | A change to the number of engines. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 4. | Replacement of piston or turboprop engines with turbojet or turbofan engines. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 5. | Change to engine configuration (tractor/pusher). | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |



1. Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

| | | |
|----|---|--|
| 6. | Increase from subsonic to supersonic flight regime. | |
| 7. | Change from an all-metal to all-composite aeroplane. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 8. | Certifying a CS-23 (or predecessor basis, such as JAR-23) aeroplane into another certification category, such as CS-25. | — |

A.1.2 Table A-2 contains examples of changes that are ‘significant’ for small aeroplanes (CS-23).

| Table A-2. Examples of Significant Changes for Small Aeroplanes (CS-23) | | | | | |
|---|---|--|--|--|---|
| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
| [...] | [...] | [...] | [...] | [...] | [...] |
| 26. | Conversion from normal category Level 3 to commuter category Level 4 aeroplane as defined in CS 23.2005(b). | Yes | No | Yes | Requires compliance with all commuter Level 4 certification specifications regulatory standards and means of compliance . In many cases, this change could be considered a substantial change to the type design. Therefore, a proposed change of this nature would be subject to EASA determination under 21.A.19. |
| [...] | [...] | [...] | [...] | [...] | [...] |

A.1.3 Table A-3 contains examples of changes that are ‘not significant’ for small aeroplanes (CS-23).

| Table A-3. Examples of Not Significant Changes for Small Aeroplanes (CS-23) | | | | | |
|---|--|--|--|--|--|
| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
| [...] | [...] | [...] | [...] | [...] | [...] |
| 21. | A change to the maximum take-off mass weight of less than 5 per cent, unless assumptions made in justification of the design are thereby invalidated. | No | No | No | Although a major change to the aeroplane, likely the original general configuration, principles of construction, and certification assumptions remain valid. |
| [...] | [...] | [...] | [...] | [...] | [...] |
| [...] | [...] | [...] | [...] | [...] | [...] |
| 42. | Modification to ice protection systems. | No | No | No | Recertification required, but certification basis should be evaluated for adequacy. |



A.2 Examples of Substantial, Significant, and Not Significant Changes for Large Aeroplanes (CS-25).

A.2.1 Table A-4 contains examples of changes that are ‘substantial’ for large aeroplanes (CS-25).

Table A-4. Examples of Substantial Changes for Large Aeroplanes (CS-25)

| Example | Description of Change | Notes |
|---------|---|--|
| 1. | Change to the number or location of engines, e.g. four to two wing-mounted engines or two wing-mounted to two body-mounted engines. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 2. | Change from a high-wing to low-wing configuration. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 3. | Change from an all-metal to all-composite aeroplane. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 4. | Change of empennage configuration for larger aeroplanes (cruciform vs ‘T’ or ‘V’ tail). | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 5. | Increase from subsonic to supersonic flight regime. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |

A.2.2 Table A-5 contains examples of changes that are ‘significant’ for large aeroplanes (CS-25).

Table A-5. Examples of Significant Changes for Transport Large Aeroplanes (CS-25)

| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
|---------|---|--|--|--|---|
| [...] | [...] | [...] | [...] | [...] | [...] |
| 9. | Changing the number of axles or number of landing gear done in context with a product change that involves changing the aeroplane’s gross weight. | Yes | No | No | This type of landing gear change with an increase in gross weight is significant since it requires changes to aircraft structure, affects aircraft systems, and requires AFM changes, which invalidate the certification assumptions. |
| [...] | [...] | [...] | [...] | [...] | [...] |
| 11. | An increase in design massweight of more than 10 per cent. | No | No | Yes | Design massweight increases of more than 10 per cent result in significant design load increase that invalidates the assumptions used for certification, requiring re-substantiation of aircraft structure, aircraft performance, and flying qualities and associated systems. |
| | | | | | |



1. Proposed amendments to the AMC and GM to Annex I
(Part 21) to Commission Regulation (EU) No 748/2012

A.2.3 Table A-6 contains examples of changes that are ‘not significant’ for large aeroplanes (CS-25).

| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
|---------|--|--|--|--|--|
| [...] | [...] | [...] | [...] | [...] | [...] |
| 7. | Modification to ice protection systems. | No | No | No | Recertification required, but certification basis is adequate. |
| 8. | Brakes: design or material change, e.g. steel to carbon. | No | No | No | Recertification required, but certification basis is adequate. |
| [...] | [...] | [...] | [...] | [...] | [...] |
| 16. | Airframe life extension. | No | No | No | This does not include changes that involve changes to design loads, such as pressurisation or massweight increases. Also, this does not include changing from safe life to damage tolerance. |
| [...] | [...] | [...] | [...] | [...] | [...] |

A.3 Examples of Substantial, Significant, and Not Significant Changes for Rotorcraft (CS-27 and CS-29).

A.3.1 Table A-7 contains examples of changes that are ‘substantial’ for rotorcraft (CS-27 and CS-29).

Table A-7. Examples of Substantial Changes for Rotorcraft (CS-27 and 29)

| Example | Description of Change | Notes |
|---------|---|--|
| 1. | Change from the number and/or configuration of rotors (e.g. main & tail rotor system to two main rotors). | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 2. | Change from an all-metal rotorcraft to all-composite rotorcraft. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |

A.3.2 Table A-8 contains examples of changes that are ‘significant’ for rotorcraft (CS-27 and CS-29).

| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
|---------|-----------------------|--|--|--|-------|
| [...] | [...] | [...] | [...] | [...] | [...] |



1. Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

A.3.3 Table A-9 contains examples of changes that are ‘not significant’ changes for rotorcraft (CS-27 and CS-29).

| Table A-9. Examples of Not Significant Changes for Rotorcraft (CS-27 and CS-29) | | | | | |
|---|--|---|---|---|--|
| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
| [...] | [...] | [...] | [...] | [...] | [...] |
| 5. | Expanded limitations with minimal or no design changes, following further tests/justifications or different mix of limitations (CG limits, oil temperatures, altitude, minimum/maximum weight mass , minimum/maximum external temperatures, speed, engine ratings). | No | No | No | Changes to an operating envelope (such as operating altitude and temperature) and mission profile (such as passenger-carrying operations to external-load operations, flight over water, or operations in snow conditions) that are not so different that the original certification assumptions remain valid. |
| [...] | [...] | [...] | [...] | [...] | [...] |
| 19. | An ETSO C-127 dynamic seat installed in a helicopter with an existing certification basis prior to addition of CS 29.562, Emergency landing dynamic conditions. | No | No | No | |

A.4 Examples of Substantial, Significant, and Not Significant Changes for Engines (CS-E)

A.4.1 Table A-10 contains examples of changes that are ‘substantial’ for engines (CS-E).

Table A-10. Examples of Substantial Changes for Engines (CS-E)

| Example | Description of Change | Notes |
|------------------------|--|--|
| Turbine Engines | | |
| 1. | Traditional turbofan to geared-fan engine. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 2. | Low-bypass ratio engine to high-bypass ratio engine with an increased inlet area. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 3. | Turbojet to turbofan. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 4. | Turboshaft to turbo-propeller. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 5. | Conventional ducted fan to unducted fan. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |
| 6. | Turbine engine for subsonic operation to afterburning engine for supersonic operation. | Proposed change to design is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required. |



1. Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

A.4.2 Table A-11 contains examples of changes that are ‘significant’ for engines (CS-E).

| Table A-11. Examples of Significant Changes for Engines (CS-E) | | | | | |
|--|-----------------------|--|--|--|-------|
| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
| Turbine Engines | | | | | |
| [...] | [...] | [...] | [...] | [...] | [...] |
| Piston Engines | | | | | |
| [...] | [...] | [...] | [...] | [...] | [...] |

A.4.3 Table A-12 contains examples of changes that are ‘not significant’ for engines (CS-E).

| Table A-12. Examples of Not Significant Changes for Engines (CS-E) | | | | | |
|--|-----------------------|--|--|--|-------|
| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
| Turbine Engines | | | | | |
| [...] | [...] | [...] | [...] | [...] | [...] |
| Piston Engines | | | | | |
| [...] | [...] | [...] | [...] | [...] | [...] |

A.5 Examples of Substantial, Significant, and Not Significant Changes for Propellers (CS-P).

A.5.1 Table A-13 contains an example of a change that is ‘substantial’ for propellers (CS-P).

[...]

A.5.2 Table A-14 contains examples of changes that are ‘significant’ for propellers (CS-P).

| Table A-14. Examples of Significant Changes for Propellers (CS-P) | | | | | |
|---|-----------------------|--|--|--|-------|
| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
| [...] | [...] | [...] | [...] | [...] | [...] |

A.5.3 Table A-15 contains examples of changes that are ‘not significant’ for propellers (CS-P).

| Table A-15. Examples of Not Significant Changes for Propellers (CS-P) | | | | | |
|---|---|--|--|--|--|
| Example | Description of change | Is there a change to the general configuration? 21.A.101(b)(1)(i) | Is there a change to the principles of construction? 21.A.101(b)(1)(ii) | Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(iii) | Notes |
| [...] | [...] | [...] | [...] | [...] | [...] |
| 5. | Change to the intended usage, such as normal to category. | No | No | No | Propeller’s operating characteristics and inherent strength require re-evaluation. |
| [...] | [...] | [...] | [...] | [...] | [...] |



Appendix B to GM 21.A.101 Application charts for changed product rule

Table A-16. Application Chart for 21.A.101(a) and (b) and 21.A.19

| Substantial (21.A.19) | Significant (21.A.101(a) and (b)) | | Not Significant (21.A.101)(b)(1)) | | | |
|---|---|---|---|--|---|--|
| <p>Substantially changed product Compliance with all latest CSs required for product certification. Previously approved type design and compliance data may be allowed if valid for the changed product.</p> | <p>Affected area (Changed and/or affected areas) New demonstration of compliance is required. Previously approved type design and compliance data may be allowed if valid for the changed product.</p> | | <p>Unaffected area No new demonstration of compliance is required. Unaffected area continues to comply with the existing type-certification basis and OSD certification basis.</p> | <p>Affected area (Changed and/or affected areas) New demonstration of compliance is required. The applicant may propose a type-certification basis and OSD certification basis using an earlier amendment but not earlier than in the existing TC basis. Previously approved type design and compliance data may be allowed if valid for the changed product.</p> | <p>Unaffected area No new demonstration of compliance is required. Unaffected area continues to comply with the existing type-certification basis and OSD certification basis.</p> | |
| | <p>Compliance with the latest amendment materially contributes to safety</p> | | | | | <p>No material contribution to safety</p> |
| | <p>Practical —</p> | <p>Impractical The applicant may propose a type-certification basis and OSD certification basis using earlier CS(s), but not earlier than the existing TC basis.</p> | | | | <p>The applicant may propose a type-certification basis and OSD certification basis using earlier CS(s), but not earlier than the existing TC basis.</p> |
| <p>Type-Certification Basis and OSD Certification Basis Proposed by the Applicant</p> | | | | | | |
| <p>New type-certification basis and OSD certification basis using latest CSs.</p> | <p>CSs at earlier amendments with supporting rationale.</p> | | <p>Existing type-certification basis and OSD certification basis.</p> | <p>Existing type-certification basis and OSD certification basis including ‘elects to comply’.</p> | <p>Existing type-certification basis and OSD certification basis.</p> | |
| <p>EASA Resultant Type-Certification Basis</p> | | | | | | |
| <p>New type-certification basis and OSD certification basis using the latest CSs, and special conditions if required.</p> | <p>New type-certification basis and OSD certification basis using the CSs at earlier approved amendments, and special conditions if required.</p> | | <p>Existing type-certification basis and OSD certification basis.</p> | <p>Existing type-certification basis and OSD certification basis (if adequate); if not, first appropriate later amendment(s) and/or special conditions including ‘elects to comply’.</p> | <p>Existing type-certification basis and OSD certification basis.</p> | |



Table A-17. Application Chart for 21.A.101(c) Excepted Products

| | | |
|---|--|--|
| Affected area (Changed areas and/or unchanged but affected) New demonstration of compliance is required. Previously approved type design and compliance data may be allowed if valid for the changed product. | | Unaffected area No new demonstration of compliance is required. Unaffected area continues to be compliant with the existing TC basis and OSD certification basis. |
| Type-Certification Basis and OSD Certification Basis Proposed by the Applicant | | |
| The existing TC type-certification basis and OSD certification basis, including 'elects to comply'. | | The existing TC basis and OSD certification basis. |
| Found by EASA to be 'significant in an area'. | | Not 'significant in an area'. |
| Compliance with a later amendment materially contributes to safety. | | |
| Practical | Impractical | |
| EASA Resultant Type-Certification Basis and OSD Certification Basis | | |
| The latest amendment designated by EASA including special conditions and including 'elects to comply'. | The existing TC basis and OSD certification basis. If inadequate, the first appropriate later amendment. If not appropriate, add special conditions, including 'elects to comply'. | The existing TC basis and OSD certification basis. |



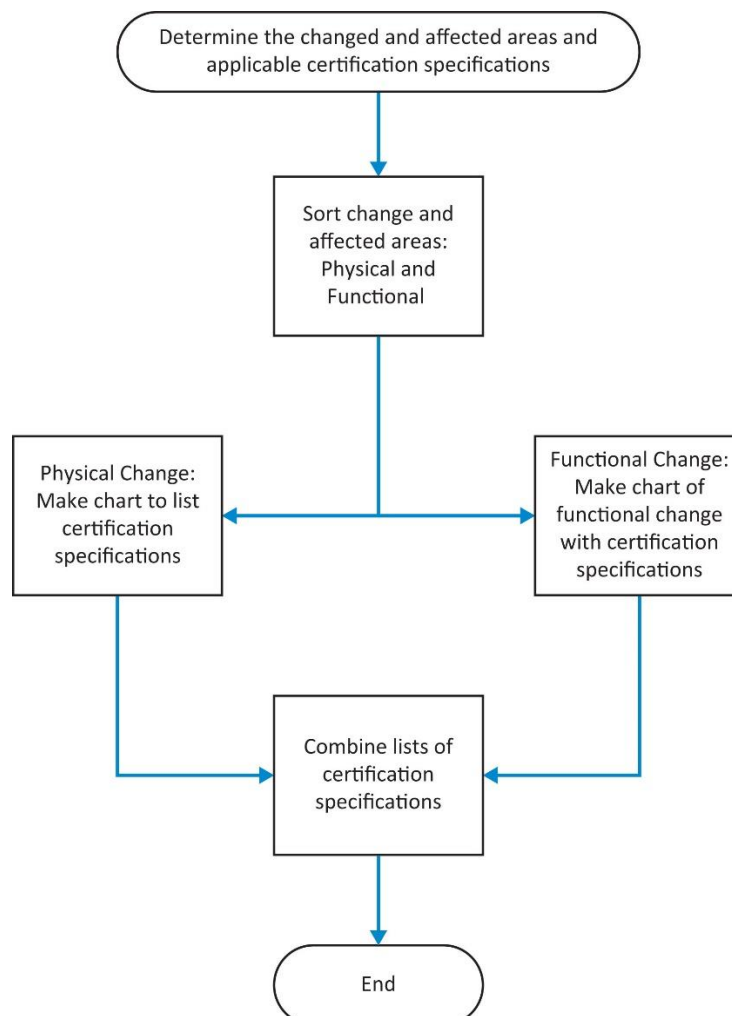
Appendix C to GM 21.A.101 A method to determine the changed and affected areas

C.1 Overview.

C.1.1 When a product is changed, some areas may change physically, while others may change functionally. EASA refers to this combination as changed and affected areas. For example, an extension to the wing of a fixed-wing aircraft would physically change the wing tip and likely other wing structure. Some areas of the airframe may have sufficient strength for the increase in load and would change functionally, i.e. they would carry greater load, but they would not change physically. These areas have associated certification specifications, which become part of the certification basis for the change.

C.1.2 Figure C-1 below provides an overview of one method that applicants may use to determine the changed and affected areas and the applicable certification specifications.

Figure C-1. Method to Determine the Changed and Affected Areas



C.2 Physical Changes.



C.2.1 Steps.

Step 1. Make a list of the physical changes.

Step 2. List the corresponding certification specifications applicable to the physical changes.

Step 3. List the **certification specifications'** amendment levels recorded in ~~on~~ the existing certification basis of the baseline product and the **certification specifications'** amendments on the date of application.

C.2.2 Example.

The change is adding a winglet to a fixed-wing aircraft and a change to the leading-edge slats for a performance increase. As part of the change, an electrically driven slat actuator is modified by changing the mounting structure of the actuator used to connect the actuator to the slat. The actuator structure is changed. The electrical system in the actuator is not affected. The applicant would list certification specifications applicable to the actuator. The applicant would not list the certification specifications applicable to the electrical system of the actuator. See Table C-1 below for an example of how to chart a physical change and the associated certification specifications.

Table C-1. Example of Associating a Physical Change with the Applicable Certification Specifications

| Physical Change | Applicable Certification Specifications* | Amendment of Existing Type-Certification Basis | Amendment on Application Date |
|------------------------------------|--|--|-------------------------------|
| Structural change to slat actuator | 25.xxx | 25-aaa | 25-ddd |
| | 25.yyy | 25-bbb | 25-eee |
| | 25.zzz | 25-ccc | 25-fff |

* These would be certification specifications related to structural aspects only.

C.3 Functional Changes.

C.3.1 Steps.

Step 1. Describe each change.

Step 2. Describe the effects of the change (e.g. structural, performance, electrical, etc.).

Step 3. List the areas, systems, parts, and appliances that are affected by those effects.

Step 4. List the certification specifications associated with the effects for each area, system, part, or appliance.

Step 5. List the **certification specifications'** amendment levels recorded in ~~on~~ the existing certification basis of the baseline product and the **certification specifications'** amendment **levels** on the date of application.

C.3.2 Example.

The change is adding a winglet to a fixed-wing aircraft and a change to the leading-edge slats for a performance increase. The wing root bending moment has increased. The loads in the wing box are increased but the wing box has sufficient structural margins to carry the higher loads. Thus, the wing box is not physically changed but its function has changed because it carries greater loads. See Table C-2 below for an example of how to chart a functional change, its effects, and the affected areas (steps 1 through 3 above). See Table C-3 below for an example of how to chart an area affected by a functional change and the associated certification specifications (steps 4 and 5 above).



Table C-2. Example of a Functional Change, Affected Areas, and Associated Effects

| Description of Change | Effects | Affected Areas |
|-------------------------|-----------------------------------|----------------|
| Installation of winglet | Increased loads in wing structure | Wing spars |
| | | Wing skins |
| | Effect 2* | Area 1 |
| | | Area 2 |
| Effect 3* | Area 3 | |

* There may be other effects as well.

Table C-3. Example of Associating Affected Areas with the Applicable Certification Specifications

| Impacted Area | Applicable Certification Specifications* | Amendment of Existing Type-Certification Basis | Amendment on Application Date |
|---------------|--|--|-------------------------------|
| Wing spar | 25.xxx | 25-aaa | 25-ddd |
| | 25.yyy | 25-bbb | 25-eee |
| | 25.zzz | 25-ccc | 25-fff |

* These would be structural certification specifications only. There could be other certification specifications applicable to the wing box. But since the effect is structural, then only the structural certification specifications are applicable.

C.4 Combine the Lists.

- C.4.1 EASA typically presents the **type-certification basis and OSD** certification basis for a product by certification specification and not by area. The next step is to combine these two lists. However, since only a portion of the product is being changed, the changed and affected areas of the new certification basis need to be identified. The unchanged area is not required to comply with the certification specifications in effect **on** ~~at~~ the date of application. (See point 21.A.101(b)(2))
- C.4.2 When the change is quite extensive, applicants will save time by listing all the certification specifications applicable to the category of product they are certifying. They can use Table C-4 below in the next step where they will identify any other exceptions that they would like EASA to consider.
- C.4.3 Example. If we use the examples above for the combined list for the actuator structural changes and the wing box functional change, then the **type**-certification basis would be listed as shown in Table C-4 below.

Table C-4. Example of a Combined List of Physical and Functional Changes with Applicable Certification Specifications

| Certification Specification | Certification Specification Amendment Levels | | Changed and Affected Area |
|-----------------------------|--|-------------------------------|---------------------------|
| | Amendment of Existing Type-Certification Basis | Amendment on Application Date | |
| 25.xxx* | 25-aaa | 25-ddd | - Wing spar |
| 25.yyy* | 25-bbb | 25-eee | - Leading-edge actuator |
| 25.zzz* | 25-ccc | 25-fff | - Wing loads |

* These represent structural certification specifications.

Appendix D to GM 21.A.101 Other guidance for affected areas

D.1 Sample Questions in Determining Affected Areas.

Below are sample questions to assist in determining whether an area is affected by the change. If the answer to any of these questions is yes, then the area is considered to be affected.



1. Is the area changed from the identified baseline product?
2. Is the area impacted by a significant product-level change?
3. Is there a functional effect on the unchanged area by a change to the system or system function that it is a part of?
4. Does the unchanged area need to comply with a system or product-level certification specification that is part of the change?
5. Are the product-level characteristics affected by the change?
6. Is the existing compliance for the area invalidated?

D.2 Sub-Areas within an Affected Area.

Within areas affected by a change, there may be 'sub-areas' of the area that are not affected. For those sub-areas, the **certification specifications'** amendment levels ~~in~~ the existing certification basis remain valid, along with the previous compliance findings. For example, if a passenger seat fitting is changed as part of a significant change, then the structure of the seat is affected. Thus, the **certification specifications'** amendment level for CS 25.561 and CS 25.562, along with other applicable structural certification specifications, would be at the **certification specifications'** amendment level on the date of application (unless an exception is granted). However, the seat fabric is not affected, so the **certification specification** amendment level for CS 25.853 (flammability) may remain ~~the same as the one in~~ the existing certification basis, and a new compliance finding would not be required.

Appendix E to GM 21.A.101 Procedure for evaluating material contribution to safety or impracticality of applying latest certification specifications to a changed product

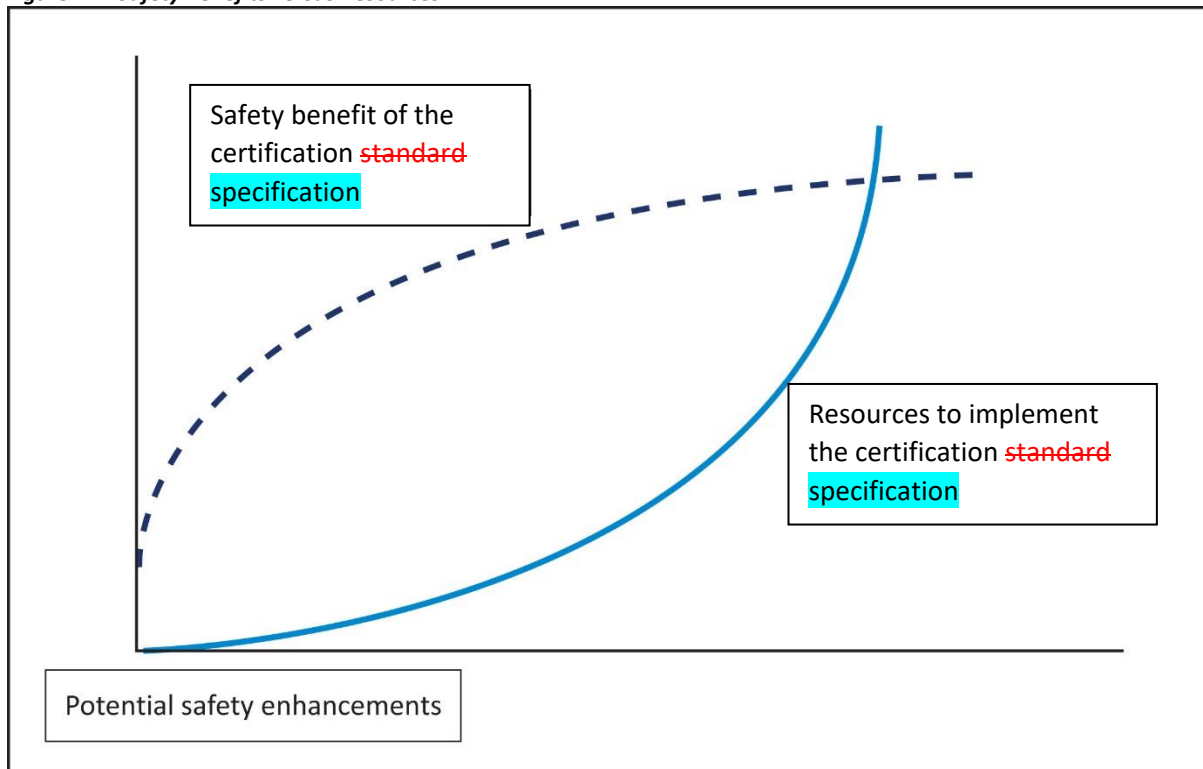
E.1 Introduction.

- E.1.1 The basic principle of enhancing the level of safety of changed aeronautical products is to apply the latest certification specifications for significant changes to the greatest extent practical. In certain cases, the cost of complying fully with a later certification specification may not be commensurate with the small safety benefit achieved. These factors form the basis where compliance with the latest **certification specification** ~~standard~~ may be considered impractical, thereby allowing compliance with an earlier certification specification. This Appendix gives one method of determining whether compliance with a later certification specification is impractical; however, it does not preclude the use of other methods for improving the safety of aeronautical products.
- E.1.2 EASA recognises that other procedures can be used and have historically been accepted on a case-by-case basis. The acceptance of results through the use of these procedures may vary from state to state. Consequently, they may not be accepted through all bilateral certification processes. Regardless of which method is used, the process must show that a proposed **type-certification basis** **and OSD certification basis** ~~are~~ able to achieve a positive safety benefit for the overall product.
- E.1.3 Regarding impracticality, any method used must encourage the incorporation of safety enhancements that will have the most dramatic impact on the level of safety of the aircraft while considering the effective use of resources. This important point is illustrated graphically



in Figure E-1 below. This Figure notionally shows the interrelation between the total resources required for incorporating each potential safety enhancement with the corresponding net increase in safety benefit.

Figure E-1. Safety Benefits versus Resources



- E.1.4 Typically, it is found that, for impractical **type-certification basis** or **OSD certification basis** changes, there are proposals that can achieve a positive safety benefit that are resource-effective. Conversely, there are proposals that may achieve a small safety benefit at the expense of a large amount of resources to implement them. Clearly, there will be a point where a large percentage of the potential safety benefit can be achieved with a reasonable expenditure of resources. The focus of the methods used should be to determine the most appropriate certification **specifications-standards** relative to the respective incremental cost to reach this point.
- E.1.5 This Appendix provides procedural guidance for determining the material contribution to the level of safety, or the practicality of applying a certification **specification standard** at a particular amendment level to a changed product. The procedure is generic in nature and describes the steps and necessary inputs that may be used on any project to develop a position.
- E.1.6 The procedure is intended to be used, along with good engineering judgment, to evaluate the relative merits of a changed product complying with the latest certification **specifications standards**. It provides a means, but not the only means, for applicants to present their position regarding an exception under point 21.A.101(b)(3).
- E.1.7 The **applicable certification basis** for a change to a product **will not be** **must not be of an earlier level than the existing certification basis** ~~at an amendment level earlier than the existing certification basis.~~



E.2 Procedure for evaluating the material contribution or impracticality of applying the latest certification specifications to a changed product.

The following are steps to determine the material contribution or impracticality of applying a certification specification at a particular amendment level.

E.2.1 Step 1: Identify the regulatory change being evaluated.

In this step, applicants should document:

E.2.1.1 The specific certification **specification standard** (e.g. CS 25.365),

E.2.1.2 The amendment level of the **certification specification or predecessor standard in the existing certification basis** ~~for the standards~~, and

E.2.1.3 The latest amendment level of the certification specification.

E.2.2 Step 2: Identify the specific hazard that the certification specification addresses.

E.2.2.1 Each certification specification and its subsequent amendments addresses a hazard or hazards. In this step, the specific hazard(s) is (are) identified. This identification will allow for a comparison of the effectiveness of the amendment levels of the certification specification in addressing the hazard.

E.2.2.2 In many cases, the hazard and the cause of the hazard will be obvious. When the hazard and its related cause are not immediately obvious, it may be necessary to review the explanatory note (EN) and/or the impact assessment (IA) in the ED Decision by which the certification specification or its amendment was adopted. It may also be helpful to discuss the hazard with the responsible EASA team.

E.2.3 Step 3: Review the consequences of the hazard(s).

E.2.3.1 Once the hazard is identified, it is possible to identify the types of consequences that may occur due to the hazard. More than one consequence can be attributed to the same hazard. Typical examples of consequences would include but are not limited to:

incidents where only injuries occurred,

accidents where a total hull loss occurred,

accidents where less than 10 per cent of the passengers died,

accidents where 10 per cent or more passengers died, and

engine- and propeller-specific hazards.

E.2.3.2 The explanatory note (EN) and/or the impact assessment (IA) in the ED Decision may provide useful information regarding the consequences of the hazard that the certification specification addresses.

E.2.4 Step 4: Identify the historical and predicted frequency of each consequence.

E.2.4.1 Another source for determining impracticality is the historical record of the consequences of the hazard that led to a certification specification or an amendment to a certification specification. From these data, a frequency of occurrence for the hazard can be determined. It is important to recognise that the frequency of occurrence may be higher or lower in the future. Therefore, it also is necessary to predict the frequency of future occurrences.



E.2.4.2 More than one consequence can be attributed to the same hazard. Therefore, when applicable, the combination of consequences and frequencies of those consequences should be considered together.

E.2.4.3 The explanatory note (EN) and/or the impact assessment (IA) in the ED Decision may provide useful information regarding the frequency of an occurrence.

E.2.5 Step 5: Determine how effective full compliance with the latest amendment of the certification specification would be in addressing the hazard.

E.2.5.1 When each amendment is issued, it is usually expected that compliance with the certification specification would be completely effective in addressing the associated hazard for the designs and technology envisioned at the time. It is expected that the hazard would be eliminated, avoided, or mitigated. However, experience has shown that this may not always be the case. It is also possible that earlier amendment levels **of the certification specifications** may have addressed the hazard but were not completely effective. A product may also contain a design feature~~(s)~~ that provides a level of safety that approaches that of the latest certification specifications, yet is not fully compliant with the latest certification specifications. Therefore, in comparing the benefits of compliance with **a certification specification from the existing type-certification basis or OSD certification basis** to the latest amendment level **of that certification specification**, it is useful to estimate the effectiveness of both amendment levels in dealing with the hazard.

E.2.5.2 It is recognised that the determination of levels of effectiveness is normally of a subjective nature. Therefore, prudence should be exercised when making these determinations. In all cases, it is necessary to document the assumptions and data that support the determination.

E.2.5.3 The following five levels of effectiveness are provided as a guideline:

1. Fully effective in all cases. Compliance with the certification specification eliminates the hazard or provides a means to avoid the hazard completely.
2. Considerable potential for eliminating or avoiding the hazard. Compliance with the certification specification eliminates the hazard or provides a means to completely avoid the hazard for all probable or likely cases, but it does not cover all situations or scenarios.
3. Adequately mitigates the hazard. Compliance with the certification specification eliminates the hazard or provides a means to avoid the hazard completely in many cases. However, the hazard is not eliminated or avoided in all probable or likely cases. Usually this action only addresses a significant part of a larger or broader hazard.
4. Hazard only partly addressed. In some cases, compliance with the certification specification partly eliminates the hazard or does not completely avoid the hazard. The hazard is not eliminated or avoided in all probable or likely cases. Usually this action only addresses part of a hazard.
5. Hazard only partly addressed but action has a negative side effect. Compliance with the certification specification does not eliminate or avoid the hazard or may have negative safety side effects. The action is of questionable benefit.

E.2.5.4 If it is determined that compliance with the latest certification specifications does not contribute materially to the product's level of safety, applicants should skip Step 6 of this



Appendix and go directly to Step 7 to document the conclusion. If it is determined that complying with the latest amendment of the certification specification contributes materially to the product's level of safety, applicants should continue to Step 6 of this Appendix.

E.2.6 Step 6: Determine the incremental resource costs and cost avoidance.

E.2.6.1 There is always cost associated with complying with a certification specification. This cost may range from minimal administrative efforts to the resource expenditures that support full-scale testing or the redesign of a large portion of an aircraft. However, there are also potential cost savings from compliance with a certification specification. For example, compliance with a certification specification may avoid aircraft damage or accidents and the associated costs to the manufacturer for investigating accidents. Compliance with the latest amendment of a certification specification may also help a foreign authority to certify a product.

E.2.6.2 When determining the impracticality of applying a certification specification at the latest amendment level, only the incremental costs and safety benefits from complying with the existing certification basis should be considered.

E.2.6.3 When evaluating the incremental cost, it may be beneficial for applicants to compare the increase in cost of complying with the latest certification specifications with the cost of incorporating the same design feature in a new aircraft. In many cases, an estimate for the cost of incorporation in a new aircraft is provided by EASA in the regulatory impact assessment, which was presented when the corresponding certification specification was first issued. Incremental costs of retrofit/incorporation on existing designs may be higher than that for production. Examples of costs may include but are not limited to the following:

Costs

The accuracies of fleet size projections, utilisation, etc., may be different from those experienced for derived product designs and must be validated.

Labour: work carried out in the design, fabrication, inspection, operation, or maintenance of a product for the purpose of incorporating or demonstrating compliance with a proposed action. Non-recurring labour certification specifications, including training, for the applicant supporting development and production of the product, should be considered.

Capital: construction of new, modified, or temporary facilities for design, production, tooling, training, or maintenance.

Material: costs associated with product materials, product components, inventory, kits, and spares.

Operating costs: costs associated with fuel, oil, fees, training, and expendables.

Revenue/utility loss: costs resulting from earning/usage capability reductions from departure delays, product downtime, and performance loss due to seats, cargo, range, or airport restrictions.

The cost of changing compliance documentation and/or drawings in itself is not an acceptable reason for an exception.

Cost Avoidance.



Avoiding costs of accidents, including investigation of accidents, lawsuits, public relations activities, insurance, and lost revenue.

Foreign certification: conducting a single effort that would demonstrate compliance with the certification specifications of most certifying authorities, thus minimising certification costs.

E.2.7 Step 7: Document the conclusion.

With the information from the previous steps documented and reviewed, the applicant's position and rationale regarding whether complying with the latest certification specifications contributes materially to the product's level of safety or its practicality can be documented. EASA records the determination of whether the conditions for the proposed exception were met. That determination is based on the information and analysis provided by the applicant in the preceding steps. If the determination to grant the exception is based on the product's design features, those features are documented at a high level in the TCDS. Documentation in the TCDS is required so that the features are maintained during subsequent changes to the product, therefore, maintaining the product's agreed level of safety. If the results of this analysis are inconclusive, then further discussions with EASA are warranted.

E.3 **Examples of how to certify changed aircraft.**

[...]

Appendix F to GM 21.A.101 The use of service experience in the exception process

F.1 **Introduction.**

Service experience may support the application of an earlier certification specification pursuant to point 21.A.101(b)(3) if, in conjunction with the applicable service experience and other compliance measures, the earlier certification specification provides a level of safety comparable to that provided by the latest certification specification. The applicant must provide sufficient substantiation to allow EASA to make this determination. A statistical approach may be used, subject to the availability and relevance of data, but sound engineering judgment must be used. For service history to be acceptable, the data must be both sufficient and pertinent. The essentials of the process involve:

- A clear understanding of the certification specification change and the purpose for the change,
- A determination based on detailed knowledge of the proposed design feature,
- The availability of pertinent and sufficient service experience data, and
- A comprehensive review of that service experience data.

F.2 **Guidelines.**

The CRI process (either as a stand-alone CRI or included in the CRI A-01) would be used, and the applicant should provide documentation to support the following:

F.2.1 The identification of the differences between the certification specification in the existing **certification** basis and the certification specification as amended, and the effect of the change to the specification.



- F.2.2 A description as to what aspect(s) of the latest certification specifications the proposed changed product would not meet.
- F.2.3 Evidence showing that the proposed **type-certification basis and OSD certification basis** for the changed product, together with applicable service experience, relative to the hazard, provides a level of safety that approaches the latest certification specification, is not fully compliant with the latest certification specifications.
- F.2.4 A description of the design feature and its intended function.
- F.2.5 Data for the product pertinent to the requirement.
- F.2.5.1 Service experience from such data sources, such as:
- Accident reports,
 - Incident reports,
 - Service bulletins,
 - Airworthiness directives,
 - Repairs,
 - Modifications,
 - Flight hours/cycles for fleet leader and total fleet,
 - World airline accident summary data,
 - Service difficulty reports,
 - Accident Investigation Board reports, and
 - Warranty, repair, and parts usage data.
- F.2.5.2 Show that the data presented represent all relevant service experience for the product, including the results of any operator surveys, and is comprehensive enough to be representative.
- F.2.5.3 Show that the service experience is relevant to the hazard.
- F.2.5.4 Identification and evaluation of each of the main areas of concern with regard to:
- Recurring and/or common failure modes,
 - Cause,
 - Probability by qualitative reasoning, and
 - Measures already taken and their effects.
- F.2.5.5 Relevant data pertaining to aircraft of similar design and construction may be included.
- F.2.5.6 Evaluation of failure modes and consequences through analytical processes. The analytical processes should be supported by:
- A review of previous test results,
 - Additional detailed testing as required, or
 - A review of aircraft functional hazard assessments (FHA) and any applicable system safety assessments (SSA) as required.
- F.2.6 A conclusion that draws together the data and the rationale.



1. Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

F.2.7 These guidelines are not intended to be limiting, either in setting the required minimum elements or in precluding alternative forms of submission. Each case may be different, based on the particulars of the system being examined and the requirement to be addressed.

F.3 [...]

Appendix G to GM 21.A.101 Changed product rule (CPR) decision record

| CHANGED PRODUCT RULE (CPR) DECISION RECORD | |
|---|--|
| TC/STC No: Click here to enter text. | Project Number: Click here to enter text. |
| Step 1: Identify the proposed type design changes to the aeronautical product. (See paragraph 3.2 of GM 21.A.101) | The proposed type design changes are identified here or in the following document(s): Click here to enter text. |
| Note: The CRI process is used to track/document the decisions at Step 2 and Steps 5 through 8 as required. | |
| Step 2: Is the proposed type design change substantial? (See paragraph 3.3 of GM 21.A.101) | <input type="checkbox"/> Yes New Type Certificate: Proceed to point 21.A.19. Point 21.A.101 does not apply. A Certification Review Item CRI A-01 will be used to establish and document the certification basis. <input type="checkbox"/> No Proceed to Step 3. |
| Step 3: Will you use the latest certification specifications-standards? (See paragraph 3.4 of GM 21.A.101) | <input type="checkbox"/> Yes Latest certification specifications-standards : Propose a certification basis using the CSs in effect on at the date of application. Proceed to Step 8. <input type="checkbox"/> No Proceed to Step 4. |
| Step 4: Arrange changes into related and unrelated groups. (See paragraph 3.5 of GM 21.A.101) | Note: For multiple groupings, continuation of this process should be split into separate decision records. Groupings may be rationalised and recorded in separate documents: Click here to enter text. |
| Step 5: Is each related or unrelated group a significant change? (See paragraph 3.6 of GM 21.A.101) | <input type="checkbox"/> Yes Proceed to Step 6. <input type="checkbox"/> No Earlier certification specifications-standards : Propose a certification basis using the CSs in effect before the date of application but not earlier than the existing certification basis. Certification basis to be defined and documented as indicated (below). Proceed to Step 8. |
| Step 6: Prepare your Certification Basis List. (See paragraph 3.9 of GM 21.A.101) Affected Areas: | The Affected Area(s) is (are) detailed here or in the following Certification Basis List document number(s): Click here to enter text. Process and propose each applicable certification specification individually. Proceed to Step 7. |
| Not Affected Areas: | Existing certification specifications-standards : You may continue using the existing certification basis. |
| Step 7: Do the latest certification specifications-standards contribute materially to the level of safety and are they practical? (See paragraph 3.10 of GM 21.A.101) | <input type="checkbox"/> Yes Latest certification specifications-standards : Propose a certification basis using the CSs in effect on the date of application. <input type="checkbox"/> No Earlier certification specifications-standards : You may propose a certification basis using the CSs in effect before the date of application but not earlier than the existing certification basis. Certification basis defined or documented as indicated below. |
| <input type="checkbox"/> Continuation Sheet(s) Attached | Note: Several CSs may apply to each affected area, and the assessment may differ from specifications to specifications. Indicate 'Yes' if compliance with any latest certification specification(s)-standard(s) is required. Indicate 'No' only if earlier certification specification(s)-standard(s) is (are) proposed. |
| Note: You may submit a proposal for the decision in Step 7; however, EASA will make the final certification basis determination. | |
| Step 8: Ensure the proposed certification basis is adequate. (See paragraph 3.11 of GM 21.A.101) | If you deem that the certification basis is adequate, submit the proposed certification basis to EASA. If not, consult EASA. CRI A-01 may be needed to document the certification basis. |
| Certification Basis: | The certification basis is detailed here or in the following document(s): Click here to enter text. |
| Based on the information provided above, I am proposing the certification basis with the following classification for the type design change. (check one) | |
| <input type="checkbox"/> Significant, pursuant to point 21.A.101. <input type="checkbox"/> Not significant, pursuant to point 21.A.101. | |
| Click here to enter text. Printed Name/Title | Click here to enter text. Signature |
| | Click here to enter text. Date |



Appendix H to GM 21.A.101 Examples of documenting the proposed certification basis list

H.1 Example 1.

H.1.1 This optional tool may be used to establish the applicable ~~airworthiness and OSD~~ certification specifications that will become part of the type-certification ~~basis for airworthiness or~~ and OSD certification basis. For a significant change, the applicant must demonstrate compliance for the change and the area affected by the change with the certification specifications that were in effect ~~on~~ ~~at~~ the date of application. However, in some cases earlier or later certification specifications can be used, as allowed in point 21.A.101.

In addition, the applicant must demonstrate compliance with the applicable environmental protection requirements in accordance with point 21.A.101(a).

H.1.2 In order to efficiently determine and agree upon a certification basis with EASA, the following information is useful to understand the applicant's position:

H.1.2.1 The scope of the change. This includes a high-level description of the physical and functional changes and performance/functional characteristics, which are changed as a result of the physical or functional change, and the certification specifications for which compliance demonstration is required as a result of the change.

H.1.2.2 The amendment level of all the applicable certification specifications ~~and of the applicable environmental protection requirements on~~ ~~at~~ the date of application.

H.1.2.3 The proposed certification basis, including amendment levels.

H.1.2.4 Applicants who propose a certification basis that includes ~~certification specifications with~~ amendment levels earlier than what was in effect ~~on~~ ~~at~~ the date of application should include the exception as outlined in point 21.A.101 and their justification if needed.

H.1.3 Exceptions.

H.1.3.1 Unrelated changes that are not significant (point 21.A.101(b)(1)).

H.1.3.2 Not affected by the change (point 21.A.101(b)(2)).

H.1.3.3 Compliance with the certification specification would not contribute materially to the level of safety (point 21.A.101(b)(3)).

H.1.3.4 Compliance with the certification specification would be impractical (point 21.A.101(b)(3)).

H.1.4 One easy way to document the proposed ~~type~~ certification basis ~~and OSD certification basis~~ is using a tabular form as shown in ~~the~~ ~~Table~~ below.

Table H-1. Tabular Form for Documenting a Proposed ~~Type~~ Certification Basis ~~and OSD Certification Basis~~



1. Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

| CS | Certification Specification Amendment Levels | | Applicant Justification for Lower Amendment Level and Comments | Affected Area |
|----------------------------|--|----------------------------------|--|---------------|
| | Existing TCDS Amendment | Amendment at Date of Application | | |
| Subpart A – General | | | | |
| | | | | |
| Subpart B – Flight | | | | |
| | | | | |

H.1.5 Best Practices.

H.1.5.1 Account for all certification specifications, even if they are not applicable.

H.1.5.2 Mark certification specifications that are not applicable as ‘N/A’.

H.1.5.3 If more than one amendment level of the certification specifications is used depending on the area of the product, list all areas and amendment levels at each area with proper justification.

H.1.5.4 If the justification is long, provide the justification below the table and only place the certification specification reference and note in the comment field.

H.1.5.5 Include airworthiness and OSD standards required by other EU regulations (e.g. Part-26) of affected areas.

H.1.6 Environmental protection requirements

The applicant for the approval of a change should provide references to the environmental protection requirements applicable to the changed product, for example ‘Section [XX] of Chapter [XX] of Part [XX] of Amendment [XX] to Volume [XX] of Annex 16 to the Chicago Convention’.

H.2 **Example 2.**

~~Pages 129 through 135 of this Appendix contain~~ The below provides another example for documenting a proposed certification basis.



TITLE OF DESIGN CHANGE

Product Name or Change to Type Certificate [XXXX]

Proposed Certification Basis Pursuant to point 21.A.101



1. INTRODUCTION.**1.1 REFERENCE DOCUMENTS.**

| Reference | Title |
|---------------------------|---|
| [1] Point 21.A.101 | Designation of applicable certification specifications and environmental protection requirements Type-certification basis, operational suitability data certification basis and environmental protection requirements for a major change to a type-certificate |
| [2] GM 21.A.101-1B | Establishing the C certification B basis of C changed A aeronautical P products |
| [3] XXXX | Application letter |
| [4] Type Certificate YYYY | Product type -certification basis |
| [5] Document ZZZZ | Certification plan |
| [6] | |

<The above-referenced documents are examples. Each applicant should reference documents appropriate to their products and procedures.>

1.2 ACRONYMS.

| Acronym | Meaning |
|---------|--------------------------------|
| AFM | Aircraft Flight Manual |
| AMC | Acceptable Means of Compliance |
| CRI | Certification Review Item |
| ELOS | Equivalent Level of Safety |
| ESF | Equivalent Safety Finding |
| GM | Guidance Material |
| MOC | Means of Compliance |
| SC | Special Condition |
| TC | Type Certificate |

<This section constitutes a representative list of acronyms. Each applicant should provide an acronym list appropriate for their product and document.>

1.3 PURPOSE OF THE DOCUMENT.

The purpose of this document is to propose the certification basis applicable to [Product Design Change] in accordance with point 21.A.101.

<Note that this optional document is intended to be used for changes to type-certified products for which the change or a portion of the change is significant at the product level pursuant to 21.A.101. Not significant changes being accomplished concurrently with significant changes(s) would also be identified in this document.>

2. DESIGN DEFINITION.**2.1 BASELINE PRODUCT.**

The type design to be changed, which is also known as the ‘baseline product,’ is the Model Series___ (this should be a specific product configuration, such as a specific serial number or line number).

The reference product certification basis is TCDS No. [XXXX], issued on [DATE].

2.2 DESIGN CHANGE AND BASELINE PRODUCT COMPARISON SUMMARY.

<Example table where the product is an aeroplane. This is a representative set of data that may be provided by the applicant.>

| Specification | Model Series X | Model Series Y |
|---|----------------|----------------|
| Max Taxi Weight — MTW (lb) | A1 | A2 |
| Max Take-off Weight — MTOW (lb) | B1 | B2 |
| Max Landing Weight — MLW (lb) | C1 | C2 |
| Max Zero Fuel Weight — MZFW (lb) | D1 | D2 |
| Max Length (ft, in) | E1 | E2 |
| Max Height (ft, in) | F1 | F2 |
| Wing Span (ft, in) | G1 | G2 |
| Horizontal Tail Span (ft, in) | H1 | H2 |
| Fuel Capacity (gal) | I1 | I2 |
| Total Cargo Volume (ft ³) | J1 | J2 |
| Max Passenger Limit — one class seating (occupants) | K1 | K2 |
| Engine Types | L1 & M1 | L2 |
| Maximum Engine Thrust | T1 | T2 |

2.3 DESCRIPTION OF DESIGN CHANGE, GROUPING AND CLASSIFICATION.

2.3.1 SIGNIFICANT CHANGE(S).

<Describe here the stand-alone change(s) and/or change grouping(s) that are part of the proposed changed product and are proposed as significant. Include with each stand-alone change or change grouping the relevant accumulated change(s) and the applicable physical and/or functional effects. Note, the description should be detailed enough to identify why the change or change grouping is proposed as significant.>

The following group of changes is proposed as significant based on [GM 21.A.101-1, Appendix A, '[Description of Change in Appendix A]'] or [the general configuration is not retained, principles of construction are not retained, or assumptions for certification of the product to be changed do not remain valid].

Changes Related to [Title of Significant Change X]:

[Title of High-Level Change C1]

The areas of physical change are:

- [design change xx]
- [design change yy]
- [design change zz]

The areas unchanged but affected by the change are:

- [affected area aaa]
- [affected area bbb]
- [affected area ccc]

[Title of High-Level Change C2]...

2.3.2 UNRELATED NOT-SIGNIFICANT CHANGES.



<Describe here the not significant stand-alone changes or change groupings that are part of the modification but are unrelated to any of the significant changes described in paragraph 2.3.1.>

[Title of High-Level Change D1]. [Description].

<The description must be just detailed enough to serve its purpose, which is to identify why each of those changes is not significant and unrelated.>

[Title of High-Level Change D2]. [Description]...

3. IDENTIFICATION OF APPLICABLE CERTIFICATION ~~STANDARDS~~ BASIS.

3.1 PROPOSED CERTIFICATION BASIS.

Based on the effective application date, [date], under the provisions of 21.A.101, the applicable certification ~~specifications standards~~ and the applicable environmental protection requirements for the [Title of Design Change] are proposed as follows. The proposed certification basis includes exceptions to earlier amendments (reversions), deviations, special conditions, and equivalent (level of) safety findings.

3.1.1 Certification specifications effective ~~on~~ at the date of application.

Applicable certification specifications in effect on the date of the application are:

<List the applicable parts and amendment levels here.>

Example for large aeroplanes:

A. Airworthiness:

- CS-25,
- CS-AWO.

B. Operational Suitability Data:

- CS-CCD,
- CS-FCD,
- CS-MCSD (to be published),
- CS-MMEL,
- CS-SIMD.

~~C. Environmental Protection:~~

~~CS-34,~~

~~CS-36.~~

3.1.2 Point 21.A.101 exception rationale.

The completed rationale for each does not contribute materially to the level of safety (DCMLS) or impracticality exception is provided in this section.

Exception 1: ...

Exception 2: ...

3.1.3 ~~Optional~~ Certification ~~specifications~~ standards

Applicable certification specifications in effect on the date of the application are:

<List the applicable parts and amendment levels here.>



Example for large aeroplanes:

- CS 25.803, *Emergency evacuation*, Amendment 12,
- CS 25.1810, *Emergency egress assisting means and escape routes*, Amendment 17.

3.1.4 Design-related requirements from other aviation domains.

Applicable certification specifications in effect on the date of the application are:

<List the applicable parts and amendment levels here.>

Example for large aeroplanes:

- CS-ACNS Communications, Navigation and Surveillance, Initial Issue, dated 17 December 2013, Subpart D Sections 2/3.

~~CS-26.~~

3.1.5 Proposed Special Conditions.

| Special Condition (or TBD) | Title | Effective Date (or TBD) |
|----------------------------|-------|-------------------------|
| | | |

3.1.6 Equivalent Safety Findings.

| ELOS Memo No (or TBD) | Title | Applicable Standard |
|-----------------------|-------|---------------------|
| | | |

3.1.7 Deviations.

| Deviation No (or TBD) | Title | Applicable Standard | Date Issued (or TBD) |
|-----------------------|-------|---------------------|----------------------|
| | | | |

3.1.8 Elect to comply

| Elect to Comply No (or TBD) | Title | Applicable Standard | Date Issued (or TBD) |
|-----------------------------|-------|---------------------|----------------------|
| | | | |

3.1.9 Environmental protection requirements

The applicant for the approval of a change should propose the references to the environmental protection requirements applicable to the changed product, for example 'Section [XX] of Chapter [XX] of Part [XX] of Amendment [XX] to Volume [XX] of Annex 16 to the Chicago Convention'.

Example from the FAA for a FAR Part 25 aeroplane:

Proposed Certification Basis



1. Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

The certification basis is a complete extract from the applicable FAA 14 CFR part [A] and it references the certification basis [B]. Column [C] identifies the amendment level for the specific requirement on the date of application. The changed product’s certification basis is proposed in last column [D]. References to FAR sections and amendments are kept.

Example for a Part 25 aeroplane:

| [A] Requirement | Title (or subparagraph) | [B] Existing Certification Basis Amendment Level | [C] Amendment Level on Application Date | [D] Proposed Amendment for Changed Product | Applicable Area | Notes |
|--------------------|--|---|---|--|----------------------------|--|
| 25.25 | <i>Weight limits</i> | | | | | |
| | | 25-23 | 25-63 | 25-63 | Product | |
| 25.33 | <i>Propeller speed and pitch limits</i> | | | | | |
| | | N/A | 25-72 | N/A | — | Not applicable to Changed Product (Jet Aircraft) |
| 25.1309(a) | <i>Equipment, systems, and installations</i> | | | | | |
| | | 25-41 | 15-123 | 25-123 | Changed and Affected Areas | |
| | | 25-41 | 25-123 | 25-41 | Exception — Not Affected | See example 1 in section 3.1.2 |
| 25.1703 | <i>Function and installation: EWIS</i> | | | | | |
| | | N/A | 25-124 | N/A | Exception — Product | See example 2 in section 3.2.1 |

Appendix I to GM 21.A.101 Related documents

[...]

Appendix J to GM 21.A.101 Definitions and terminologies

J.1 Aeronautical product or product.

The terms ‘aeronautical product’ or ‘product’ used in this guidance material include type-certified aircraft, engines, or propellers and, for the purpose of this GM, an ETSO-authorized APU.

J.2 Assumptions used for certification.



The assumptions used for certification are the evaluations and decisions that led to the approval of the baseline product's characteristics. Examples of the product's baseline characteristics include but are not limited to the following:

- Design methodologies, methods of compliance, specifications and standards used to achieve compliance with the certification specifications making up the type-certification basis and the OSD certification basis;
- Structural, mechanical, electrical, propulsion, aerodynamic, performance, operational, and maintenance characteristics;
- Operational and flight envelopes defining the product performance and capabilities at specified masses-weights, speeds, altitudes, load factors, and centres of gravity;
- Crashworthiness;
- Role or mission;
- Airworthiness and operational limitations; or
- Pilot training, if necessary.

J.3 Baseline product.

It is an aeronautical product with a specific, defined approved configuration and certification basis that the applicant proposes to change.

J.4 Certification basis.

The combination of the:

- airworthiness-type certification specifications as provided for in point 21.B.80;
- OSD certification specifications as provided for in point 21.B.82; and
- applicable environmental protection requirements, as provided for in point 21.B.85,

and as established for the change according to point 21.A.101, as well as the:

- special conditions;
- equivalent safety findings;
- elects to comply; and
- deviations, applicable to the product to be certified.

J.5 Change.

The term 'change' refers to a change to a product type certificate (as defined in point 21.A.41) approved or to be approved under Subpart D or Subpart E (as a supplemental type-certificate) of Part 21, including a change to an STC or a change to the ETSOA for auxiliary power units (APUs) under Subpart O. A change may consist of a single stand-alone change to one TC component or several interrelated changes to different TC components (e.g. the type design, operating characteristics, OSD, environmental compatibility-protection characteristics, etc. (see point 21.A.41 and GM to 21.A.90A)).

References to 'change' include the change to the product and areas affected by the change pursuant to point 21.A.101.

J.6 Design change.

The term 'design change' refers to a change to the type design (as defined in point 21.A.31) of an aeronautical product. In the context of this document, the terms 'change to the type design', 'modification', 'design change', and 'type design change' are synonymous.



J.7 Earlier certification specifications ~~standards~~.

The certification specifications ~~or previous standards~~ in effect prior to the date of application for the change, but not prior to the **ones in the** existing certification basis.

J.8 Existing certification basis.

The certification **basis** ~~specifications or previous standards~~ incorporated by reference in the type certificate of the baseline product to be changed.

J.9 Latest certification specifications ~~standards~~.

The certification specifications in effect on the date of application for the change.

J.10 Previous relevant design changes.

Previous design changes, the cumulative effect of which could result in a product significantly or substantially different from the original product or model, when considered from the last time the latest **certification specifications ~~standards~~** were applied.

J.11 Product-level change.

A change or combination of changes that makes the product distinct from other models of the product (e.g. range, payload, speed, design philosophy). Product-level change is defined at the aircraft, aircraft engine, or propeller level of change.

J.12 Secondary change.

A change that is part of a significant physical change that does not contribute materially to the level of safety. Guidance is contained in paragraph 3.10.1.4 of this GM.

J.13 Significant change.

A change to the type certificate to the extent that it changes one or more of the following, but not to the extent to be considered a substantial change: the general configuration, principles of construction, or the assumptions used for certification. The significance of the change is considered in the context of all previous relevant design changes and all related revisions to the applicable **certification specifications ~~standards~~**. Not all product-level changes are significant.

J.14 Significant change to area.

For aircraft excepted under point 21.A.101(c) only: a change to an area is significant if the general configuration or the principles of construction in that area are not retained, or the assumptions used for the certification of that area do not remain valid.

J.15 Substantial change.

A change that is so extensive that a substantially complete investigation of compliance with the applicable certification basis is required, and consequently a new type certificate is required pursuant to point 21.A.19.

AMC1 21.A.101(e)(1)(ii) Type-certification basis, operational suitability data certification basis and applicable environmental protection requirements for a major change to a type-certificate

APPROVAL OF A MAJOR CHANGE REQUIRED AS A CORRECTIVE ACTION OF AN UNSAFE CONDITION



(a) General

Under point 21.A.3B(c)(1), when EASA has issued an airworthiness directive, the design approval holder shall propose appropriate corrective action. This corrective action might be the embodiment of a change to the type-certificate; as such, it needs to be approved by EASA in accordance with point 21.A.97.

There are continued airworthiness issues where the initial design is affected by non-compliance. Experience has shown that, for necessary practical reasons, compliance is proposed to be re-established by more than one type-certificate change, implemented in a sequential manner.

In such cases, compliance with point 21.A.97(b)(1) cannot be demonstrated until the last of the correcting changes to the type-certificate is implemented.

However, each of these sequential changes to the type-certificate that provide an 'alleviating action' (as used in GM 21.A.3B(d)(4)4.1(i) and 4.2(i)) should be permitted to be approved, to mitigate a potential unsafe condition and to maintain an adequate level of safety (according to GM 21.A.3B(d)(4) 2.5(a)).

(b) Applicability

This AMC is applicable for the approval of changes to a type-certificate that are required because:

- in-service experience reveals non-compliance with the product's type-certification basis or OSD certification basis, leading to an unsafe condition; and
- the corrective actions consist of more than one change to the type-certificate, which will be implemented in line with GM 21.A.3B(d)(4) but in a sequential manner, to restore an acceptable level of safety as soon as possible; and
- each of the correcting changes to the type-certificate contributes to the restoration of compliance with the same parts of the type-certification basis or OSD certification basis, but each change on its own does not provide full compliance at the product level.

(c) Condition for acceptance of a partial compliance demonstration

The applicable type-certification basis and OSD certification basis of a change include all parts of the type-certification basis and OSD certification basis that are affected by the change at the product level.

Under the condition of point 21.A.3B(c)(1) and as described in paragraph (b) above, point 21.A.97(b)(1) is considered fulfilled if all the following conditions are met:

1. the change to the type-certificate is demonstrated to increase the level of safety in the affected area of change; and
2. the complementing corrective actions necessary to restore full compliance with the applicable type-certification basis and OSD certification basis at the product level are identified and planned by the TC, RTC or STC holder by identifying the affected type-certification basis and OSD certification basis and referring to the complementing corrective changes. These complementing corrective changes are to be proposed to EASA for acceptance. The complementing corrective changes will be approved at a later stage, according to a timescale that is to be accepted by the Agency (see GM 21.A.3B(d)(4)); and



3. The residual non-compliance at the product level should be covered by additional mitigating means as described in GM 21.A.3B(d)(4) points 4.1(i) and 4.2(i).

~~GM No 1 to 21.A.101(g) Establishment of the operational suitability data (OSD) certification basis for changes to type certificates (TCs)~~

~~This GM provides guidance on the application of point 21.A.101(g) in order to determine the applicable OSD certification basis in accordance with points 21.A.101(a), (b), (c), (d), (e) and (f) for major changes to the OSD of type-certified aircraft.~~

~~1. Minor changes~~

~~Minor changes to the OSD are automatically outside the scope of point 21.A.101. See GM 21.A.95 for their certification basis.~~

~~2. Major changes~~

~~a. If the design change that triggered the change to the OSD constituent is classified as non-significant, the change to the OSD constituent is also non-significant.~~

~~b. If the design change that triggered the change to the OSD constituent is classified as significant, the change to the OSD constituent should comply with the latest amendment of the applicable CSs, unless the exceptions of 21.A.101(b)(3) apply or unless the OSD change can be classified as minor as per 21.A.91. The guidance of GM 21.A.101 Section 3.10 regarding the exceptions 'impractical' and 'not contributing materially to the level of safety', can be applied by analogy and as far as it is applicable to OSD changes.~~

~~c. Stand-alone changes to an OSD constituent are considered to be non-significant.~~

~~d. When a new OSD constituent is added or required to be added, it should comply with the latest amendment of the applicable CSs.~~

~~e. Reserved.~~

~~f. Reserved.~~

~~g. Point 21.A.101(c) provides an exception from the requirements of 21.A.101(a) for a change to the OSD of certain aircraft below a specified maximum weight. If an applicant applies for a change to the OSD for an aircraft (other than rotorcraft) of 2 722 kg (6 000 lbs) or less maximum weight, or for a non-turbine-powered rotorcraft of 1 361 kg (3 000 lbs) or less maximum weight, the applicant can demonstrate that the changed OSD complies with the OSD certification basis incorporated by reference in the TC. The applicant can also elect to comply, or may be required to comply, with a later amendment. See also Chapter 4 Section 4.1 (GM 21.A.101) for specific guidance on this requirement.~~

~~Note: Refer to GM No 1 to 21.A.15(d) for the applicability of the OSD to other than complex motor-powered aircraft.~~



GM1 to 21.A.112B Demonstration of capability

DEMONSTRATION OF CAPABILITY FOR SUPPLEMENTAL TYPE-CERTIFICATE (STC) CASES

See also AMC 21.A.14(b) for the details of the alternative procedures.

The following examples of major changes to type design (ref.: 21.A.91) are classified in two groups. Group 1 contains cases where a design organisation approved under Part 21 Subpart J ('Subpart J DOA') should be required, and Group 2 cases where the alternative procedure may be accepted. They are typical examples, but each STC case should be addressed on its merits and there would be exceptions in practice. This classification is valid for new STCs, not for evolution of STCs, and may depend upon the nature of the STC (complete design or installation).

| Product | Discipline | Kind of STC | Group |
|--|-----------------|--|----------------|
| [...] | | | |
| CS-23 (products where a Subpart J DOA is required for TC) | [...] | | |
| | Equipment | [...] | |
| | | Aeromedical system installations | 2 1 |
| | | [...] | |
| [...] | | | |
| CS-27 or CS-29 | All disciplines | | |
| Note: 2/1 means that an assessment of consequences in terms of handling qualities and performance may lead to classification in Group 1. | | Replacement of main rotor or tail rotor blades | 1 |
| | | Autopilot | 1 |
| | | Engine type change | 1 |
| | | GPS installation | 2 |
| | | Jettisonable overhead raft installation | 2 |
| | | Utility basket installation | 2 1 |
| | | Nose or side mount camera installation | 2 1 |
| | | Passenger access step installation | 2 1 |
| | | Protection net & handle installation (parachuting) | 2 |
| | | VIP cabin layout | 2 |
| | | Navigation system installation | 2 |
| | | Fuel boost pump automatic switch-on installation | 2 |
| | | Decrease of maximum seating capacity | 2 |
| | | Agricultural spray kit installation | 2 1 |
| | | Long exhaust pipe installation | 2 |
| | | Flotation gear installation | 2 1 |
| | | Wipers installation | 2 |
| | | Engine oil filter installation | 2 |



1. Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

| Product | Discipline | Kind of STC | Group |
|---------|---------------------|--|-------|
| | | Skid gear covering installation | 2/1 |
| | | Gutter installation (top pilot door) | 2 |
| | | Cable cutter installation | 2 |
| | | Auxiliary fuel tank fixed parts installation | 2 |
| | | Cabin doors windows replacement | 2 |
| | | Radio altimeter aural warning installation | 2 |
| | | Standby horizon autonomous power supply | 2 |
| | | Fire attack system | 2/1 |
| | | Hoisting system installation | 2/1 |
| | | External loads hook installation | 2 |
| | | Emergency flotation gear installation | 2/1 |
| | | Heating/demisting (P2 supply) | 2 |
| | General | | |
| | | Extension or introduction of new operational capabilities (e.g. NVFR, IFR, PBN, NVG, HEC, NHEC) | 1 |
| | Cabin Safety | | |
| | | Replacement of cabin door windows: | |
| | | (1) If: <ul style="list-style-type: none"> — the window is an emergency exit; or — a mechanical mechanism for latching and locking is used; or — a flight test is necessary. | 1 |
| | | (2) In all other cases. | 2 |
| | | Decrease of maximum seating capacity: | |
| | | (1) If it involves any of the following: <ul style="list-style-type: none"> — dynamic seat testing; — exceeding the seat ETSO limitations; — evaluation of rotorcraft structure, e.g. attachment to bulkhead, use of seat adapter plate; — modification of the evacuation path; — minor obstructions in the access region of the emergency exit; — exit derating; — blocking of exits; — modification of the emergency exit opening/jettisoning mechanism; — restricting access to some emergency exits for some passengers; — modifications of primary structural elements or critical parts; — modifications requiring a flight test to demonstrate compliance with CS 27.251 or CS 29.251. | 1 |
| | | (2) In all other cases. | 2 |
| | | Emergency flotation gear installation: | |
| | | (1) If it involves any of the following: | 1 |



1. Proposed amendments to the AMC and GM to Annex I
(Part 21) to Commission Regulation (EU) No 748/2012

| Product | Discipline | Kind of STC | Group |
|---------|------------|--|-------|
| | | <ul style="list-style-type: none"> — buoyancy analysis, if the alternative procedure for DOA (ADOA) holder has no experience in the domain; — modifications of primary structural elements or critical parts; — first certification of emergency flotation capability for the rotorcraft; — irregular wave testing; — modification of the location of the existing emergency flotation gear; — a flight test for in-flight deployment demonstration; — a flight test for handling qualities or performance demonstration of the undeployed and deployed emergency flotation system. | |
| | | (2) In all other cases. | 2 |
| | | Flotation gear installation: | |
| | | (1) If it involves any of the following: <ul style="list-style-type: none"> — buoyancy analysis if the alternative procedure for DOA (ADOA) holder has no experience in this domain; — modifications of primary structural elements or critical parts; — first certification of flotation capability for the rotorcraft; — modification of the location of the existing flotation gear; — a flight test for in-flight deployment demonstration; — a flight test for handling qualities or performance demonstration of the undeployed and deployed flotation system. | 1 |
| | | (2) In all other cases. | 2 |
| | | Ditching certification | 1 |
| | | HEMS installation | 1 |
| | | Life raft installation: | |
| | | (1) Life raft stowed or carried on board the rotorcraft; | 2 |
| | | (2) Life raft integrated with the rotorcraft structure and remotely deployable; | 1 |
| | | Passenger access step installation: | |
| | | (1) If it involves any of the following: <ul style="list-style-type: none"> — potential interaction with life raft or flotation deployment; — modification of primary structural elements or critical parts; — modifications that could impact the energy absorption capability of the landing gear and/or invalidate the drop | 1 |



1. Proposed amendments to the AMC and GM to Annex I
(Part 21) to Commission Regulation (EU) No 748/2012

| Product | Discipline | Kind of STC | Group |
|---------|-----------------|--|-------|
| | | test result in terms of resulting load factor or gear deformation. | |
| | | (2) In all other cases. | 2 |
| | | Protection net and handle installation (parachuting) | 2 |
| | | VIP cabin layout: | |
| | | (1) If it involves any of the following: <ul style="list-style-type: none"> — dynamic seat testing; — exceeding the seat ETSO limitations; — evaluation of rotorcraft structure; — modification of the evacuation path; — minor obstructions in the access region of the emergency exit; — exit derating; — blocking of exits; — modification of the emergency exit opening/jettisoning mechanism; — restricting access to some emergency exits for some passengers; — modifications of primary structural elements or critical parts; — modifications requiring a flight test to demonstrate compliance with CS 27.251 or CS 29.251. | 1 |
| | | (2) In all other cases. | 2 |
| | Avionics | | |
| | | Autopilot | 1 |
| | | Installation of global navigation satellite system (GNSS) equipment used as primary navigation means | 2 |
| | | Radio-altimeter aural warning installation | 2 |
| | | Installation of radio-altimeter in IFR rotorcraft | 1 |
| | | HTAWS | 1 |
| | | Installation of Mode S transponder | 1 |
| | | ADS-B Out | 1 |
| | | Installation of new integrated modular avionics (IMA) equipment | 1 |
| | | Installation of TCAS I or TAS or ADS-B In | 1 |
| | | Installation of ACAS or TCAS II | 1 |
| | | Installation of new communications equipment | 2 |
| | | Weather radar | 2 |
| | | Electronic flight bag (EFB) installed resources | 2 |
| | | Installation or modification, including relocation, of large external antenna and (only for IFR rotorcraft) of transmitting antenna | 1 |
| | | Mobile phone installations | 1 |
| | | SATCOM installation | 2 |
| | | Installations with an effective Class 3B and 4 LASER emission to the exterior (IEC 60825-1) | 1 |



1. Proposed amendments to the AMC and GM to Annex I
(Part 21) to Commission Regulation (EU) No 748/2012

| Product | Discipline | Kind of STC | Group |
|---------|---|---|-------|
| | | Cockpit voice recorder or flight data recorder | 2 |
| | | LPV/PBN | 1 |
| | | Tracking device (interface with the flight crew, avionics, new active antenna) | 2 |
| | Powerplant and Fuel | | |
| | | Fuel tank installation | 1 |
| | | Fixed elements of an auxiliary fuel tank installation: | |
| | | (1) If the demonstration of compliance with crashworthiness requirements (i.e. CS 27.952, CS 29.952) is not affected; | 2 |
| | | (2) In all other cases. | 1 |
| | | Modification of the fuel system installation, including changes of fuel lines that alter the routing | 1 |
| | | Engine oil filter installation | 2 |
| | | Change of engine type or model | 1 |
| | | Long exhaust pipe installation | 2 |
| | | Inlet barrier filter | 1 |
| | | Engine parameter displays: | |
| | | Primary displays | 1 |
| | | Additional displays for special purposes | 2 |
| | | Fire-extinguishing system | 1 |
| | Structures | | |
| | | Replacement of main rotor blades or tail rotor blades | 1 |
| | | Installation of a manual scissor cable cutter in the cabin | 2 |
| | | Fixed external wire cutter installation | 1 |
| | | Bearpaws, skis or other skid gear covering installation: | |
| | | (1) If it involves any of the following: — modification of primary structural elements or critical parts; — flight testing. | 1 |
| | | (2) In all other cases. | 2 |
| | | Gutter installation (on the top of a door): | |
| | | (1) If it involves modifications of primary structural elements or critical parts; | 1 |
| | | (2) In all other cases. | 2 |
| | Hydromechanical Systems, Flight Control Systems, Doors | | |
| | | Door modifications: | |
| | | (1) If the latching/locking mechanism or its monitoring/indication in a CS-29 rotorcraft is affected. | 1 |
| | | (2) In all other cases. | 2 |



1. Proposed amendments to the AMC and GM to Annex I
(Part 21) to Commission Regulation (EU) No 748/2012

| Product | Discipline | Kind of STC | Group |
|---------|---|--|-------|
| | | Flight control system modification | 1 |
| | | Electric landing gear installation (retraction/extension and brakes) | 1 |
| | | Hoisting system installation | 1 |
| | Environmental Systems and Icing Protection | | |
| | | Wiper installation | 2 |
| | | Heating/demisting (P2 supply) | 2 |
| | | Medical oxygen installation | 1 |
| | | Air-conditioning system installation | 2 |
| | External Installations | | |
| | | External installations with negligible impact on handling qualities, performance, vibration level or fatigue spectrum | 2 |
| | | Utility basket or cargo platform installation | 1 |
| | | Complex personnel-carrying device system (PCDS) (see CS 27.865(c), CS 29.865(c)) | 1 |
| | | Simple personnel-carrying device system (PCDS) (see AMC No 3 to CS 27.865, AMC No 2 to CS 29.865) | 2 |
| | | External load hook installation: | |
| | | (1) If: <ul style="list-style-type: none"> — the use of the hook is limited to NHEC; and — the aircraft is already certified for external carriage of NHEC loads; and — there is no increase in the already certified external load weight; and — there is no modification of primary structural elements or critical parts; and — the demonstration of compliance with crashworthiness requirements (i.e. CS 27.952, CS 29.952) is not affected. | 2 |
| | | (2) In all other cases. | 1 |
| | | Nose or side mount camera installation | 1 |
| | | External mirror installation | 1 |
| | | Agricultural spray kit installation | |
| | | (1) If: <ul style="list-style-type: none"> — the aircraft is already certified for underslung loads; and — no passengers are carried; and — flights always happen inside the safe flight area of the H/V diagram. | 2 |
| | | (2) In all other cases. | 1 |
| | | Fire attack system | 1 |



GM 21.A.133(a) Eligibility — Approval appropriate for showing conformity

APPROVAL APPROPRIATE FOR SHOWING CONFORMITY

'Appropriate' should be understood as follows:

- The applicant produces or intends to produce aeronautical products, parts and/or appliances intended for airborne use as part of a type-certificated product (this excludes simulators, ground equipment and tools).
- The applicant will be required to show a need for an approval, normally based on one or more of the following criteria:
 1. Production of aircraft, engines or propellers (except if the competent authority considers a POA inappropriate).
 2. Production of ETSO articles and parts marked EPA.
 3. Direct delivery to users, such as owners or operators, maintenance organisations, with the need for exercising the privileges of issuing Authorised Release Certificates – EASA Form 1.
 4. Participation in an international co-operation programme where working under an approval is considered necessary by the competent authority.
 5. Criticality and technology involved in the part or appliance being manufactured. Approval in this case may be found by the competent authority as the best tool to exercise its duty in relation to airworthiness control.
 6. Where an approval is otherwise determined by the competent authority as being required to satisfy the essential requirements of Annex II to the Regulation (~~EC~~ No 216/2008) (EU) 2018/1139.
- It is not the intent of the competent authority to issue approvals to manufacturing firms organisations that perform only sub-subcontracted work for main manufacturers of products and are consequently placed under their direct surveillance.
- It is not the intent of the competent authority to issue a production organisation approval to a company that fully subcontracts all its manufacturing activities. When the requested scope of work includes products, it is expected that the applicant's facilities will include the final assembly line(s) for the respective products.
- Where standard parts, materials, processes or services are included in the applicable design data (see guidance on applicable design data in GM 21.A.131) their standards should be controlled by the POA holder in a manner which is satisfactory for the final use of the item on the product, part or appliance. Accordingly, the manufacturer or provider of the following will not at present be considered for production organisation approval:
 - consumable materials
 - raw materials
 - standard parts
 - parts identified in the product support documentation as 'industry supply' or 'no hazard'
 - non-destructive testing or inspection



- processes (heat treatment, surface finishing, shot peening, etc.)

AMC1 21.A.139(d)(1) Production management system

AIRCRAFT SOFTWARE HANDLING WITHIN PRODUCTION ORGANISATIONS

(a) General

Software can be received by a POA holder from a DOA holder or another POA holder, and can be installed by the POA holder in aircraft systems and/or aircraft components. Software can also be duplicated and/or delivered to the customer by the POA holder (i.e. released with EASA Form 1).

Note 1: The term '(aircraft) software' used in this AMC refers to the software included in the type design definition of the aircraft, aircraft change or aircraft repair.

Note 2: Software described within this AMC is stored on a physical device (e.g. CD, USB device).

Note 3: This AMC also applies to the software for engines and/or ETSO parts.

The following points list the main activities related to software handling within a POA holder:

- (1) software incoming verification;
- (2) software installation and/or duplication;
- (3) software installation/duplication verification; and
- (4) software release.

Data and media authenticity and integrity need to be ensured in accordance with the applicable design data until delivery to the final customer.

Software handling within the POA needs to be documented, traceable, recorded and archived in accordance with the relevant POA procedures.

Where the software installation results in a hardware index increase, the data plate and/or label should be renewed and/or updated in accordance with the applicable design data.

(b) Software incoming verification

When the software is received by the production organisation, an appropriate incoming check should be performed in accordance with the relevant POA procedures. These incoming procedures may also need to take into account considerations stemming from Delegated Regulation (EU) 2022/1645 for the proper management of information security risks.

In the frame of this acceptance check, the POA needs to ensure that the software is clearly identified by software configuration (e.g. part number (PN) identification). If the software is available on a device (USB device, CD, etc.), this device should be identified (e.g. serial number,



version number, hologram, etc.) and examined for deterioration or damage (e.g. packing, seal, etc.).

When software is received by the POA, all necessary design data need to be available. These include, as applicable:

- loading instructions (including integrity check instructions);
- design approval for software;
- software and media identification;
- hardware and software compatibility (eligibility).

(c) Software installation and duplication

Any software in the environment of the POA should be installed in accordance with applicable design data (e.g. loading instructions, appropriate installation means, etc.). The POA should check that the software identification is correct for the specific configuration of the aircraft system or equipment ('configuration check').

The software installation process shall be accomplished in a suitable environment and with the appropriate means.

Any duplication of software should be done from the master file or the master copy (provided by the DOA). The duplication of software should be accomplished with suitable IT equipment on suitable software storage devices/media in accordance with the applicable design data.

Any software copy should be clearly identified using an appropriate tracing system.

(d) Software installation/duplication verification

The following verifications should be performed:

- verification of the software installation (e.g. check of version, built-in test equipment (BITE) test, checksum test);
- compliant operation of the system in accordance with the installation instructions (e.g. system or functional check, ground or flight acceptance test).

After each duplication process, the software should be checked for completeness and correctness in accordance with the applicable design data (e.g. checksum test, BITE test, readability check, data conformity check).

Invalid/corrupt software should be handled as non-conformity in accordance with the relevant POA procedures.

(e) Software release

Software leaving the POA environment should be accompanied by appropriate documents (e.g. EASA Form 1, installation information, etc.).



Release of the software media follows the approved POA process related to the issuance of an airworthiness release certificate.

AMC2 21.A.145(a) Resources

STAFF NUMBER AND COMPETENCE

[...]

- (d) The competence evaluation should include, where appropriate, verification that specific qualification standards have been implemented, for example, for welding, ~~for~~ non-destructive testing (NDT), etc. For example, for NDT, the European Standard EN 4179 is the relevant standard recognised by EASA.

[...]

GM 21.A.151 Terms of approval – Scope and categories

[...]

FOR PRODUCTS:

1. General area, similar to the titles of the corresponding certification codes.
2. Type of Product, in accordance with the type-certificate.

FOR PARTS AND APPLIANCES:

1. General area, showing the expertise, e.g. mechanical, metallic structure.
2. Generic type, e.g. wing, landing gear, tyres.



1. Proposed amendments to the AMC and GM to Annex I (Part 21) to Commission Regulation (EU) No 748/2012

| SCOPE OF WORK | RATING | PRODUCTS/CATEGORIES |
|---------------|------------------------|--|
| A1 | Large Aeroplanes | State types |
| A2 | Small Aeroplanes | ' |
| A3 | Large Helicopters | ' |
| A4 | Small Helicopters | ' |
| A5 | Gyroplanes | ' |
| A6 | Sailplanes | ' |
| A7 | Motor Gliders | ' |
| A8 | Manned Balloons | ' |
| A9 | Airships | ' |
| A10 | Light Sport Aeroplanes | ' |
| A11 | Very Light Aeroplanes | ' |
| A12 | Other | ' |
| B1 | Turbine Engines | ' |
| B2 | Piston Engines | ' |
| B3 | APUs | ' |
| B4 | Propellers | ' |
| B5 | Other | ' |
| C1 | Appliances: | State appliance generic types (e.g. Tyres, Altimeter, etc.) Examples include: Avionic, Com/Nav/Pulse Computer System, Aircraft/Engine/Avionic Instruments, Mechanical/Electrical/Gyroscopic/Electronic Mechanical/Hydraulic/Pneumatic |
| C2 | Parts: | State part generic types (e.g. Wing, Landing Gear, etc.) Examples include: Structural, Metallic/non-metallic Mechanical/Hydraulic/Pneumatic Electrical Electronic |
| D1 | Maintenance | State aircraft types |
| D2 | Issue of permit to fly | State aircraft types |

AMC2 21.A.163(c) Completion of EASA Form 1

[...]

EASA Form 1 Block 12 'Remarks'

Examples of conditions which would necessitate statements in Block 12 are:

- When the certificate is used for prototype purposes the following statement must be entered at the beginning of block 12:
'NOT ELIGIBLE FOR INSTALLATION ON IN-SERVICE TYPE-CERTIFICATED AIRCRAFT'.



- Re-certification of items from ‘prototype’ (conformity only to non-approved data) to ‘new’ (conformity to approved data and in a condition for safe operation) once the applicable design data is approved.

The following statement must be entered in block 12:

RE-CERTIFICATION OF ITEMS FROM ‘PROTOTYPE’ TO ‘NEW’:

THIS DOCUMENT CERTIFIES THE APPROVAL OF THE DESIGN DATA *[insert TC/STC number, revision level]*, DATED *[insert date if necessary for identification of revision status]*, TO WHICH THIS ITEM (THESE ITEMS) WAS (WERE) MANUFACTURED.

PREVIOUS RELATED CERTIFICATE IS: *[enter original tracking number]* DATED *[enter original issuance date]*

- When a new certificate is issued to correct error(s) the following statement must be entered in block 12:

‘THIS CERTIFICATE CORRECTS THE ERROR(S) IN BLOCK(S) *[enter block(s) corrected]* OF THE CERTIFICATE *[enter original tracking number]* DATED *[enter original issuance date]* AND DOES NOT COVER CONFORMITY/ CONDITION/RELEASE TO SERVICE’.

Examples of data to be entered in this block as appropriate:

- For complete engines, a statement of compliance with the applicable emissions requirements current on the date of manufacture of the engine.
- For ETSO articles, state the applicable ETSO number.
- Modification standard.
- Compliance or non-compliance with airworthiness directives or service bulletins.
- Details of repair work carried out, or reference to a document where this is stated.
- Shelf-life data, manufacture date, cure date, etc.
- Information needed to support shipment with shortages or reassembly after delivery.
- References to aid traceability, such as batch numbers.
- In the case of an engine, if the competent authority has granted an exemption from the applicable engine environmental protection requirements, the record: ‘ENGINE EXEMPTED FROM *[REFERENCE TO THE TYPE OF EMISSION]* EMISSIONS ENVIRONMENTAL PROTECTION REQUIREMENT’.

AMC1 21.A.239(d)(3) Design management system

PARTNERS AND SUBCONTRACTORS — INDUSTRY STANDARDS

Compliance with subcontractor acceptance requirements in point 21.A.239(d)(3) may be demonstrated by the use and application of the industry standard contained in the ASD-STAN technical report TR 9255, *Acceptance of supplier’s design capabilities and management of design organisation authorisations*, edition P1, dated 31 August 2022.



AMC1 21.A.303(b) Compliance with applicable requirements

INSTALLATION APPROVAL

An equipment-level approval, issued under the ETSO authorisation procedures of Subpart O, does not represent an approval for installing the respective part or appliance on a certified product. The installation approval should consider the installation aspects, the product environment, the type-certification basis, the OSD certification basis and the environmental protection requirements. Such an approval is issued following the certification procedures in Subpart B (for (restricted) type-certificates), Subpart D (changes to the (restricted) type-certificates) and Subpart E (supplemental type-certificates).

GM1 21.A.307 The eligibility of parts and appliances for installation

EASA FORM 1

EASA Form 1 is the authorised release certificate issued to an aircraft part that permits its installation in an aircraft registered in an EU Member State (or subassembly) during maintenance. The issue of this form associated with a part is established by Regulation (EU) No 748/2012 in the case of new parts and Regulation (EU) No 1321/2014 in the case of used parts.

Standard parts and certain new parts fulfilling the conditions described in point 21.A.307(b) of this Annex are exempt from requiring this form.

Some bilateral agreements signed between the European Union and a third country recognise a certificate issued in accordance with the third country regulation as equivalent to an EASA Form 1, enabling the installation of a part accompanied by the equivalent form on an aircraft registered in an EU Member State.

GM1 21.A.307(c) The eligibility of parts and appliances for installation

ACCEPTABLE DOCUMENTATION FOR CERTAIN PARTS

According to point 21.A.307(c), in order to be eligible for installation in a type-certified product, the part subject to the derogation in point 21.A.307(b) shall be accompanied by a document issued by the manufacturer of the respective part. Such a document might be issued in various ways (e.g. certificate of conformity, delivery note) but should contain the information required in point 21.A.307(c).



AMC1 21.A.606(b) Requirements for the issuance of an ETSO authorisation

DEMONSTRATION OF COMPLIANCE

A. Non-ETSO function

A non-ETSO function is a function provided by an article that is not covered by ETSO-approved minimum operational performance standards (MOPS) and does not support or affect the hosting article's ETSO function(s).

An ETSO article may host:

- (1) functions covered by the ETSO standards the applicant has applied for; and
- (2) functions not covered by any ETSO standards (non-ETSO functions).

Functions in (1) are the ETSO functions subject to the authorisation.

Functions in (2) are considered accepted (not approved) on a non-interference basis, which means that the applicant shall show that they do not detrimentally affect ETSO function performance and compliance with the standard. These functions shall be listed in the installation manual and in the declaration of design and performance (DDP).

Note: EASA will authorise articles only where the ETSO functions represent the core functions of the article.

If there are functions hosted in the article that are subject to an ETSO standard for which the applicant has not applied, one of the following two situations may exist.

- (a) The additional functions are mostly covered by an existing standard, ETSO-Cxyz, and therefore they cannot be qualified as non-ETSO functions. As a result, the applicant should also apply and show compliance with the existing standard, ETSO-Cxyz. Consequently, the functions fall under category (1) above. A 'non-ETSO' function can only be a function for which no ETSO standard exists.
- (b) They do not meet the intent of the standard, and therefore they are non-ETSO functions, falling under category (2) above.

Example: A flight data recording function embedded on an ETSO-C113 display, without any crash-protecting measure, is not required to apply ETSO-C124 or ETSO-2C197.

It should be noted that standards sometimes overlap. In such a case, the applicant is required to apply only for the most appropriate one. For example, ETSO-C201 (Attitude and Heading Reference Systems) is more stringent, and therefore more appropriate, than ETSO-C3d (Turn and Slip Instrument), ETSO-C4c (Bank and Pitch Instruments) and ETSO-C5e/C6e (Direction Instrument — stabilised). Similarly, ETSO-C106 A1 (Air Data Computer) is more stringent, and therefore more appropriate, than ETSO-C2d (Airspeed Instruments), ETSO-C8e (Vertical Velocity Instrument), ETSO-C10b (Aircraft Altimeter), ETSO-C43c (Temperature Instruments), ETSO-C46a (Maximum Allowable Airspeed Indicator Systems) and ETSO-C95a (Mach Meters).



In accepting a non-ETSO function, EASA has an acceptable means of compliance equivalent to that set out in FAA AC 21-46A, Section 5-5.

- (1) The non-ETSO functions should be declared in the certification programme, and demonstration that they cannot adversely affect the performance of the ETSO function and its compliance with the MOPS is required. Only if these are declared and demonstrated is the hosting article eligible for an ETSOA.
- (2) The requirements and performance of the non-ETSO functions are not assessed for the ETSOA, but the applicant needs to apply a development process consistent with the ETSO article and its targeted environment as a whole.

Note: Non-ETSO functions' descriptive or substantiation data that are not needed to show compliance with the ETSO MOPS are evaluated during the aircraft installation design approval (e.g. TC/STC).

- (3) The non-ETSO functions should be listed in the DDP and in the installation manual. Non-ETSO functions are considered 'accepted', in the frame of the ETSO authorisation, only on a non-interference basis, meaning that it is demonstrated and stated in the DDP that they cannot detrimentally affect the performance of the ETSO functions.

B. Incomplete ETSO article

An incomplete ETSO article is one that provides only part of the performance and/or functionality specified in the applicable ETSO.

EASA accepts applications for incomplete ETSO articles under the following conditions.

- (1) The incomplete article provides a major and independent function of that specified in the ETSO standard. There should be ETSO requirement(s) that are specific to the function that is provided (i.e. in addition to general requirements for software, airborne electronic hardware or environmental qualification). It should be possible to meet the complete ETSO requirement(s) with additional articles.

The MOPS requirements that cover the functions hosted in the ETSO article should be complete and properly identified in the certification programme.

Examples are provided below.

(a) Example of an incomplete article that contains major and independent ETSO functions: an electronic flight instrument system (EFIS) that may be used in accordance with ETSO-C4 (Bank and Pitch Instruments). The EFIS displays 'bank and pitch' information but does not include a vertical gyro. Since the EFIS constitutes a major part and independent function of the ETSO-C4 functions with specific requirements pertaining to the display, an incomplete ETSOA to ETSO-C4 may be granted.

(b) Example of an incomplete article that contains no major and independent ETSO functions: a cooling fan for a global positioning system under ETSO-C196 (Airborne Supplemental Navigation Sensors for Global Positioning System Equipment Using Aircraft-Based



Augmentation). Since the cooling fan does not constitute a major part of the ETSO-C196 functions, no partial ETSOA can be granted.

(2) The ETSO MOPS specifically provide appropriate and adequate standards for evaluation of the article as an incomplete article. The ETSO compliance report must identify and show compliance with all the specific performance requirements in the ETSO standard that are applicable to the incomplete article.

(3) Installation drawings and/or installation manuals must contain detailed instructions and limitations for the installation and use of the incomplete article. For example, company 'ABC' manufactures — under ETSO-C119 (Airborne Collision Avoidance System II (ACAS II) Version 7.1 with Hybrid Surveillance) — a traffic alert and collision avoidance system (TCAS) antenna with an interface that is interoperable with a company 'XYZ' model '123' TCAS computer. The installer must substantiate the interoperability when showing compliance with the applicable airworthiness requirements.

(4) The DDP and the installation manual shall list the specific MOPS that the article meets.

This should be provided by referencing the specific paragraphs (a single reference to a parent paragraph and all its subparagraphs can frequently be used). This information will assist the installer of the ETSO article in knowing the limitations of the article's capabilities.

AMC1 21.A.606(d) Declaration requirements for the issuance of an ETSO authorisation

DECLARATION

The related declaration should confirm that compliance with the applicable ETSO is successfully demonstrated and that all the assumptions, constraints, deviations, limitations, and open problem reports that are relevant for ~~the approval of~~ the installation are defined for both the ETSO and the non-ETSO functions.

Additionally, the applicant should demonstrate and declare that the non-ETSO functions do not interfere with the ETSO functions.

The above declaration should be included in the Declaration of Design and Performance (see point 21.A.608 and AMC1 21.A.608).

Note: An equipment level approval, issued under the ETSO authorisation procedures of Subpart O, does not represent an approval for installing the respective part or appliance on a certified product. The installation approval should consider the installation aspects, the product environment, the type-certification basis, the OSD certification basis and the environmental protection requirements. Such an approval is issued following the certification procedures in Subpart B (for (restricted) type-certificates), Subpart D (changes to the (restricted) type-certificates) and Subpart E (supplemental type-certificates).



AMC1 21.A.608 Declaration of Design and Performance (DDP)

Note 1: If certain sections of the DDP are not applicable for the ETSO article in question, please state 'N/A' in those sections (but keep the section numbering).

Note 2: The DDP template has been designed with consideration of the possibility that the ETSOA applicant/holder is different from the manufacturer. If this is not the case, Section 1 may be simplified, with just the single entity being stated.

STANDARD FORM

Declaration of Design and Performance

DDP No.

ISSUE No.

Date:

1. Name and address of ~~manufacturer~~ the ETSOA applicant/holder.

Name and address of the manufacturer, if different from the ETSO applicant/holder.

2. Description and identification of article including:

Article designation:

Model/Type No:

~~Modification Standard~~

~~Master drawing record~~

~~Weight and overall dimensions~~

Part number(s):

(including eventual provision for minor changes, modification standard if any)

Note: When several articles constitute the approved part, the part number of each article should be listed. In particular, for articles embedding software for which the configuration is not set by the hosting hardware part number, the software loadable part number(s) should be identified. A compatibility matrix or equivalent information should be provided showing the authorised configurations.

When the part number includes open brackets, the DDP should also list the individual approved part numbers covered by the open brackets. The DDP should address the performance of these individual part numbers.

- ~~3. Specification reference, i.e., ETSO No. and Manufacturer's design specification.~~

3. List of ETSO functions and non-ETSO functions (when present).

Identification of the article functions, making clear the distinction between the ETSO functions and the non-ETSO functions.



~~4. The rated performance of the article directly or by reference to other documents.~~

4. Specification reference, (i.e. ETSO standard and applicable CS-ETSO amendment and/or the aircraft manufacturer design specification, if applicable).

ETSO-.....

~~5. Particulars of approvals held for the equipment.~~

5. Master drawing reference:

Note: Optionally add article marking drawing reference, if not already specified in the certification programme.

~~6. Reference to qualification test report.~~

6. The rated performance of the article directly or by reference to other documents.

Equipment type, class, etc.

Weight and overall dimensions

Limits of accuracy of measuring instruments

~~7. Service and Instruction Manual reference number.~~

7. A statement of the assumed failure condition classification used as a design input (see CS-ETSO Subpart A).

~~8. Statement of compliance with the appropriate ETSO and any deviations therefrom.~~

8. A statement of the software level(s) used (or 'None' if not applicable), along with the applicable development assurance standards and/or other means of compliance with their version.

(Note: For Software levels (software development assurance levels (DAL)) are those define in the industry document referred in the latest edition of AMC 20-115) and applicable standard, refer to CS-ETSO subpart A)

For those articles containing software, and as required per the software standard, references to:

- plan for software aspects of certification;
- software configuration index;
- software accomplishment summary.

~~9. A statement of the level of compliance with the ETSO in respect of the ability of the article to withstand various ambient conditions or to exhibit various properties.~~

The following are examples of information to be given under this heading depending on the nature of the article and the specifications of the ETSO.

(a) Environmental Qualification

i. Temperature and Altitude

ii. Temperature Variation

iii. Humidity

iv. Operational Shocks and Crash Safety

v. Vibration



- ~~vi. — Explosion-Proofness~~
- ~~vii. — Waterproofness~~
- ~~viii. — Fluids Susceptibility~~
- ~~ix. — Sand and Dust~~
- ~~x. — Fungus Resistance~~
 - ~~xi. — Salt Spray~~
 - ~~xii. — Magnetic Effect~~
 - ~~xiii. — Power Input~~
 - ~~xiv. — Voltage Spike~~
 - ~~xv. — Audio Frequency Conducted Susceptibility – Power Inputs~~
 - ~~xvi. — Induced Signal Susceptibility~~
 - ~~xvii. — Radio Frequency Susceptibility (Radiated and Conducted)~~
 - ~~xviii. — Emission of Radio Frequency Energy~~
 - ~~xix. — Lightning Induced Transient Susceptibility~~
 - ~~xx. — Lightning Direct Effects~~
 - ~~xxi. — Icing~~
 - ~~xxii. — Electrostatic Discharge~~
 - ~~xxiii. — Fire, Flammability~~

~~(Note: The manufacturer should list environmental categories for each of the sections of the issue of EUROCAE ED-14/RTCA DO-160 that was used to qualify the article.)~~

- ~~(b) — For radio transmitters the transmitting frequency band, maximum transmitting power, and emission designator.~~
- ~~(c) — Working and ultimate pressure or loads.~~
- ~~(d) — Time rating (e.g., continuous, intermittent) or duty cycle.~~
- ~~(e) — Limits of accuracy of measuring instruments.~~
- ~~(f) — Any other known limitations which may limit the application in the aircraft e.g., restrictions in mounting attitude.~~

9. For airborne electronic hardware, a statement of design assurance level for the complex hardware used, or 'None', if not applicable, along with the applicable development assurance standards and/or other means of compliance with their version.

Note: For design assurance levels, refer to CS-ETSO Subpart A.

For those articles containing complex electronic hardware, as required by the airborne electronic hardware standard, references to:

- plan for hardware aspects of certification;
- hardware configuration index;



— hardware accomplishment summary.

~~10. A statement of the software level(s) used or 'None' if not applicable.~~

~~{Note: Software levels (software development assurance levels (DAL)) are those defined in the industry document referred in the latest edition of AMC 20-115}~~

10. Any other known limitations (including open problem reports for SW and AEH) that may limit the application on the aircraft, for example restrictions in mounting attitude or non-compliance with the article specification, or installation limitation.

Note 1: If the ETSO article has no limitations, this should be explicitly stated (i.e. 'None') in this section.

Note 2: For software and airborne electronic hardware, the open problem report's description should follow the applicable guidelines (as introduced in ED-94C DP #9).

~~11. A statement of design assurance level for complex hardware or a statement indicating whether complex hardware is embedded or not in the product.~~

~~{Note: Complex hardware design assurance levels are those defined in the applicable issue of EUROCAE ED-80/RTCA DO-254.}~~

11. Deviations from ETSO standard(s) (if applicable).

Note 1: Deviations that have already been published should be referenced with their publication number (such as 'Deviation ETSO-Cxxx#yy published in ETSO.DevP.zz').

Note 2: If the ETSO article has no deviation from the ETSO standard, this should be explicitly stated (i.e. 'None') in this section.

~~12. The declaration in this document is made under the authority of~~

12. A statement of the level of compliance of the article with the ability to withstand various environmental conditions, in the form of an environmental qualification form.

With a reference to the environmental qualification test plan and report(s) (refer to EUROCAE ED-14/RTCA document DO-160).

13. For radio transmitters the transmitting frequency band, maximum transmitting power, and emission designator (European Telecommunications Standards Institute (ETSI) or US Federal Communications Commission (FCC)).

14. Approvals held for the article

(i.e. foreign TSO authorisations, initial approval, other non-airworthiness certification approval).

15. Reference to the certification programme for the article, with identification of the deviations from the certification programme.

16. Reference to ETSO compliance reports (compliance matrix, test plans/reports, other qualification reports).



17. Reference to the safety documents (failure mode effect analysis, single event effects analysis, system safety analysis) relevant to the article.

18. Service and instruction, installation, maintenance and operation manuals reference number (CMM, IM, OM).

19. It is hereby declared that:

(a) the article(s) described in this document has been designed in compliance with Part 21, Subpart O (reference: 21.A.605(a)(2));

(b) in accordance with the certification programme, the article(s) comply(ies) with the referenced applicable ETSO standard(s) (reference: 21.A.605(a)(3));

— without limitations / with the limitations listed in Section 9;

— without deviations / with the deviations listed in Section 10;

— the non-ETSO functions listed in Section 11 do not interfere with the ETSO functions.

(c) no feature or characteristic (including non-ETSO functions) has been identified that may make the article unsafe for the uses for which certification is requested (reference: 21.A.606(d)).

~~The~~This declaration ~~in this document~~ is made under the authority of

.....(~~name of manufacturer~~) (name of ETSOA applicant/holder)

(~~Manufacturer's name~~) (Name of ETSOA applicant/holder) cannot accept responsibility for equipment used outside the limiting conditions stated above without their agreement.

Date:Signed.....(~~Manufacturer's name~~) Authorised representative of ETSOA applicant/holder; alternative procedure for DOA reference number)

GM 21.A.719 Transfer of a permit to fly

Except for permits to fly issued under 21.A.701(a)(15), like aircraft without TC holder, a permit to fly is issued based upon the applicant's declaration of many aspects of the proposed flight or flights, some of which are specific to the applicant. Accordingly, the basis upon which a permit to fly has been issued



necessarily is no longer fully in place when the holder of a permit to fly changes, ownership changes, and/or there is a change of register. Such changes necessitate a new application under 21.A.707.

For permits to fly issued under point 21.A.701(a)(15) where ownership of an aircraft has changed, unless there is a change to the configuration of the aircraft that invalidates the permit to fly or flight conditions, the permit to fly and the related approved flight conditions remain valid and the permit to fly should be transferred to the new owner.

The transfer of the permit to fly, when possible (see above), includes a transfer of the obligations in accordance with point 21.A.727.

The flight conditions are linked with the specific aircraft serial number(s) and therefore do not have a holder and are not subject to transfer. In addition, there are no direct obligations linked with a flight conditions approval. The permit-to-fly holder has the obligation to ensure that the flight conditions are met.



AMC1 21.A.807(a) Identification of ETSO articles

(a) Manufacturer name and address

An ETSO authorisation applicant/holder may demonstrate their production capability not by holding a production organisation approval (POA) but by establishing an agreement under point 21.A.2 with a different legal entity that holds a POA.

In such a case, the ETSO article marking should include both companies' names and addresses.

(b) Electronic marking

Electronic marking is an alternative to physical marking for electronic hardware articles. Through this marking method, the identification information is embedded within the electronic hardware component itself (using software).

For EASA to accept electronic marking, the following conditions should be observed:

- the identification information is readily accessible without the use of special tools or equipment;
- the identification information is stored in non-volatile memory;
- the electronic identification system is verifiable on board the aircraft, when the aircraft is on the ground at any geographical location; and
- the electronic identification system provides the specific information required by point 21.A.807(a).

(c) Marking of incomplete ETSO articles

For conditions to accept an application for ETSO authorisation for an incomplete article, refer to AMC1 21.A.606(b).

When not obvious from the component, the ETSOA article should be permanently and legibly marked with at least 'INCOMP' adjacent to the ETSO number marking (e.g. 'ETSO-C69c INCOMP') and include detailed instructions in the installation drawings or installation manual. Marking an article 'INCOMP' or 'Incomplete' will eliminate ambiguity about the article's level of compliance.

GM 21.B.80 Type-certification basis for a type certificate (TC) or restricted type certificate (RTC)

1. [...]
2. [...]
3. [...]



4. [...]
5. [...]
6. SPECIAL CONDITIONS (see point 21.B.75)

EASA may also prescribe special conditions in accordance with point 21.B.75. Guidance on special conditions is provided in GM 21.B.75.

Note: When prescribing special conditions, EASA will also review the special conditions already published and establish their applicability to the new product.

GM 21.B.82 Operational suitability data (OSD) certification basis for an aircraft type certificate (TC) or restricted type certificate (RTC)

[...]

5. ALTERNATIVE MEANS OF COMPLIANCE (see point 21.B.82(a)(23))

If the intent of the CSs defined in point 21.B.82(a) cannot be met, EASA may accept mitigating factors to the CSs, provided that the safety objective is met.

In the case of a TC, the alternative means should provide a demonstration of compliance with the essential requirements for airworthiness laid down in Annexes II, IV and V to Regulation (EU) 2018/1139.

In the case of an RTC, the alternative means should provide a sufficient level of safety for the intended use.

Note: 'Alternative means of compliance' should not be confused with 'AMC'.

[...]



AMC 21.B.100(a) and 21.A.15(b)(6) Level of involvement (LoI) in a certification project for a type certificate (TC), a major change to a TC, a supplemental type certificate (STC), a major repair design or European technical standard order (ETSO) authorisation for an auxiliary power unit (APU)

1. [...]

2. Background

The applicant has to submit a certification programme for their compliance demonstrations in accordance with point 21.A.15(b). The applicant has to break down the certification programme into meaningful groups of compliance demonstration activities and data, hereinafter referred as 'CDIs', and provide their proposal for EASA's LoI.

The applicant should also indicate the EASA panel(s) that is (are) affected by each CDI.

This AMC explains:

- (a) how to propose EASA's LoI for each CDI as per points 21.A.15(b)(6), 21.A.93(b)(3)(iii), 21.A.432C(b)(6) as well as 21.A.113(b); and
- (b) how EASA will determine its LoI on the basis of the criteria established in point 21.B.100.

EASA will review the proposal and determine its LoI. Both parties, in mutual trust, should ensure that the certification project is not delayed through the LoI proposal and determination.

Additionally, in accordance with point 21.A.20, the applicant has the obligation to update the certification programme, as necessary, during the certification process, and report to EASA any difficulty or event encountered during the compliance demonstration process which may require a change to the LoI that was previously notified to the applicant.

In such a case, or when EASA has other information that affects the assumptions on which the LoI was based, EASA will revisit its LoI determination.

In accordance with points ~~21.A.33, 21.A.447 and 21.A.615~~ **21.A.9**, irrespective of the LoI, EASA has the right to review any data and information related to compliance demonstration.

Note: This AMC should not be considered ~~to be~~ interpretative material for the classification of changes or repairs.

3. [...]

3.1. [...]

3.2. [...]

3.3. Criticality

[...]

The potential impact of a non-compliance within a CDI should be classified as critical if, for example:



- a function, component or system is introduced or affected where the failure of that function, component or system may contribute to a failure condition that is classified as hazardous or catastrophic at the aircraft level, for instance for ‘equipment, systems and installations’, e.g. where applicable as defined in 2X.1309;
- a CDI has an appreciable effect on the human–machine interface (HMI) (displays, approved procedures, controls or alerts);
- airworthiness limitations or operating limitations are established or potentially affected;
- a CDI is affected by an existing airworthiness directive (AD), or affected by an occurrence (or occurrences) potentially subject to an AD, a known in-service issue or by a safety information bulletin (SIB); ~~or~~
- a CDI affects parts that are classified as critical as per CS 27.602/29.602, CS-E 515, or that have a hazardous or catastrophic failure consequence (e.g. a principal structural element as per CS 25.571); ~~or~~
- the installation or activation of, or a change to, a function, component or system that, when subjected to an intentional unauthorised electronic interaction (IUEI) with that function, component or system, may contribute to a condition that has an adverse effect on the safety at the aircraft level.

If the classification of the potential impact of a non-compliance within a CDI as critical is based on the criterion that the CDI is affected by an AD, then the impact of a non-compliance within that CDI may be reclassified by EASA as non-critical due to the involvement of EASA in the continued-airworthiness process.

[...]

3.45. Determination of EASA’s Lol

[...]

EASA’s Lol is reflected in a list of activities and data, in which EASA retains the verification of compliance demonstration (e.g. review ~~and acceptance~~ of compliance data, witnessing of tests, etc.), as well as the depth of the verification. The depth of the verification for individual compliance reports, data, test witnessing, etc., may range from spot checks to extensive reviews. EASA always responds to those retained compliance demonstration activities and data with corresponding comments or a ‘statement of no objection’.

[...]

By default, the following activities require EASA’s involvement in all cases:

- initial issues of, and changes to, a flight manual (for those parts that require EASA approval and that do not fall under the DOA holder’s privilege);
- classification of failure cases that affect the handling qualities and performance, when ~~performed~~ through test (in flight or in a simulator); and
- initial issues of, and non-editorial changes to, airworthiness limitations.

If the risk assessment (Steps 1 and 2 above) is made on the level of a compliance demonstration activity or on the level of a document, the risk class provides an indication for the depth of the involvement, i.e. the verification may take place only for certain compliance data within a compliance document.

4. [...]

5. [...]



AMC ~~No 2 to~~ 21.B.100(b) Level of involvement (LoI) in European technical standard order authorisation (ETSOA) projects

[...]

1. Principles

[...]

2. Determination of EASA's LoI

[...]

To every LoI class corresponds a list of activities that govern EASA's involvement. By means of these activities, EASA verifies the demonstration of compliance (e.g. by document review **and acceptance**, test witnessing, sampling on the applicant's site, desktop assessments, etc.).

The ETSO applicant is responsible for providing a complete ETSO certification data package.

[...]

3. The process of determining EASA's LoI

[...]

Note: For a minor change, this process does not apply; in that case, EASA's **LoI review** consists of an assessment of the minor change classification, an update of the certificate, and, when needed, an assessment of the DDP **and all affected compliance documents**.

GM1 21.B.433(d) Findings and corrective actions; observations

EXTENSION, ESCALATION AND DE-ESCALATION OF FINDINGS

Findings can be extended, escalated from level 2 to level 1 and de-escalated from level 1 to level 2 under certain prerequisites:

(a) Only level 2 findings can be extended based on an agreed corrective action plan. Such findings can be extended more than once when the competent authority agrees to an updated corrective action plan.

(b) Level 2 findings should be escalated to level 1 findings when the prerequisites of point 21.B.433(d)(2)(iii) apply, i.e. when the organisation fails to submit an acceptable corrective action plan, or fails to perform the corrective action within the time period accepted or extended by the competent authority.

(c) Level 1 findings can be de-escalated to level 2 findings in the following cases:

(1) Ref. point 21.B.433(b): The nature of the non-compliance is no longer uncontrolled and potentially unsafe. Further actions needed to fully correct the non-compliance can then



be governed under a level 2 finding with appropriate change of deadline and under a corrective action plan acceptable to the competent authority.

(2) Ref. point 21.B.433(b)(1): Not applicable.

(3) Ref. point 21.B.433(b)(2): Not applicable.

(4) Ref. point 21.B.433(b)(3): Not applicable.

(5) Ref. point 21.B.433(b)(4): The head of the design organisation acceptable to the competent authority has been appointed, but for example procedures need to be updated to properly reflect the required appointment process and criteria.

(6) Ref. point 21.B.433(d)(2)(iii):

(i) For not submitting a corrective action plan acceptable to the competent authority:

The organisation submitted a corrective action plan acceptable to the competent authority.

(ii) For the failure to perform the corrective actions within the time period accepted by the competent authority:

The subsequent performance of these corrective actions would close the level 1 finding or an updated corrective action plan acceptable to the competent authority would allow for de-escalation to a level 2 finding.

Note: The de-escalation of level 1 findings is specific to DOA holders as the applicable requirement imposes a strict timeframe for addressing the level 1 finding (i.e. 21 working days). Consequently, keeping a finding at level 1, even if the conditions for level 1 classification no longer exist, may affect proper implementation of further corrective and preventive actions requiring a longer implementation period.

