

AMC and GM to Part 21 Issue 2 Change Information

1. Introduction

The Agency has adopted issue 2 of 'AMC and GM to Part 21' by ED Decision 2012/020/R of 30 October 2012 as a clean version consolidating the initial issue of 'AMC and GM to Part 21' of 17 October 2003 and all the changes adopted by the Agency since the initial issue. It also includes additional changes triggered by the publication of the new recast of Part 21 in Regulation (EU) No 748/2012. All changes are listed and explained in the Explanatory Note to ED Decision 2012/020/R.

As an additional service to the readers this change information has been produced which makes visible all the changes in the AMC/GM that were introduced after the last amendment of the AMC/GM to Part 21 (Amending Decision No 2011/010/R of 1 December 2011).

However, considering the different nature of the changes (changes of substance versus editorial/formal changes), the Agency does not consider practical to highlight all the changes the way it normally does. The editorial changes as well as some formal changes of no relevance to the technical content are repetitive and their highlighting would only worsen the readability of the text. Therefore such changes are only presented in the introductory part below before the actual text of 'AMC and GM to Part 21' starts.

2. Changes which are not highlighted

2.1 Editorial changes for consistency with Regulation (EU) No 748/2012

The following editorial changes were introduced for consistency with the Commission Regulation (EU) No 748/2012:

Old	New
21A.xx 21B.yy	21.A.xx 21.B.yy
Competent Authority	competent authority
Special Conditions	special conditions
Aircraft Flight Manual	aircraft flight manual
Part-21	Part 21

2.2 Other editorial and grammatical corrections

Several spelling corrections and grammatical improvements were made such as:

- Introducing a hyphen in words as necessary (e.g. 'on-going' instead of 'ongoing');
- Replacing American English spelling by UK English (e.g. 'aeroplane' instead of 'airplane');
- Proper use of capital letters versus small case;
- Replacing double quotation marks by single

2.3 Formatting

The formatting of the document was improved for internal consistency.

3. Highlighted changes

3.1 Changes linked to the four Agency Opinions incorporated in Regulation 748/2012

See explanatory note.

3.2 Terminology changes for consistency with Regulation (EU) No 748/2012

The following formal changes were introduced for consistency with the Commission Regulation (EU) No 748/2012:

Old	New
(airworthiness) requirements	certification specifications
show, showing	demonstrate, demonstration, demonstrating
Basic Regulation	Regulation (EC) No 216/2008
(sub-)paragraph	point
Regulation (EC) No 1702/2003	Regulation (EU) No 748/2012

3.3 Other changes of substance

1. References to AMC 20-6 ('ETOPS') were replaced by a reference to 'the latest edition of AMC 20-6 (see AMC-20 document)';
2. References to AMC 20-8 ('occurrence reporting') were replaced by a reference to 'the latest edition of AMC 20-8 (see AMC-20 document)';
3. Certification terminology is brought in line with the EU regulatory structure; e.g. no more use of the word 'exemption';
4. References to EUROCAE ED12 and RTCA DO-178 'Software considerations in airborne systems and equipment certification' were replaced by a reference to AMC 20-115 which always refers to the relevant editions of the EUCORAE and RTCA documents;
5. In GM 21.A.101 some terminology is adjusted to the EU regulatory structure; e.g. 'later amendment' replaced by 'latest certification specifications';
6. GM 21.A.101 is aligned with the latest text of Part 21.A.101 resulting from Opinion No 01/2009. In addition various errors in the example tables were corrected.
7. The arrangement sample form of AMC No. 2 to 21.A.122 is aligned with the same form in AMC No. 2 to 21.A.133(b) and (c);
8. GM 21.A.131 is aligned with the new text of the instructions for the use of EASA Form 1 paragraph 1.3, Appendix I to Annex I – Part-21;
9. References to the EASA Form 4 have been adjusted to link to the right place on EASA website;
10. In GM 21.A.151 the scope of work table was amended to include 'A10 Light Sport Aeroplanes';
11. GM 21.A.263(c)(6) was adjusted to reflect the new text of Part 21A.263(c)(6) which was changed to extend the DOA privilege to approve flight conditions for permit to fly to include first flight of new types or modified types;
12. Headings of forms were amended to better reflect the status of competent authorities versus the Agency;
13. Form 56 was amended to reflect the changes in the regulation and to clarify that the form also applies in case of a significant change to the organisation.

4. AMC/GM to Part 21 with highlighted changes

In the following part the full text of issue 2 of 'AMC and GM to Part-21' is reproduced in which all the text changes as described under paragraph 3 above are highlighted as follows:

Deleted text has a different colour and is shown with a strike through: ~~deleted~~

New text has a different colour and is underlined: new

AMC and GM to Part 21

Acceptable Means of Compliance and Guidance Material

**for the airworthiness and environmental certification of aircraft
and related products, parts and appliances, as well as for the
certification of design and production organisations**

Issue 2

30 October 2012

Log of amendments

Amending Decisions

Amd. No.	Decision	Effective date
AMC & GM to Part 21	Decision No. 2003/1/RM of the Executive Director of the Agency of 17 October 2003	17-10-2003
AMC & GM Part 21/1	Decision No. 2006/13/R of the Executive Director of the Agency of 20 December 2006	27-12-2006
AMC & GM Part 21/2	Decision No. 2007/008/R of the Executive Director of the Agency of 2 April 2007	03-04-2007
AMC & GM Part 21/3	Decision No. 2007/006/R of the Executive Director of the Agency of 4 April 2007	05-04-2007
AMC & GM Part 21/4	Decision No. 2007/012/R of the Executive Director of the Agency of 22 November 2007	29-11-2007
AMC & GM Part 21/5	Decision No. 2009/011/R of the Executive Director of the Agency of 24 August 2009	31-08-2009
AMC & GM Part 21/6	Decision No. 2010/001/R of the Executive Director of the Agency of 23 March 2010	30-03-2010
AMC & GM Part 21/7	Decision No. 2010/016/R of the Executive Director of the Agency of 16 December 2010	23-12-2010
AMC & GM Part 21/8	Decision No. 2011/006/R of the Executive Director of the Agency of 19 August 2011	26-08-2011
AMC & GM Part 21/9	Decision No. 2011/010/R of the Executive Director of the Agency of 1 December 2011	08-12-2011

Note: This consolidated version of 'AMC an GM to Part 21'(Annex 1 to Decision No 2012/020/R) incorporates also changes necessary to align this Agency Measure with Regulation (EU) 748/2012 of 3 August 2012. For details see the Explanatory Note to the above Decision.

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TERMINOLOGY

For information purposes:

The “Basic Regulation” means Regulation (EC) No 1592/2002 of 15 July 2002.

“Certification Specifications” (CS) refers when used in the text to the airworthiness codes and associated acceptable means of compliance developed by the Agency in accordance with Articles 13(b) and 14.2(a) of the Basic Regulation.

“Acceptable Means of Compliance” (AMC) illustrate a means, but not the only means, by which a requirement contained in an airworthiness code or an implementing rule can be met.

“Guidance Material” (GM) helps to illustrate the meaning of a requirement.

“Competent Authority” should be understood in accordance with 21.1 (see Part 21).

SECTION A

Subpart A — General

AMC No 1 to 21.A.3A(a) Collection, investigation and analysis of data related to Flammability Reduction Means (FRM) reliability

Holders of a type-certificate, restricted type-certificate, supplemental type-certificate ~~and of~~ any other relevant approval deemed to have been issued under Part 21 and which have included a FRM in their design should assess on an on-going basis the effects of aeroplane component failures on FRM reliability. This should be part of the system for collection, investigation and analysis of data required by 21.A.3A(a). The applicant/holder should do the following:

- (a) Demonstrate effective means to ensure collection of FRM reliability data. The means should provide data affecting FRM reliability, such as component failures.
- (b) Unless alternative reporting procedures are approved by the Agency, provide a report to the Agency every six months for the first five years after service introduction. After that period, continued reporting every six months may be replaced with other reliability tracking methods found acceptable to the Agency or eliminated if it is established that the reliability of the FRM meets, and will continue to meet, the exposure specifications of paragraph M25.1 of Appendix M to CS-25.
- (c) Develop service instructions or revise the applicable aeroplane manual, according to a schedule approved by the Agency, to correct any failures of the FRM that occur in service that could increase any fuel tank's Fleet Average Flammability Exposure to more than that specified by paragraph M25.1 of Appendix M to CS-25.

[Decision 2009/011/R, 24.8.2009]
[Decision 2010/016/R, 16.12.2010]

AMC No 2 to 21.A.3A(a) Collection, investigation and analysis of data related to ETOPS significant occurrences

- (1) Holders of a type-certificate, restricted type-certificate, supplemental type-certificate or any other relevant approval deemed to have been issued under Part 21 and which includes extended range operation with two-engined aeroplane (ETOPS) capability should implement a specific tracking, reporting and resolution system for ETOPS significant occurrences, suitable to ensure the initial and continued fleet compliance with the applicable ETOPS reliability objectives. This system should be part of the system for collection, investigation and analysis of data required by 21.A.3A(a).

Appropriate coordination should exist between engine TC holder, propeller TC holder and APU ETSO ~~approval~~ authorisation holder with the aircraft TC holder to ensure compliance with the ETOPS reliability objectives.

- (2) For tracking, reporting and resolution of ETOPS significant occurrences refer to EASA the latest edition of AMC 20-6 (see AMC-20 document).

[Decision 2010/016/R, 16.12.2010]

GM 21.A.3A(a) The system for collection, investigation and analysis of data

In the context of this requirement the word 'Collection' means the setting up of systems and procedures which will enable relevant malfunctions, failures and defects to be properly reported when they occur.

GM 21.A.3A(b) Occurrence reporting

For occurrence reporting, refer to the latest edition of AMC 20-8, in (see AMC-20 document).

AMC 21.A.3A(b)(2) Reporting to the Agency

Within the overall limit of 72 hours the degree of urgency for submission of a report should be determined by the level of hazard judged to have resulted from the occurrence.

Where an occurrence is judged by the person identifying the possible unsafe condition to have resulted in an immediate and particularly significant hazard the Agency (or the competent authority of the Member State as required) expects to be advised immediately and by the fastest possible means (telephone, fax, email, telex, etc.) of whatever details are available at that time. This initial report must be followed up by a full written report within 72 hours. A typical example would be an uncontained engine failure resulting in damage to aircraft primary structure.

Where the occurrence is judged to have resulted in a less immediate and less significant hazard, report submission may be delayed up to the maximum of three days in order to provide more details.

GM 21.A.3B(d)(4) Defect correction – Sufficiency of proposed corrective action

This GM provides guidelines to assist in establishing rectification campaigns to remedy discovered defects.

1. STATUS

This document contains GM of a general nature for use in conjunction with engineering judgement, to aid airworthiness engineers in reaching decisions in the state of technology at the material time.

While the main principles of this GM could be applied to small private aeroplanes, helicopters, etc. the numerical values chosen for illustration are appropriate to large aeroplanes for public transport.

2. INTRODUCTION

- 2.1 Over the years, target airworthiness risk levels underlying airworthiness requirements have developed on the basis of traditional qualitative airworthiness approaches; they have been given more precision in recent years by being compared with achieved airworthiness levels (judged from accident statistics) and by the general deliberations and discussions which accompanied the introduction of rational performance requirements, and more recently, the Safety Assessment approach in requirements. Although the target airworthiness risk level tends to be discussed as a single figure (a fatal accident rate for airworthiness reasons of not more than 1 in 10 000 000 flights/flying hours for large aeroplanes) it has to be recognised that the requirements when applied to particular aircraft types will result in achieved airworthiness levels at certification lying within a band around the target level and that thereafter, for particular aircraft types and for particular aircraft, the achieved level will vary within that band from time to time.
- 2.2 The achieved airworthiness risk levels can vary so as to be below the target levels, because it is difficult if not impossible to design to the minimum requirements without being in excess of requirements in many areas; also because aircraft are not always operated at the critical conditions (e.g., aircraft weight, CG position and operational speeds; environmental conditions - temperature, humidity, degree of turbulence). The achieved level may vary so as to be above the target level because of undetected variations in material standards or build standards, because of design deficiencies, because of encountering unforeseen combinations of failures and/or combinations of events, and because of unanticipated operating conditions or environmental conditions.
- 2.3 There is now a recognition of the need to attempt to monitor the conditions which tend to increase the level and to take appropriate corrective action when the monitoring indicates the need to do so in order to prevent the level rising above a predetermined 'ceiling'.
- 2.4 The Agency also has a duty in terms of providing the public with aviation services and therefore should consider the penalties associated with curtailment or even removal (by

'grounding') of aviation services when establishing the acceptability of any potential variation in airworthiness level.

2.5 Thus, the purpose of this GM is:

- (a) To postulate basic principles which should be used to guide the course of actions to be followed so as to maintain an adequate level of airworthiness risk after a defect has occurred which, if uncorrected, would involve a potential significant increase of the level of risk for an aircraft type.
- (b) For those cases where it is not possible fully and immediately to restore an adequate level of airworthiness risk by any possible alleviating action such as an inspection or limitation, to state the criteria which should be used in order to assess the residual increase in risk and to limit it to an appropriate small fraction of the mean airworthiness through life risk.

3. DISCUSSION

- 3.1 Several parameters are involved in decisions on safety matters. In the past the cost of proposed action has often been compared with the notional 'risk cost', i.e. the cost of a catastrophe multiplied by its probability of occurrence.
- 3.2 This can be a useful exercise, but it should be held within the constraint of acceptable airworthiness risk levels, i.e., within airworthiness risk targets which represent the maximum levels of risk with which an aircraft design must comply, i.e., in the upper part of the 'band'. Currently for large aeroplanes the mean airworthiness risk level is set at a catastrophe rate for airworthiness reasons of not more than one in every ten- million flights/flying hours. The constraint is overriding in that any option, which could be permitted on risk cost considerations, or other grounds, is unacceptable if it leads to significant long-term violation of this safety requirement.
- 3.3 While it should clearly be the objective of all to react to and eliminate emergency situations, i.e., those involving a potentially significant increase of airworthiness risk levels, without unreasonable delay, the Agency should be able finally to rule on what is a minimum acceptable campaign programme. It has therefore seemed desirable to devise guidelines to be used in judging whether a proposed campaign of corrective actions is sufficient in airworthiness terms, and clearly this ought to be based on determining the summation of the achieved airworthiness risk levels for the aircraft and passengers during any periods of corrective action and comparing them with some agreed target.
- 3.4 As the period of corrective action will not be instantaneous (unless by grounding), there is potentially an increase in the achieved airworthiness risk level possibly to and, without controls, even above the higher part of the 'band', and the amount by which the level is above the mean target figure, and the period for which it should be allowed to continue, has been a matter of some arbitrary judgement.
- 3.5 It would appear desirable to try to rationalise this judgement. For example, if an aircraft were to spend 10 % of its life at a level such that the risk of catastrophe was increased by an order of magnitude, the average rate over its whole life would be doubled which may not be in the public interest. A more suitable criterion is perhaps one which would allow an average increase in risk of, say one third on top of the basic design risk when spread over the whole life of the aircraft an amount which would probably be acceptable within the concept (See Figure 1). It would then be possible to regard the 'through life' risk to an aircraft - e.g., a mean airworthiness target of not more than one airworthiness catastrophe per 10 million (10^7) hours, as made up of two parts, the first being 3/4 of the total and catering for the basic design risk and the other being 1/4 of the total, forming an allowance to be used during the individual aircraft's whole life for unforeseen campaign situations such as described above.
- 3.6 Investigation has shown that a total of ten such occasions might arise during the life of an individual aircraft.
- 3.7 Using these criteria, there could then be during each of these emergency periods (assumed to be ten in number) a risk allowance contributed by the campaign alone of:

- 1 x 10⁻⁷ for 2.5% of the aircraft's life; or
- 5 x 10⁻⁷ for 0.5% of the aircraft's life; or
- 1 x 10⁻⁶ for 0.25% of the aircraft's life; or
- 1 x 10⁻⁵ for 0.025% of the aircraft's life, etc.

without exceeding the agreed 'allowance' set aside for this purpose.

- 3.8 Thus a 'reaction table' can be created as indicated in Table 1 (the last two columns assuming a typical aircraft design life of 60,000 hours and an annual utilisation of 3 000 hours per annum) showing the flying or calendar time within which a defect should be corrected if the suggested targets are to be met.

Table 1

Estimated catastrophe rate to aircraft due to the defect under consideration (per a/c hour)	Average reaction time for aircraft at risk (hours)	On a calendar basis
4 x 10 ⁻⁸	3 750	15 months
5 x 10 ⁻⁸	3 000	12 months
1 x 10 ⁻⁷	1 500	6 months
2 x 10 ⁻⁷	750	3 months
5 x 10 ⁻⁷	300	6 weeks
1 x 10 ⁻⁶	150	3 weeks
1 x 10 ⁻⁵	15	Return to base

- 3.9 These principles may be applied to a single aircraft or a number of aircraft of a fleet but in calculating risk, all the risk should be attributed to those aircraft which may carry it, and should not be diluted by including other aircraft in the fleet which are known to be free of risk. (It is permissible to spread the risk over the whole fleet when a source is known to exist without knowing where). Where a fleet of aircraft is involved Column 2 may be interpreted as the mean time to rectification and not the time to the last one.
- 3.10 There is one further constraint. However little effect a situation may have on the 'whole life' risk of an aircraft, the risk should not be allowed to reach too high a level for any given flight. Thus while a very high risk could be tolerated for a very short period without unacceptable degradation of the overall airworthiness target, the few flights involved would be exposed to a quite unacceptable level of risk. It is therefore proposed that the Table 1 should have a cut-off at the 2 x 10⁻⁶ level so that no flight carries a risk greater than 20 times the target. At this level the defect is beginning to contribute to a greater likelihood of catastrophe than that from all other causes, including non-airworthiness causes, put together. If the situation is worse than this, grounding appears to be the only alternative with possibly specially authorised high-risk ferry flights to allow the aircraft to return to base empty. Figures 2 and 3 show a visualisation chart equivalent to Table 1, giving average rectification time (either in flight hours or months) based on probability of defect that must be corrected.
- 3.11 It will be seen that the above suggestions imply a probability of catastrophe from the campaign alone of 1.5/10 000 per aircraft during each separate campaign period (i.e., p = 0.015 per 100 aircraft fleet).

- 3.12 In addition, in order to take into account large fleet size effect, the expected probability of the catastrophic event during the rectification period on the affected fleet shall not exceed 0.1. See Figure 4.
- 3.13 It should also be noted that in assessing campaign risks against 'design risk', an element of conservatism is introduced, since the passenger knows only 'total risk' (i.e. airworthiness plus operations risks) and the fatal accident rate for all reasons is an order of magnitude greater than that for airworthiness reasons only (i.e., 10^{-6} as against 10^{-7}). The summated campaign risk allowance proposed by this GM is therefore quite a small proportion of the total risk to which a passenger is subject. When operating for short periods at the limit of risk proposed (2×10^{-6} per hour) the defect is however contributing 100 % more risk than all other causes added together.
- 3.14 A similar approach is proposed to cover the case of defects associated to hazardous failure conditions for which the safety objectives defined by the applicable [airworthiness requirements certification specifications](#) are not met. According to CS 25.1309, the allowable probability for each hazardous failure condition is set at 10^{-7} per flight hour compared to 10^{-9} per flight hour for a catastrophic failure condition. Figure 5 is showing a visualisation chart giving average rectification time based on probability of defect that should be corrected. This is similar to Figure 2 but with lower and upper boundaries adapted to cover the case of hazardous failure conditions (probabilities of 10^{-7} and 2×10^{-4} respectively).
- 3.15 In addition, in order to take into account large fleet size effect, the expected probability of the hazardous event during the rectification period on the affected fleet shall not exceed 0.5. See Figure 6.

4. GUIDELINES

- 4.1 The above would lead to the following guidelines for a rectification campaign to remedy a discovered defect associated to a catastrophic failure condition without grounding the aircraft:
- (i) Establish all possible alleviating action such as inspections, crew drills, route restrictions, and other limitations.
 - (ii) Identify that part of the fleet, which is exposed to the residual risk, after compliance has been established with paragraph (i).
 - (iii) Using reasonably cautious assumptions, calculate the likely catastrophic rate for each aircraft carrying the risk in the affected fleet.
 - (iv) Compare the speed with which any suggested campaign will correct the deficiency with the time suggested in Figure 2. The figure should not be used beyond the 2×10^{-6} level, except for specially authorised flights.
 - (v) Also ensure that the expected probability of the catastrophic event during the rectification period on the affected fleet is in accordance with Figure 4.
- 4.2 Similarly, the following guidelines would be applicable for a rectification campaign to remedy a discovered defect associated to a hazardous failure condition without grounding the aircraft:
- (i) Establish all possible alleviating action such as inspections, crew drills, route restrictions, and other limitations.
 - (ii) Identify that part of the fleet, which is exposed to the residual risk, after compliance has been established with paragraph (i).
 - (iii) Using reasonably cautious assumptions, calculate the likely hazardous rate for each aircraft carrying the risk in the affected fleet.
 - (iv) Compare the speed with which any suggested campaign will correct the deficiency with the time suggested in Figure 5.

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- (v) Also ensure that the expected probability of the hazardous event during the rectification period on the affected fleet is in accordance with Figure 6.
- 4.3 It must be stressed that the benefit of these guidelines will be to form a datum for what is considered to be the theoretically maximum reaction time. A considerable amount of judgement will still be necessary in establishing many of the input factors and the final decision may still need to be tempered by non-numerical considerations, but the method proposed will at least provide a rational 'departure point' for any exercise of such judgement.
- 4.4 It is not intended that the method should be used to avoid quicker reaction times where these can be accommodated without high expense or disruption of services.

Figure 1 - Visualisation Chart for CS-25

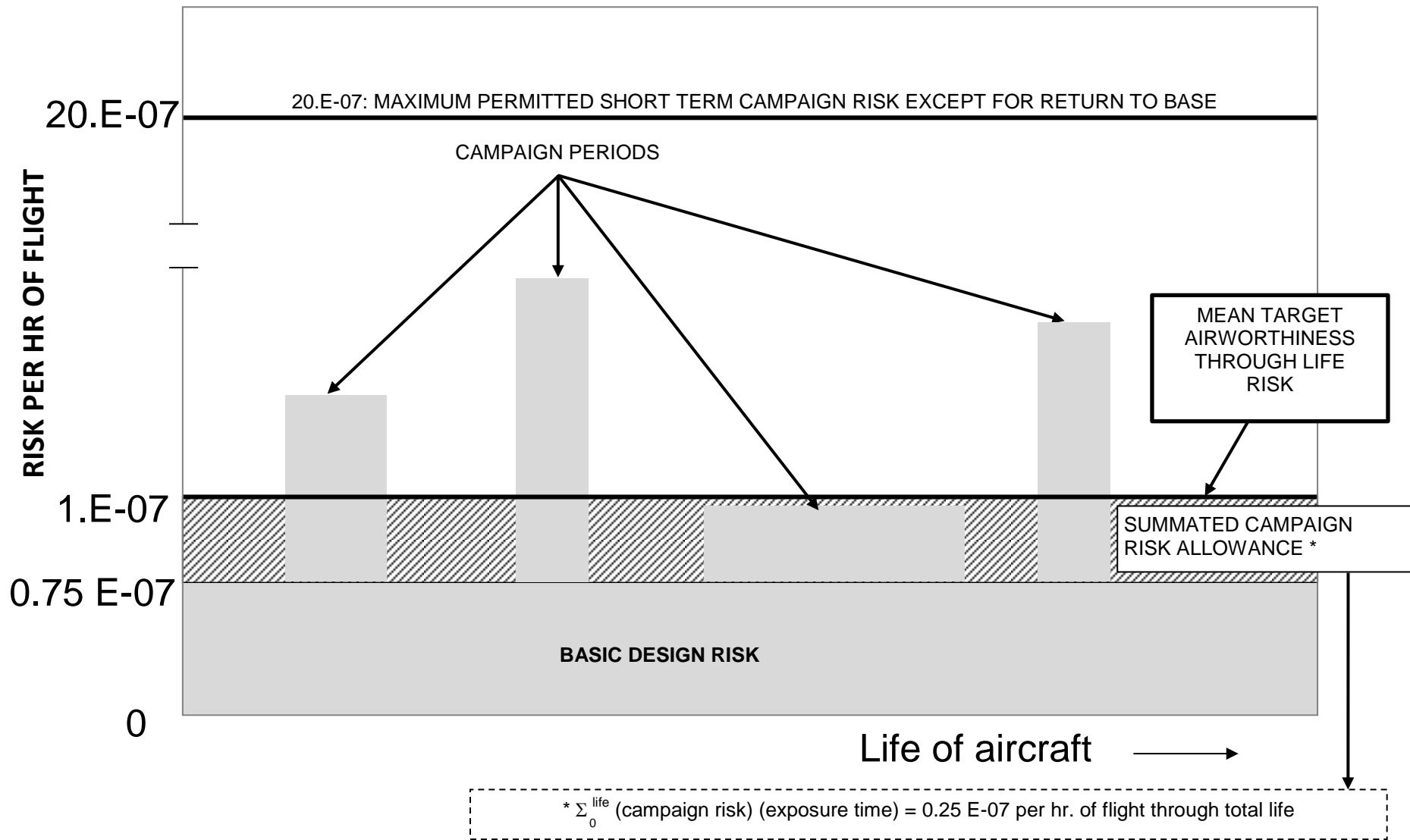


Figure 2 - Visualisation Chart for CS-25 (Flight hours)

- Assumptions:
- aircraft life of 60 000 hours
 - 10 'catastrophic events' campaigns

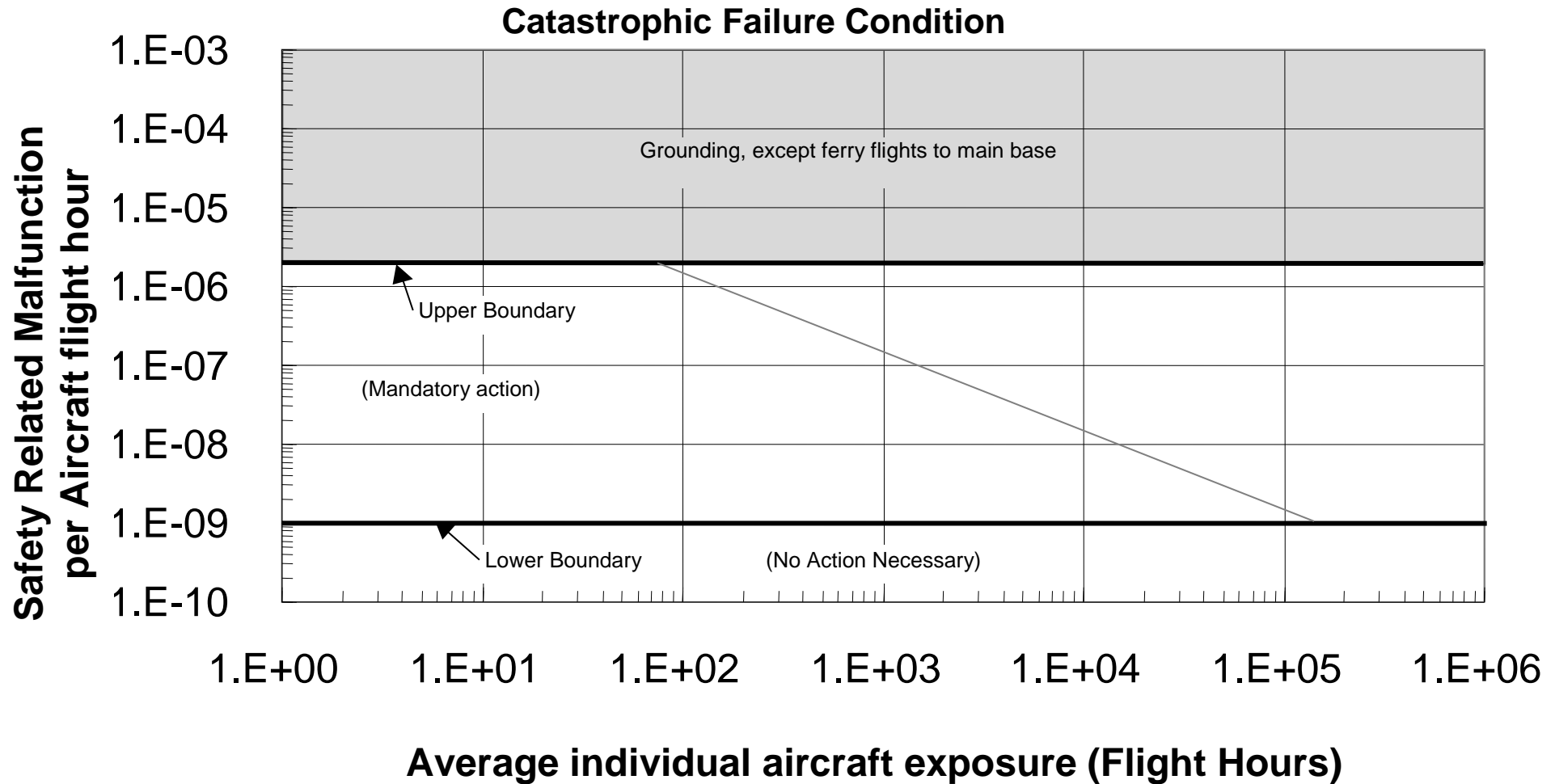
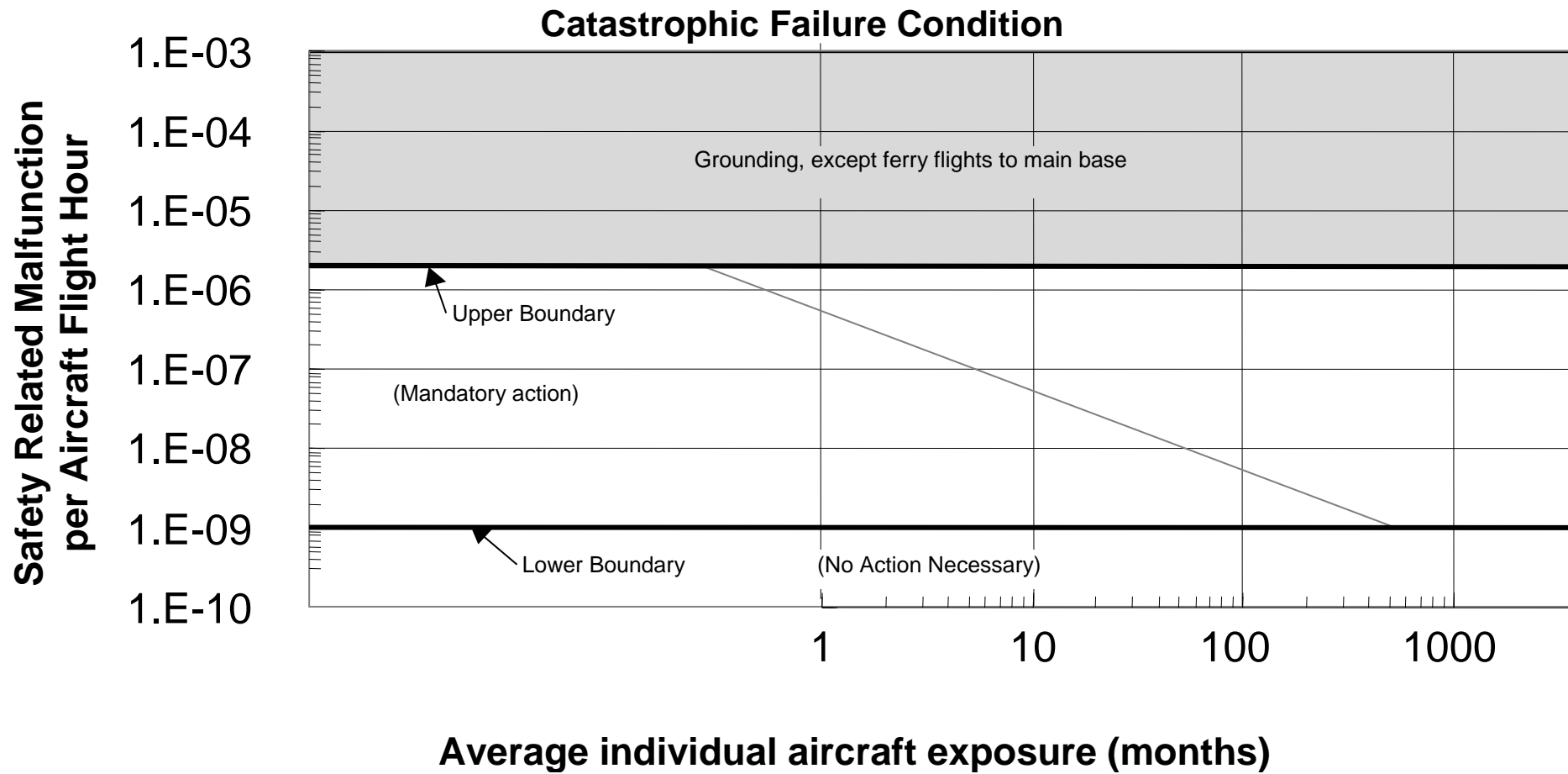


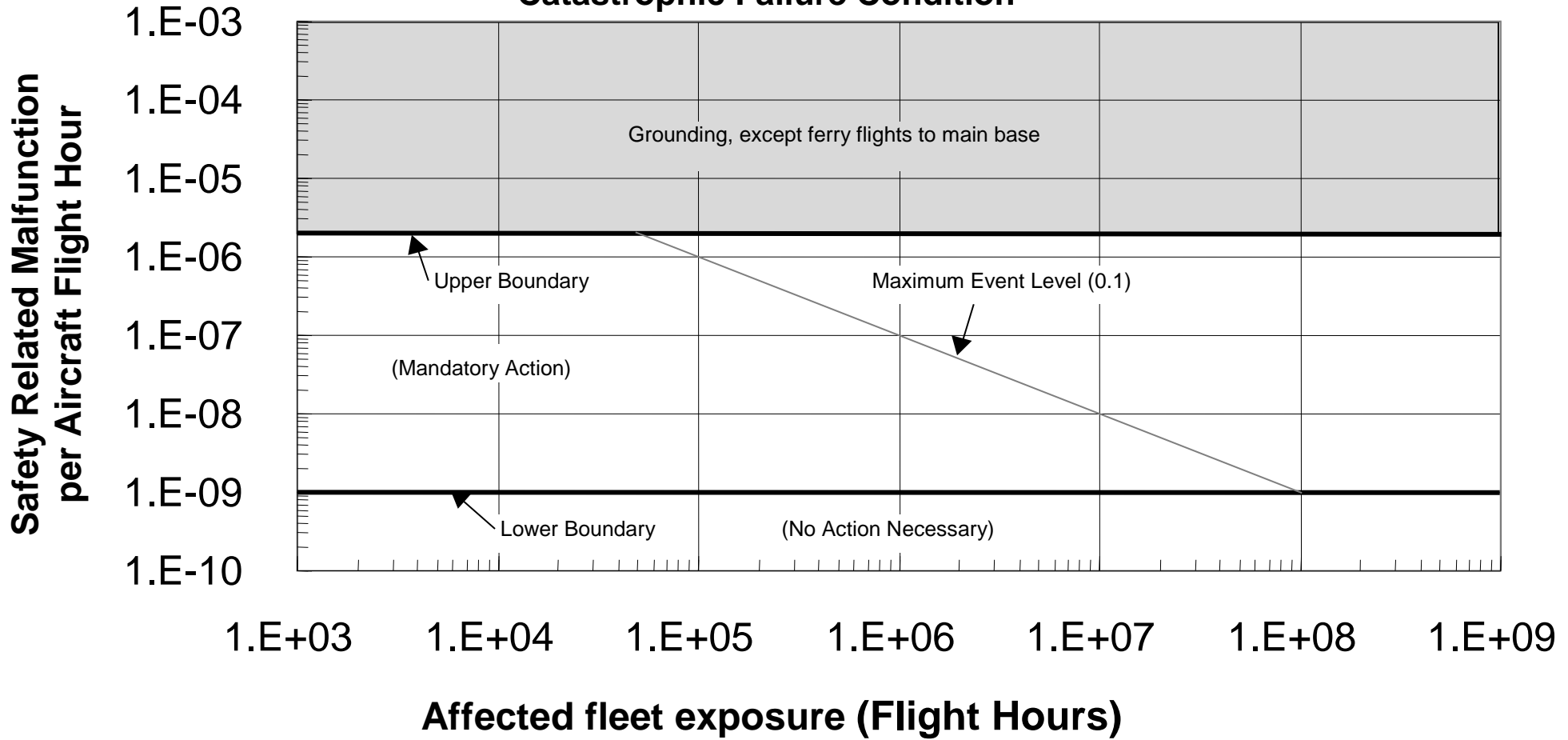
Figure 3 - Visualisation Chart for CS-25 (Calendar basis)

Assumptions: - aircraft life of 60 000 hours, 3 000 hours per year
 - 10 'catastrophic events' campaigns



**Figure 4 - Visualisation Chart for CS-25
(Flight Hours)**

Catastrophic Failure Condition



**Figure 5 - Visualisation Chart for CS-25 (Flight hours)
For Hazardous Failure Condition**

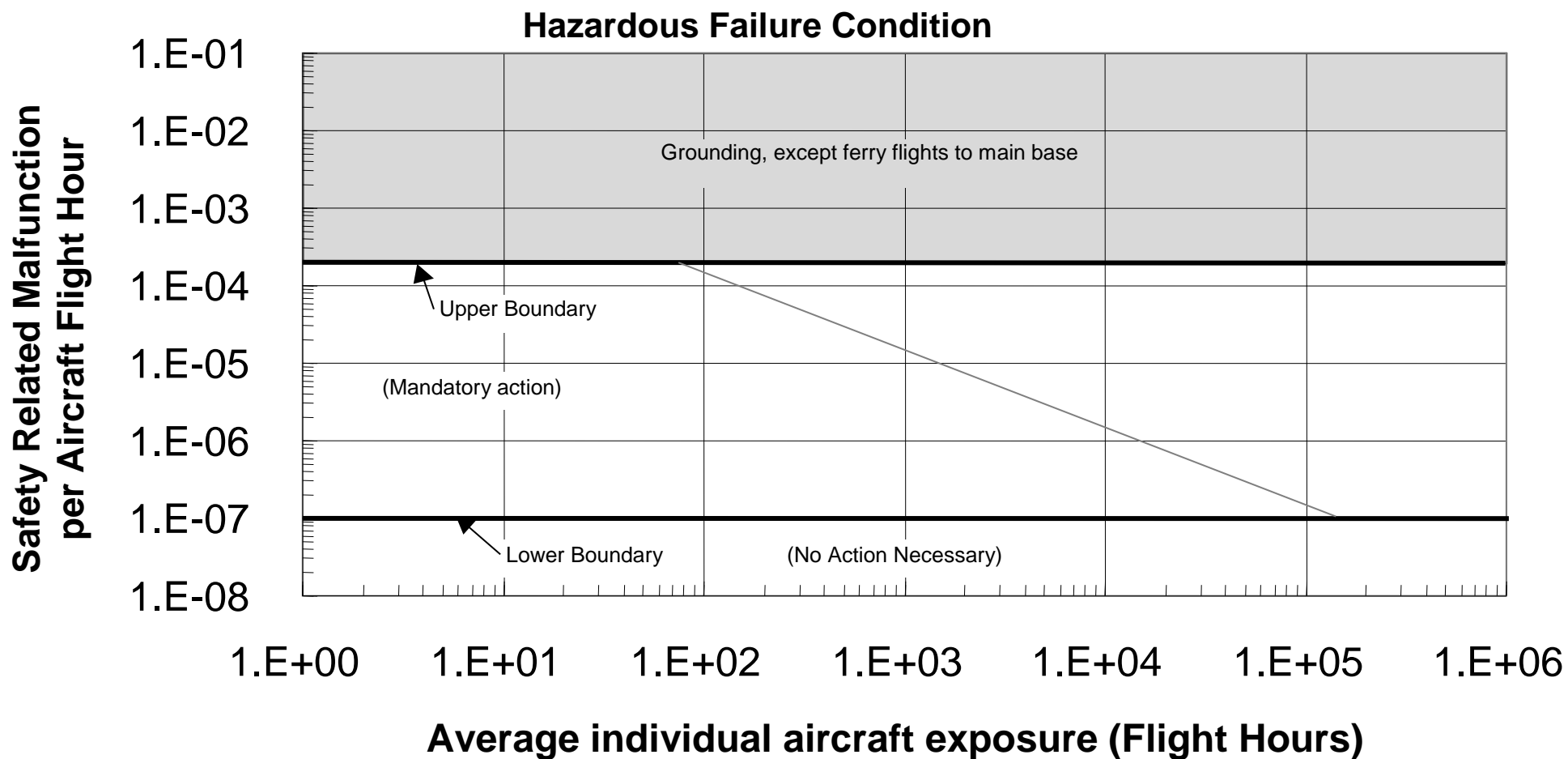
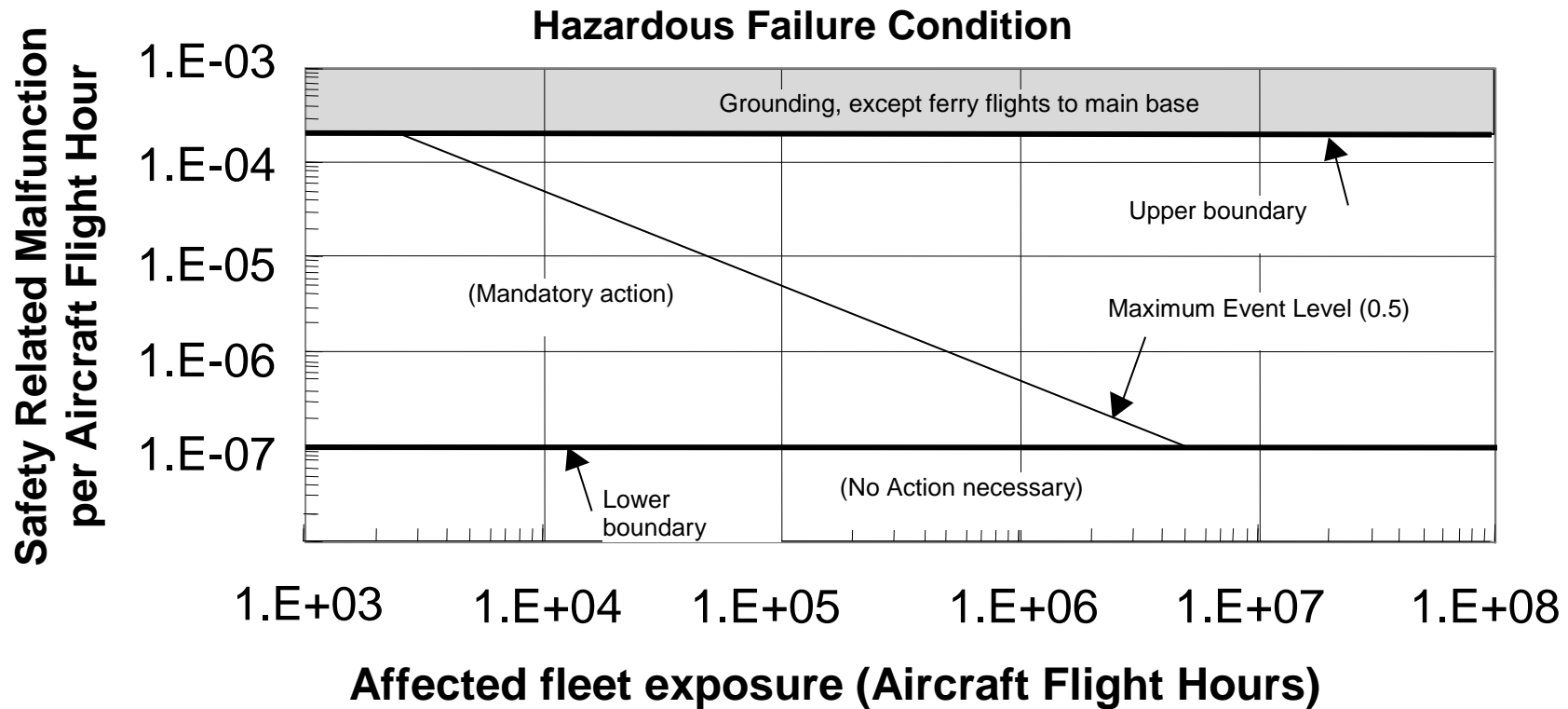


Figure 6 - Visualisation Chart for CS-25 (Flight hours)



AMC 21.A.3B(b) Unsafe condition

An unsafe condition exists if there is factual evidence (from service experience, analysis or tests) that:

- (a) An event may occur that would result in fatalities, usually with the loss of the aircraft, or reduce the capability of the aircraft or the ability of the crew to cope with adverse operating conditions to the extent that there would be:
 - (i) A large reduction in safety margins or functional capabilities, or
 - (ii) Physical distress or excessive workload such that the flight crew cannot be relied upon to perform their tasks accurately or completely, or
 - (iii) Serious or fatal injury to one or more occupants

unless it is shown that the probability of such an event is within the limit defined by the applicable ~~airworthiness requirements~~certification specifications, or

- (b) There is an unacceptable risk of serious or fatal injury to persons other than occupants, or
- (c) Design features intended to minimise the effects of survivable accidents are not performing their intended function.

Note 1: Non-compliance with applicable ~~airworthiness requirements~~certification specifications is generally considered as an unsafe condition, unless it is shown that possible events resulting from this non-compliance do not constitute an unsafe condition as defined under paragraphs (a), (b) and (c).

Note 2: An unsafe condition may exist even though applicable airworthiness requirements are complied with.

Note 3: The above definition covers the majority of cases where the Agency considers there is an unsafe condition. There may be other cases where overriding safety considerations may lead the Agency to issue an airworthiness directive.

Note 4: There may be cases where events can be considered as an unsafe condition if they occur too frequently (significantly beyond the applicable safety objectives) and could eventually lead to consequences listed in paragraph (a) in specific operating environments. Although having less severe immediate consequences than those listed in paragraph (a), the referenced events may reduce the capability of the aircraft or the ability of the crew to cope with adverse operating conditions to the extent that there would be, for example, a significant reduction in safety margins or functional capabilities, a significant increase in crew workload, or in conditions impairing crew efficiency, or discomfort to occupants, possibly including injuries.

GM 21.A.3B(b) Determination of an unsafe condition

It is important to note that these guidelines are not exhaustive. However, this material is intended to provide guidelines and examples that will cover most cases, taking into account the applicable certification requirements.

1. INTRODUCTION

Certification or approval of a product, part or appliance is a demonstration of compliance with requirements which are intended to ensure an acceptable level of safety. This demonstration however includes certain accepted assumptions and predicted behaviours, such as:

- fatigue behaviour is based on analysis supported by test,
- modelling techniques are used for Aircraft Flight Manual performances calculations,
- the systems safety analyses give predictions of what the systems failure modes, effects and probabilities may be,

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- the system components reliability figures are predicted values derived from general experience, tests or analysis,
- the crew is expected to have the skill to apply the procedures correctly, and
- the aircraft is assumed to be maintained in accordance with the prescribed instructions for continued airworthiness (or maintenance programme), etc.

In service experience, additional testing, further analysis, etc., may show that certain initially accepted assumptions are not correct. Thus, certain conditions initially demonstrated as safe, are revealed by experience as unsafe. In this case, it is necessary to mandate corrective actions in order to restore a level of safety consistent with the applicable certification requirements.

See AMC 21.A.3B(b) for definition of 'unsafe condition' used in 21.A.3A(b).

2. GUIDELINES FOR ESTABLISHING IF A CONDITION IS UNSAFE

The following paragraphs give general guidelines for analysing the reported events and determining if an unsafe condition exists, and are provided for each type of product, part or appliance subject to a specific airworthiness approval: type-certificates (TC) or supplemental type-certificates (STC) for aircraft, engines or propellers, or European Technical Standard Orders (ETSO).

This analysis may be qualitative or quantitative, i.e. formal and quantitative safety analyses may not be available for older or small aircraft. In such cases, the level of analysis should be consistent with that required by the [airworthiness requirements certification specifications](#) and may be based on engineering judgement supported by service experience data.

2.1 Analysis method for aircraft

2.1.1 Accidents or incidents without any aircraft, engines, system, propeller or part or appliance_malfunction or failure

When an accident/incident does not involve any component malfunction or failure but when a crew human factor has been a contributing factor, this should be assessed from a man-machine interface standpoint to determine whether the design is adequate or not. Paragraph 2.5 gives further details on this aspect.

2.1.2 Events involving an aircraft, engines, system, propeller or part or appliance failure, malfunction_or defect

The general approach for analysis of in-service events caused by malfunctions, failures or defects will be to analyse the actual failure effects, taking into account previously unforeseen failure modes or improper or unforeseen operating conditions revealed by service experience.

These events may have occurred in service, or have been identified during maintenance, or been identified as a result of subsequent tests, analyses, or quality control.

These may result from a design deficiency or a production deficiency (non-conformity with the type design), or from improper maintenance. In this case, it should be determined if improper maintenance is limited to one aircraft, in which case an airworthiness directive may not be issued, or if it is likely to be a general problem due to improper design and/or maintenance procedures, as detailed in paragraph 2.5.

2.1.2.1 Flight

An unsafe condition exists if:

- There is a significant shortfall of the actual performance compared to the approved performance (taking into account the accuracy of the performance calculation method), or

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- The handling qualities, although having been found to comply with the applicable ~~airworthiness requirements~~ certification specifications at the time of initial approval, are subsequently shown by service experience not to comply.

2.1.2.2 Structural or mechanical systems

An unsafe condition exists if the deficiency may lead to a structural or mechanical failure which:

- Could exist in a Principal Structural Element that has not been qualified as damage tolerant. Principal Structural Elements are those which contribute significantly to carrying flight, ground, and pressurisation loads, and whose failure could result in a catastrophic failure of the aircraft.

Typical examples of such elements are listed for large aeroplanes in AMC 25.571(a) 'Damage tolerance and fatigue evaluation of structure', and in the equivalent material for rotorcraft.

- Could exist in a Principal Structural Element that has been qualified as damage tolerant, but for which the established inspections, or other procedures, have been shown to be, or may be, inadequate to prevent catastrophic failure.
- Could reduce the structural stiffness to such an extent that the required flutter, divergence or control reversal margins are no longer achieved.
- Could result in the loss of a structural piece that could damage vital parts of the aircraft, cause serious or fatal injuries to persons other than occupants.
- Could, under ultimate load conditions, result in the liberation of items of mass that may injure occupants of the aircraft.
- Could jeopardise proper operation of systems and may lead to hazardous or catastrophic consequences, if this effect has not been taken adequately into account in the initial certification safety assessment.

2.1.2.3 Systems

The consequences of reported systems components malfunctions, failures or defects should be analysed.

For this analysis, the certification data may be used as supporting material, in particular systems safety analyses.

The general approach for analysis of in-service events caused by systems malfunctions, failures or defects will be to analyse the actual failure effects.

As a result of this analysis, an unsafe condition will be assumed if it cannot be shown that the safety objectives for hazardous and catastrophic failure conditions are still achieved, taking into account the actual failure modes and rates of the components affected by the reported deficiency.

The failure probability of a system component may be affected by:

- A design deficiency (the design does not meet the specified reliability or performance).

SECTION A — Subpart A — General

- A production deficiency (non-conformity with the certified type design) that affects either all components, or a certain batch of components.
- Improper installation (for instance, insufficient clearance of pipes to surrounding structure).
- Susceptibility to adverse environment (corrosion, moisture, temperature, vibrations etc.).
- Ageing effects (failure rate increase when the component ages).
- Improper maintenance.

When the failure of a component is not immediately detectable (hidden or latent failures), it is often difficult to have a reasonably accurate estimation of the component failure rate since the only data available are usually results of maintenance or flight crew checks. This failure probability should therefore be conservatively assessed.

As it is difficult to justify that safety objectives for the following systems are still met, a deficiency affecting these types of systems may often lead to a mandatory corrective action:

- back up emergency systems, or
- fire detection and protection systems (including shut off means).

Deficiencies affecting systems used during an emergency evacuation (emergency exits, evacuation assist means, emergency lighting system ...) and to locate the site of a crash (Emergency Locator Transmitter) will also often lead to mandatory corrective action.

2.1.2.4 Others

In addition to the above, the following conditions are considered unsafe:

- There is a deficiency in certain components which are involved in fire protection or which are intended to minimise/retard the effects of fire/smoke in a survivable crash, preventing them to perform their intended function (for instance, deficiency in cargo liners or cabin material leading to non-compliance with the applicable flammability requirements).
- There is a deficiency in the lightning or High Intensity Radiated Fields protection of a system which may lead to hazardous or catastrophic failure conditions.
- There is a deficiency which could lead to a total loss of power or thrust due to common mode failure.

If there is a deficiency in systems used to assist in the enquiry following an accident or serious incident (e.g., Cockpit Voice Recorder, Flight Data Recorder), preventing them to perform their intended function, the Agency may take mandatory action.

2.2 Engines

The consequences and probabilities of engine failures have to be assessed at the aircraft level in accordance with paragraph 2.1, and also at the engine level for those failures considered as Hazardous in CS E-510.

The latter will be assumed to constitute unsafe conditions, unless it can be shown that the consequences at the aircraft level do not constitute an unsafe condition for a particular aircraft installation.

2.3 Propellers

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The consequences and probabilities of propeller failures have to be assessed at the aircraft level in accordance with paragraph 2.1, and also at the propeller level for those failures considered as hazardous in CS P-70.

The latter will be assumed to constitute unsafe conditions, unless it can be shown that the consequences at the aircraft level do not constitute an unsafe condition for a particular aircraft installation.

2.4 Parts and appliances

The consequences and probabilities of equipment failures have to be assessed at the aircraft level in accordance with paragraph 2.1.

2.5 Human factors aspects in establishing and correcting unsafe conditions

This paragraph provides guidance on the way to treat an unsafe condition resulting from a maintenance or crew error observed in service.

It is recognised that human factors techniques are under development. However, the following is a preliminary guidance on the subject.

Systematic review should be used to assess whether the crew or maintenance error raises issues that require regulatory action (whether in design or other areas), or should be noted as an isolated event without intervention. This may need the establishment of a multidisciplinary team (designers, crews, human factors experts, maintenance experts, operators etc.)

The assessment should include at least the following:

- Characteristics of the design intended to prevent or discourage incorrect assembly or operation;
- Characteristics of the design that allow or facilitate incorrect operation,
- Unique characteristics of a design feature differing from established design practices;
- The presence of indications or feedback that alerts the operator to an erroneous condition;
- The existence of similar previous events, and whether or not they resulted (on those occasions) in unsafe conditions;
- Complexity of the system, associated procedures and training (has the crew a good understanding of the system and its logic after a standard crew qualification programme?);
- Clarity/accuracy/availability/currency and practical applicability of manuals and procedures;
- Any issues arising from interactions between personnel, such as shift changeover, dual inspections, team operations, supervision (or lack of it), or fatigue.

Apart from a design change, the corrective actions, if found necessary, may consist of modifications of the manuals, inspections, training programmes, and/or information to the operators about particular design features. The Agency may decide to make mandatory such corrective action if necessary.

AMC 21.A.4 Transferring of information on eligibility and approval status from the design holder to production organisations

Where there is a need to provide (normally outside the design organisation) a visible statement of approved design data or airworthiness or environmental protection data associated with the approved design data, the following minimum information must be provided. The need for a visible statement may be in relation to Company holding a production organisation approval (POA) in relation to 21.A.163(c).

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The procedures related to the use of forms or other electronic means to provide this information must be agreed with the Agency.

Information to be provided:

Company Name: the name of the responsible design organisation (TC, STC, approval of repair or minor change design, ETSO authorisation holder) issuing the information.

Date: the date at which the information is released.

Eligibility: indicate the specific products or articles, in case of ETSO authorisation, for which data have been approved.

Identification: the part number of the part or appliance. Preference should be given to the use of the Illustrated Parts Catalogue (IPC) designation. Alternatively the reference to the instruction for continued airworthiness (e.g., SB, AMM, etc.) could be stated. Marking requirements of Part 21 Section A Subpart Q should be taken into account.

Description: the name or description of the part or document should be given. In the case of a part or appliance preference should be given to use of IPC designation. The description is to include reference to any applicable ETSO authorisation or EPA marking, or previous national approvals still valid.

Purpose of data: the reason for the provision of the information should be stated by the design approval holder.

Examples:

- a) Provision of approved design data to a production organisation to permit manufacture (AMC No 1 to 21.A.133(b) and (c))
- b) Information regarding eligibility for installation (replacement parts, repair, modification, etc.)
- c) Direct Delivery Authorisation (AMC No 1 to 21.A.133(b) and (c))

If the data is in support of a change or repair, then reference to the aircraft level approval should be given (make reference to the approved STC, change or repair).

Limitations/Remarks: state any information, either directly or by reference to supporting documentation that identifies any particular data or limitations (including specific importing requirements) needed by a production organisation to complete Block ~~43~~¹² of the EASA Form 1.

Approval: provide reference information related to the approval of the data (Agency document or DOA privilege).

Authorised signature: name and hand-written normal or electronic signature of a person who has written authority from the design organisation, as indicated in the procedures agreed with the Agency.

Subpart B — Type-certificates and restricted type-certificates**GM 21.A.14(b) Eligibility for alternative procedures**

Design organisations approved under Part 21 Section A Subpart J ('Subpart J DOA') should be the normal approach for type certification, supplemental type certification, approval of major changes to type design or approval of major repair design, except when agreed otherwise by the Agency in accordance with 21.A.14, 21.A.112B and 21.A.432B.

The acceptance of alternative procedures, as defined in AMC 21.A.14(b), should be limited where the Agency finds it more appropriate for the conduct of type certification, supplemental type certification, approval of changes to type design, approval of repair design.

AMC 21.A.14(b) Alternative Procedures

Alternative procedures are an acceptable means to demonstrate design capability in the cases described in 21.A.14, 21.A.112B or 21.A.432B. This concept is the implementation, in the context of specific projects, of procedures required in Subpart J DOA, to ensure that the applicant will perform relevant activities as expected by the Agency, but without the requirements on the organisation itself that can be found in Subpart J. The establishment of these alternative procedures may be seen as a starting phase for a Subpart J DOA, allowing at a later stage, at the discretion of the applicant, to move towards a full Subpart J DOA by the addition of the missing elements.

1. Scope
 - 1.1 As alternative to DOA, a manual of procedures must set out specific design practices, resources and sequence of activities relevant for the specific projects, taking account of Part 21 requirements.
 - 1.2 These procedures must be concise and limited to the information needed for quality and proper control of activities by the applicant/holder, and by the Agency.
2. Management of the (supplemental) type-certification process
 - 2.1 Certification programme: See AMC 21.A.20(b) for type-certification and AMC 21.A.114 for supplemental type-certification

~~For a particular project, at the beginning of the process, the applicant must propose to the Agency for acceptance a certification programme that includes:~~

~~Part 1 — Procedures for the management of the certification programme: creation and update all along the certification process to integrate the progress of the activities, distribution.~~

~~This part must also include the milestones of the project development up to the type certification or approval of the major change, with the minimum administrative delays imposed by the Agency when necessary.~~

~~Part 2 — The attribution of responsibilities, as follows:~~

~~— names of the persons having specific responsibilities in the frame of the certification programme~~

~~— the description of their tasks, responsibilities and associated competences~~

~~— scope of authority of signatories.~~

~~Part 3 — The airworthiness requirements applicable to the project, corresponding interpretations, and the equivalence of safety or other specific cases related to the applicable requirements.~~

~~Part 4 — Working methods for showing of compliance and providing to the Agency the means by which such compliance has been shown.~~

~~This includes all or part of the following, depending on the complexity of the product:~~

SECTION A —Subpart B — Type-certificates and restricted type-certificates

- ~~_____ - _____ the means by which compliance will be shown (means of compliance), in relation with the requirements and/or their detailed interpretation~~
- ~~_____ - _____ the technical criteria associated with the means of compliance~~
- ~~_____ - _____ milestones specific to particular technical areas in relation with the general planning of the project~~
- ~~_____ - _____ the decision process, especially the key points where an Agency decision is needed before further action~~
- ~~_____ - _____ the flow of information to the Agency~~
- ~~_____ - _____ the configuration control, especially of the test specimen used to show compliance~~
- ~~_____ - _____ the organisation of the work for the interfaces or multidisciplinary subjects~~
- ~~_____ - _____ those compliance documents that will be subject to verification by the Agency~~
- ~~_____ - _____ the establishment of the compliance documentation, including the time schedule and availability to the Agency~~
- ~~_____ - _____ the control of the time schedule, for the accomplishment of the tasks in due time.~~

~~_____ The applicant must submit all revisions of the certification programme to the Agency for acceptance.~~

2.2 Compliance documentation: see AMC 21.A.20(c)

~~The applicant must establish procedures for creating compliance documents in such a way that:~~

- ~~• _____ the kind of document and the technical objectives for each document are determined at the beginning of the process~~
- ~~• _____ the production of the documents is carefully managed all along the process, in accordance with the milestones defined in the certification programme~~
- ~~• _____ the various issues of a document are controlled.~~

~~_____ Each document must contain:~~

- ~~_____ the reference of the requirements covered by the document~~
- ~~_____ data showing compliance and a statement by the applicant declaring compliance with these requirements~~

~~A numbering system to identify the compliance documents must be defined in order to have an adequate link with the certification programme.~~

~~Except as otherwise agreed with the Agency, all compliance documents must be produced before issuance of the final statement of compliance required by 21A.20(b) or 21A.97(a)(3).~~

~~2.3 There are no privileges associated with alternative procedures, however the Agency will decide on the extent of its involvement in the verification of compliance documents. This involvement may vary according to the Agency knowledge of the applicant from previous and on-going activities and the resulting assessment of competence, and must be addressed in the certification programme.~~

3. Management of design changes

3.1 Approval of changes to type design, repairs and production deviations from the approved design data

The TC or STC applicant must provide procedures acceptable to the Agency for classification and approval of changes to type design (see paragraphs 3.2 and 3.3), and repairs and production deviations from the approved design data (see paragraph 3.4).

3.2 Classification

3.2.1 Content

The procedure must address the following points:

- identification of changes to type design
- airworthiness classification
- changes to type design initiated by sub-contractors
- documents to justify the classification
- authorised signatories

Criteria used for classification must be in compliance with 21.A.91 and corresponding interpretations.

3.2.2 Identification of changes to type design

The procedure must indicate how the following are identified:

- major changes to type design
- those minor changes to type design where additional work is necessary to show demonstrate compliance with the airworthiness—requirements certification specifications
- other minor changes to type design requiring no further showing demonstrating of compliance.

3.2.3 Airworthiness classification

The procedure must show how the effects on airworthiness are analysed, from the very beginning, by reference to the applicable requirements certification specifications.

If no specific requirements certification specifications are applicable to the change, the above review must be carried out at the level of the part or system where the change is integrated and where specific requirements certification specifications are applicable.

3.2.4 Control of changes to type design initiated by sub-contractors

The procedure must indicate, directly or by cross-reference to written procedures, how changes to type design initiated by sub-contractors are controlled.

3.2.5 Documents to justify the classification

All decisions of classification of changes to type design must be documented and approved by the Agency. It may be in the format of meeting notes or register.

3.2.6 Authorised signatories

The procedure should identify the persons authorised to sign the proposed classification before release to the Agency for approval.

3.3 Approval of changes to type design

3.3.1 Content

The procedure must address the following points:

- compliance documentation
- approval process
- authorised signatories

3.3.2 Compliance documentation

For major changes and those minor changes to type design where additional work to show demonstrate compliance with the applicable airworthiness—requirements certification specifications is necessary, compliance documentation must be

established ~~following guidelines of paragraph 2.2~~ in accordance with AMC 21.A.20(c).

3.3.3 Approval process

A For the approval of major changes to type design, a certification programme as defined in ~~paragraph 2.4~~ AMC 21.A.97 must be established.

B For major changes and those minor changes to type design where additional work to show compliance with the applicable ~~airworthiness requirements~~ certification specifications is necessary, the procedure should define a document to support the approval process.

This document must include at least :

- identification and brief description of the change and its classification
- applicable ~~requirements~~ certification specifications
- reference to the compliance documents
- effects, if any, on limitations and on the approved documentation
- authorised signatory

C For the other minor changes, the procedure must define a means:

- to identify the change
- to present the change to the Agency for approval.

3.3.4 Authorised signatories

The procedure must identify the persons authorised to sign the change before release to the Agency for approval.

3.4 Repairs and production deviations from the approved design data

A procedure following the principles of paragraphs 3.2 and 3.3 must be established for the classification and approval of repairs and unintentional deviations from the approved design data occurring in production (concessions or non-conformance's). For repairs, the procedure must be established in accordance with Part 21 Section A Subpart M and associated acceptable means of compliance (AMC) or guidance material (GM).

4. Issue of information and instructions to owners

4.1 General

The information or instructions issued by a TC, STC, approval of changes to type design, approval of repair design holder are intended to provide the owners of a product with all necessary data to implement a change on the product, or a repair, or to inspect it.

The information or instructions may be issued in a format of a Service Bulletin as defined in ATA 100 system, or in Structural Repair Manuals, Maintenance Manuals, Engine and Propeller Manuals, etc.

The preparation of this data involves design, production and inspection. The three aspects should be properly addressed and a procedure should exist.

4.2 Procedure

The procedure should address the following points:

- preparation
- verification of technical consistency with corresponding approved change(s), repair(s) or approved data, including effectivity, description, effects on airworthiness, especially when limitations are changed
- verification of the feasibility in practical applications.

The persons authorised to sign before release of information and instructions to the Agency for approval should be identified in the procedure.

The procedure should include the information or instructions prepared by sub-contractors or vendors, and declared applicable to its products by the TC, STC, approval of changes to type design or approval of repair design holders.

4.3 Statement

The information and instructions should contain a statement showing Agency approval.

5. Obligations addressed in 21.A.44 (TC holder), 21.A.118A (STC holder) or 21.A.451 (repair design approval holder)

The applicant should establish the necessary procedures to show to the Agency how it will fulfil the obligations required under 21.A.44, 21.A.118A or 21.A.451, as appropriate.

6. Control of design sub-contractors

The applicant should establish the necessary procedures to show to the Agency how it will control design sub-contractors.

GM 21.A.16B Special Conditions

21.A.16B introduces 3 categories of special conditions:

1. Novel and unusual design features;
2. Unconventional use of product;
3. Service experience has shown that unsafe conditions may exist.

However, the need for a special condition based on in-service experience should be judged by using the following points as benchmarks:

- The words 'unsafe conditions' are used in GM 21.A.3B(b) to justify the basis for an airworthiness directive.
- The words 'continued safe flight and landing', according to AMC 25.1309, mean the capability for continued controlled flight and landing, possibly using emergency procedures, but without requiring exceptional pilot skill or strength. Some aircraft damage may be associated with a failure condition, during flight or upon landing.

AMC 21.A.20(b) Certification programme

1. For a particular project and as part of the technical familiarisation, the applicant provides a certification programme that includes:

1.1 a plan containing the following information:

- Description of the project and the kind of operations envisaged
- The proposed certification specifications, special conditions, equivalent safety findings and environmental protection requirements
- The description on how compliance will be demonstrated, with proposed means of compliance (see appendix to this AMC below for codes), and any selected guidance material. The description of the means of compliance should be sufficient to determine that all necessary data will be collected and compliance can be demonstrated.
- A compliance checklist addressing each paragraphs of the type-certification basis and environmental protection requirements applicable to the project, with reference to the means of compliance and to the related compliance documents.
- Identification of relevant personnel making decisions affecting airworthiness and environmental protection interfacing with the Agency, unless otherwise identified to the Agency:

- 1.2 a project schedule including major milestones.
2. The certification programme can be developed step by step, when the information needed is not available at the beginning of the project.
3. For a simple project, the certification programme can be proposed with the application.
4. The certification programme can be based on modules that can be updated independently.

Appendix to AMC 21.A.20(b) - Means of compliance codes

<u>Type of Compliance</u>	<u>Means of Compliance</u>	<u>Associated Compliance Documents</u>
<u>Engineering evaluation</u>	<u>MC0 :</u> - <u>Compliance statement</u> - <u>Reference to Type Design documents</u> - <u>Election of methods, factors</u> - <u>Definitions</u>	- <u>Type Design documents</u> - <u>Recorded statements</u>
	<u>MC1: Design review</u>	- <u>Descriptions</u> - <u>Drawings</u>
	<u>MC2: Calculation/ Analysis</u>	- <u>Substantiation reports</u>
	<u>MC3: Safety assessment</u>	- <u>Safety analysis</u>
<u>Tests</u>	<u>MC4: Laboratory tests</u>	- <u>Test programmes</u> - <u>Test reports</u> - <u>Test interpretations</u>
	<u>MC5: Ground tests on related product</u>	
	<u>MC6: Flight tests</u>	
	<u>MC8: Simulation</u>	
<u>Inspection</u>	<u>MC7: Design inspection/ audit</u>	- <u>Inspection or audit reports</u>
<u>Equipment qualification</u>	<u>MC9: Equipment qualification</u>	<u>Note : Equipment qualification is a process which may include all previous means of compliance.</u>

GM 21.A.20(b) Update to the Certification Programme

The applicant should keep the certification programme current throughout the project and submit all revised elements to the Agency.

AMC 21.A.20(c) Compliance documentation

1. Compliance documentation comprises of one or more reports, drawings, specifications, calculations, analysis etc. and provides a record of the means by which compliance with the applicable type-certification basis and environmental protection requirements is demonstrated.
2. Each compliance document should normally contain:
 - an adequate link with the corresponding certification programme

- the reference of the certification specifications, special conditions or environmental protection requirements addressed by the document
- data demonstrating compliance
- a statement by the applicant declaring that the document provides the proof of compliance for which it has been created
- the appropriate authorised signature.

3. Each compliance document should have a number and issue date. The various issues of a document should be controlled.

GM 21.A.20(d) Final statement

All compliance demonstrations should be completed before issuance of the final statement of compliance required by 21.A.20(d).

If so agreed by the Agency, some compliance documentation may be produced after issuance of the final statement of compliance required by 21.A.20(d).

GM 21A.33 Inspection and Tests

The requirements of 21.A.33(a) should not preclude the applicant requesting the Agency to make flight or other tests of particular aspects of the product during its development and before the type design is fully defined and a Declaration of Compliance can be issued for all the applicable certification specifications (CS). However in case of flight test the applicant should have performed subject tests before the Agency tests and should ensure that no features of the product preclude the safe conduct of the evaluation requested. The Agency may require to repeat any such tests once the type design is fully defined to ensure that subsequent changes have not adversely affected the conclusions from any earlier evaluation. A statement of compliance with ~~sub-paragraph~~ point 21.A.33(b) is also required for the above tests.

GM 21.A.35 Flight Tests

Detailed material on flight testing is included in the applicable CS and GM.

GM 21.A.35(b)(2) 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, that are likely to occur when 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

The testing should cover both routine operations and some simulation of abnormal conditions. The details of the programme should be agreed with the Agency prior to commencement of testing.

It may be possible to combine this testing with any required to ~~show~~ demonstrate compliance with the applicable CS. This will be agreed on a case-by-case basis with the Agency.

Where possible, testing conditions should be defined with the co-operation of an operator.

A substantial proportion of the flying should be on a single aircraft. The flying should be carried out to a continuous schedule on an aircraft that is very close to the final type design, operated as though it were in service and should include a range of representative ambient operating conditions and airfields.

GM 21.A.35(f)(1) Flying Time for Function and Reliability Testing

All flying carried out with engines and associated systems not significantly different from the final type-certificate standard may count towards the 300 hours airframe flight time required by 21.A.35(f)(1). At least 150 of the 300 flying hours should be conducted on a dedicated production configured aircraft. The requirement for 300 hours relevant flight time whenever a new turbine engine is incorporated applies regardless of whether the airframe/engine combination is subject to a new type-certificate or is to be certificated as a change or supplement to an existing type-certificate.

GM 21.A.35(f)(2) Flying Time for Function and Reliability Testing

All flying carried out on an aircraft not significantly different from the final type design may count towards the 150 hours airframe flight time required by 21.A.35(f)(2).

Subpart D — Changes to type-certificates and restricted type certificates

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

1. PURPOSE OF CLASSIFICATION

Classification of changes to a type design into MAJOR or MINOR is to determine the approval route to be followed in Part 21 Subpart D, i.e., either 21.A.95 or 21.A.97, or alternatively whether application and approval has to be made in accordance with Part 21 Subpart E.

2. INTRODUCTION

2.1 21.A.91 proposes criteria for the classification of changes to a type design as minor and major.

- (i) This GM is intended to provide guidance on the term ‘appreciable effect’ affecting the airworthiness of the product from 21.A.91, where ‘airworthiness’ is interpreted in the context of a product in conformity with type design and in condition for safe operation. It provides complementary guidelines to assess a design change in order to fulfil the requirements of 21.A.91 and 21.A.117 where classification is the first step of a procedure.

Note: For classification of Repairs see GM 21.A.435.

- (ii) Although this GM provides guidance on the classification of major changes, as opposed to minor changes as defined in 21.A.91, the GM and 21.A.91 are deemed entirely compatible.

2.2 For an ETSO authorisation, 21.A.611 gives specific additional requirements for design changes to ETSO articles.

For APU, this GM should be used.

3. ASSESSMENT OF A DESIGN CHANGE FOR CLASSIFICATION

3.1 Changes to the type design

21.A.31 defines what constitutes the type design. Alteration to any of the data included within the scope of 21.A.31 is considered a change to the type design.

3.2 Classification Process (see attached diagram)

21.A.91 requires all changes to be classified as either major or minor, using the criteria of 21.A.91 and the complementary guidance of paragraph 3.3.

On some occasions, the classification process is initiated at a time when some data necessary to make a classification decision are not yet available. Therefore, the applicant should wait for availability of data before making a decision.

Wherever there is doubt as to the classification of a change, the Agency should be consulted for clarification.

When the strict application of the paragraph 3.3 criteria results in a major classification, the applicant may request re-classification, if justified, and Agency could take the responsibility in re-classifying the change.

A simple design change planned to be mandated by an airworthiness directive may be re-classified minor due to the involvement of the Agency in the continued airworthiness process.

Reasons for a classification decision should be recorded.

3.3 Complementary guidance for classification of changes.

A change to the type design is judged to have an ‘appreciable effect on other characteristics affecting the airworthiness of the product’ and therefore should be classified major, in particular but not only, when one or more of the following conditions are met:

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

- (i) Where the change requires an adjustment of the type-certification basis (such as special condition, equivalent safety finding, elect to comply, ~~exemption~~, ~~earlier certification specification~~ (reversion), later ~~requirements certification specification~~).
- (ii) Where the applicant proposes a new interpretation of the ~~requirements certification specifications~~ used for the type type-certification basis, that has not been published as AMC material or otherwise agreed with the Agency.
- (iii) Where the demonstration of compliance uses methods that have not been previously accepted as appropriate for the nature of the change to the product or for similar changes to other products designed by the applicant.
- (iv) Where the extent of new substantiation data necessary to comply with the applicable ~~airworthiness requirements certification specifications~~ and the degree to which the original substantiation data has to be re-assessed and re-evaluated is considerable.
- (v) The change alters the Airworthiness Limitations or the Operating Limitations.
- (vi) The change is made mandatory by an airworthiness directive or the change is the terminating action of an airworthiness directive (ref. 21.A.3B). See note 1.
- (vii) Where the change introduces or affects functions where the failure effect is classified catastrophic or hazardous

Note 1: The design change previously classified minor and approved prior to the airworthiness directive issuance decision needs no re-classification. However, the Agency retains the right to review the change and re-classify/re-approve if found necessary.

Note 2: These above conditions are an explanation of the criteria noted in 21.A.91.

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.

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

The information below is intended to provide a few major change examples per discipline, resulting from application of 21.A.91 and paragraph 3.3 conditions. It is not intended to present a comprehensive list of all major changes. Examples are categorised per discipline and are applicable to all products (aircraft, engines and propellers). However a particular change may involve more than one discipline, e.g., a change to engine controls may be covered in engines and systems (software).

Those involved with classification should always be aware of the interaction between disciplines and the consequences this will have when assessing the effects of a change (i.e., operations and structures, systems and structures, systems and systems, etc.; see example in paragraph 2 (ii).

Specific rules may exist which override the guidance of these examples.

In the Part 21 a negative definition is given of minor changes only. However in the following list of examples it was preferred to give examples of major changes.

Where in this list of examples the words 'has effect' or 'affect(s)' are used, they have always to be understood as being the opposite of 'no *appreciable* effect' as in the definition of minor change in 21.A.91. Strictly speaking the words 'has appreciable effect' and 'appreciably affect(s)' should have been used, but this has not been done to improve readability.

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 primary structural elements, such as spars, frames and critical parts;
- (iii) changes that adversely affect fatigue or damage tolerance or life limit characteristics;
- (iv) 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.
- change to the pitch between seat rows.
- change of distance between seat and adjacent obstacle like a divider.
- changes to cabin lay outs that affect evacuation path or access to exits.
- installation of new galleys, toilets, wardrobes, etc.
- installation of new type of electrically powered galley insert.

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

3. Flight

Changes which adversely affect the approved performance, such as high altitude operation, brake changes that affect braking performance.

Changes which adversely affect the flight envelope.

Changes which adversely affect the handling qualities of the product including changes to the flight controls function (gains adjustments, functional modification to software) or changes to the flight protection or warning system.

4. Systems

For systems assessed under CS 25.1309, the classification process is based on the functional aspects of the change and its potential effects on safety.

- (i) Where failure effect is 'Catastrophic' or 'Hazardous', the change should be classified as major.
- (ii) Where failure effect is 'major', the change should be classified as major if:
 - aspects of the compliance demonstration use means that have not been previously accepted for the nature of the change to the system; or
 - the change affects the pilot/system interface (displays, controls, approved procedures); or
 - the change introduces new types of functions/systems such as GPS primary, TCAS, Predictive windshear, HUD.

The assessment of the criteria for software changes to systems also needs to be performed.

When software is involved, account should be taken also of the following guidelines:

Where a change is made to software produced in accordance with the guidelines of [EUROCAE ED12B/RTCA DO-178B "Software Considerations in Airborne Systems and Equipment Certification"](#), [the latest edition of AMC 20-115 \(see AMC-20 document\)](#), the change should be classified as major if either of the following apply, and the failure effect is Catastrophic, Hazardous or Major:

- [\(4\(i\)\)](#) the executable code for software, determined to be Level A or Level B in accordance with the guidelines, is changed unless that change involves only a variation of a parameter value within a range already verified for the previous certification standard; or
- [\(2\(ii\)\)](#) the software is upgraded to or downgraded from Level A, Level B or Level C; or
- [\(3\(iii\)\)](#) the executable code, determined to be level C, is deeply changed, e.g., after a software re-engineering process accompanying a change of processor.

For software developed to guidelines other than [ED-12B/DO-178B](#) [the latest edition of AMC 20-115](#), the applicant should assess changes in accordance with the foregoing principles.

For other codes the principles noted above may be used. However, due consideration should be given to specific [requirements certification specifications](#)/interpretations.

5. Propellers

Changes to:

- diameter
- airfoil
- planform
- material
- blade retention system, etc.

6. Engines

Changes:

- (i) that adversely affect operating speeds, temperatures, and other limitations.
- (ii) that affect or introduce parts identified by CS E-510 where the failure effect has been shown to be hazardous.
- (iii) that affect or introduce engine critical parts (CS E-515) or their life limits.
- (iv) to a structural part which requires a re-substantiation of the fatigue and static load determination used during certification.
- (v) to any part of the engine which adversely affects the existing containment capability of the structure.
- (vi) that adversely affect the fuel, oil and air systems, which alter the method of operation, or require reinvestigation against the type-certification basis.

(vii) that introduce new materials or processes, particularly on critical components.

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
- (ii) affect systems the failure of which may have hazardous or catastrophic effects. The design assessment will include:
 - cooling system
 - lubrication system
 - rotor controls
- (iii) adversely affect the results of the rotor drive system endurance test, the rotor drive system being defined in CS 27/29.917.
- (iv) adversely affect the results of the shafting critical speed analysis required by CS 27/29.931.

8. Environment

The introductory text to Appendix A to GM 21.A.91 describes how in Part 21 a negative definition is given of minor changes only. This philosophy is similar to the manner in which the ICAO Standards and Recommended Practices for environmental protection (ICAO Annex 16) and the associated Guidance Material (ICAO Environmental Technical Manual) define changes affecting a product's environmental characteristics in terms of 'no-acoustical changes' and 'no-emissions changes' (i.e. changes which do not appreciably affect the product's environmental characteristics).

Following the general philosophy of this Appendix, however, it is preferred to give examples of changes which might have an appreciable effect on a product's environmental characteristics (i.e. the effect might be greater than the no-acoustic change and no-emissions change criteria) and might therefore lead to a major change classification.

Where a change is made to an aircraft or aircraft engine, the effect of the change on the product's environmental characteristics should be taken into account. Examples of changes that might have an appreciable effect on the product's environmental characteristics, and might therefore be classified as a major change, are listed below. The examples are not exhaustive and will not, in every case, result in an appreciable change to the product's environmental characteristics, and therefore, will not per-se and in every case result in a major change classification.

An appreciable effect is considered to be one which exceeds the ICAO criteria for a no-acoustical change or a no-emissions change. For the definition of a no-acoustical change refer to the section of the ICAO Environmental Technical Manual, Volume I (ICAO Doc 9501, Volume I – Procedures for the Noise Certification of Aircraft) concerning changes to aircraft type designs involving no-acoustical changes (see also the definitions of a 'derived version' in ICAO Annex 16, Volume I). For the definition of a no-emissions change refer to the section of the ICAO Environmental Technical Manual, Volume II (ICAO Doc 9501, Volume II – Procedures for the Emissions Certification of Aircraft Engines) concerning no-emissions changes.

- (i) Noise: A change that introduces either:
 - an increase in the noise certification level(s); or

- a reduction in the noise certification level(s) for which the applicant wishes to take credit.

Examples of noise-related changes that might lead to a major change classification are:

- (1) For jet and heavy (maximum take-off mass greater than 8618 kg) propeller-driven aeroplanes:
 - A change that might affect the aircraft's take-off performance including:
 - a change to the maximum take-off mass;
 - a change to V₂ ('take-off safety speed'); or
 - a change to the lift augmentation devices, including their configuration under normal take-off operating conditions.
 - A change that might affect the aircraft's landing performance including:
 - a change to the maximum landing mass;
 - a change to VREF (reference landing speed); or
 - a change to the lift augmentation devices, including their deployment under normal landing operating conditions.
 - A change to the Centre of Gravity (CG) limits;
 - A change that increases the aircraft's drag;
 - A change that alters the external profile of the aircraft, including the installation or change of shape or size of any item on the external surface of the aircraft that might protrude into the airflow such as winglets and vortex generators; generally the installation of small antennas does not represent an acoustical change;
 - A change that introduces an open-ended hollow cavity at more or less right angles to the airflow (e.g. hollow pins in undercarriage assemblies);
 - A change of engine or, if fitted, propeller type;
 - A change in engine thrust rating;
 - A change to the engine rotating parts or stators, such as geometry, blade profile or blade number;
 - A change to the aerodynamic flow lines through the engine;
 - A change that affects the engine thermodynamic cycle, including a change to the engine's bypass ratio;
 - A change to the engine nacelle, including a change to the acoustic liners;
 - A change to the engine exhaust;
 - A change to the engine bleed valves, including bleed valve scheduling;
 - A change in the operation of engine power off-takes (e.g. the operation of the Environmental Control System (ECS) during a normal take-off or approach);
 - A change to the Auxiliary Power Unit (APU), including associated operating limitations (e.g. a change that allows the APU to be operated during a normal approach when previously it was not allowed);
 - A change to the propeller pitch and/or propeller speed during a normal take-off or approach;
 - A change that causes a change to the angle at which air flows into the propeller.
- (2) For light (maximum take-off mass 8618 kg or less) propeller-driven aeroplanes:
 - A change that might affect the aircraft's take-off performance including:

- a change to the maximum take-off mass;
 - a change to the take-off distance;
 - a change to the rate of climb; or
 - a change to V_y (best rate of climb speed).
- A change that increases the aircraft's drag (e.g. the installation of external cargo pods, external fuel tanks, larger tyres to a fixed undercarriage, floats etc.);
 - A change of engine or propeller type;
 - A change in take-off power including a change in engine speed (tachometer 'red line') or, for piston engines, a change to the manifold pressure limitations;
 - A change to the highest power in the normal operating range ('top of green arc');
 - In the case of an aircraft where take-off power/engine speed is time limited, a change in the period over which take-off power/engine speed may be applied;
 - A change to the engine inlet or exhaust including, if fitted, the inlet or exhaust muffler;
 - A change in propeller diameter, tip shape, blade thickness or the number of blades;
 - The installation of a variable or adjustable pitch propeller in place of a fixed pitch propeller and vice versa;
 - A change that causes a change to the angle at which air flows into the propeller.

(3) For helicopters:

- A change that might affect the take-off and/or landing performance, including a change in take-off mass and V_Y (best rate of climb speed);
- A change to V_{NE} (never-exceed airspeed) or to V_H (airspeed in level flight obtained using the torque corresponding to minimum engine installed, maximum continuous power available for sea level pressure, 25°C ambient conditions at the relevant maximum certificated mass);
- A change to the maximum take-off engine power or maximum continuous power;
- A change to the gearbox torque limits;
- A change of engine type;
- A change to the engine intake or exhaust;
- A change to the maximum normal operating rpm of the main or tail rotors;
- A change to the main or tail rotors, including a change in diameter, blade thickness or blade tip profile.

Note: The effect on the helicopter's noise characteristics of either carrying external loads or the installation of external equipment need not be considered.

(ii) Emissions: A change that introduces an increase or decrease in the emissions certification levels. Examples of smoke and gaseous engine emission-related changes that might lead to a major change classification are:

- A change in engine thrust rating;
- A change to the aerodynamic flow lines through the engine;

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

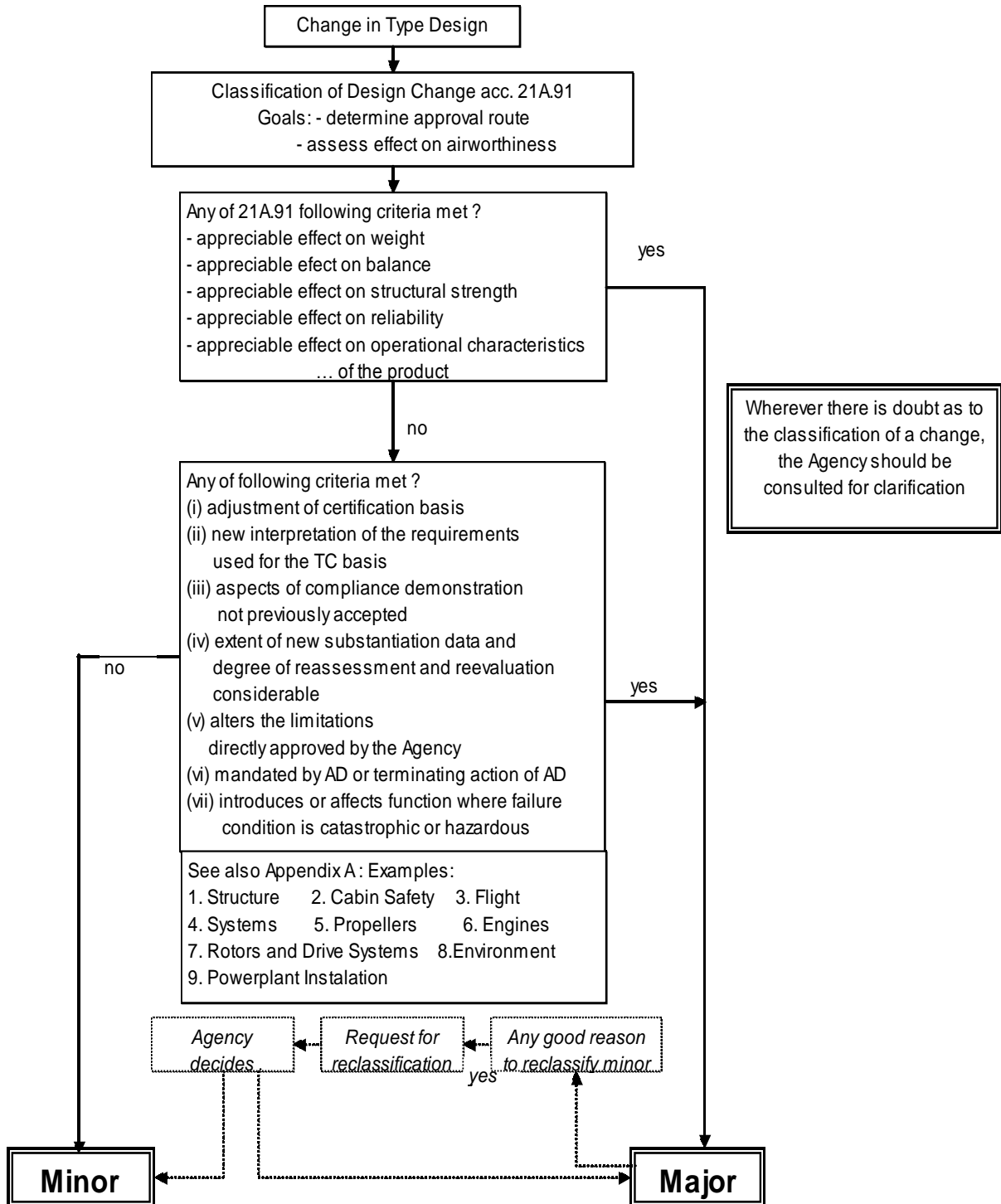
- A change that affects the engine thermodynamic cycle, specifically relevant engine cycle parameters (e.g. combustor pressure P3, combustor entry temperature T3, Air Fuel Ratio (AFR));
- A change to the compressor that might influence the combustor inlet conditions and engine overall pressure ratio;
- A change to the combustor design (geometry);
- A change to the cooling of the combustor;
- A change to the air mass flow through the combustor;
- A change that affects the fuel spray characteristics.

9. Power plant Installation

Changes which include:

- (i) control system changes which affect the engine/propeller/airframe interface;
- (ii) new instrumentation displaying operating limits;
- (iii) modifications to the fuel system and tanks (number, size and configuration);
- (iv) change of engine/propeller type.

Classification process



GM 21.A.93(b) Major Changes: Application

Identification of re-investigations necessary to ~~show~~ demonstrate compliance does not mean the ~~showing~~ demonstrating of compliance itself, but the list of affected ~~type design requirement paragraphs~~ certification specifications for which a new demonstration is necessary, together with the means (calculation, test or analysis) by which it is proposed to ~~show~~ demonstrate compliance.

AMC 21.A.97 Compliance demonstration process for major changes

1. AMC/GM to 21.A.20 should be used for a major change.
2. For major changes not requiring long and complex compliance demonstration activities, a certification programme, as described in AMC 21.A.20(b), can be submitted with the application in a simplified format. The certification programme should contain at least the following elements:
 - Purpose of change
 - Description of change
 - Applicability
 - Applicable certification specifications, special conditions, equivalent safety findings and environmental protection requirements
 - The description on how compliance will be demonstrated, with selected means of compliance (see Appendix to AMC 21.A.20(b) for the codes to be used) and reference to compliance documents
 - If relevant, the delivery schedule of compliance documents.

GM 21.A.101 Establishment of the type-certification basis of changed aeronautical products

Foreword

This guidance material (GM) provides guidance for the application of the Changed Product Rule (CPR) 21A.101 and 21A.19, for changes made to type-certificated aeronautical products.

Chapter 1. Introduction

1. Purpose
 - a. The Agency wrote this GM to provide guidance for establishing the type-certification basis for changed aeronautical products in accordance with 21.A.101 and to help identify if it will be necessary to apply for a new type-certificate (TC) under 21.A.19. The guidance describes the process for establishing the type-certification basis for changes to type certificates or restricted type-certificates, supplemental type certificates (STC) and amended STCs, detailing evaluations, classifications, and decisions made throughout the process.
 - b. The content of this GM is divided into 4 Chapters and 5 Appendices:
 - (1) Chapter 1 explains the purpose of this GM, describes its content, specifies the intended audience, and clarifies which changes are within the scope of applicability of this GM. Chapter 1 also contains definitions and terminology used in this GM for application of 21.A.101 and 21.A.19.

- (2) Chapter 2 provides a general overview of 21.A.101 and 21.A.19, clarifies the principles and safety objectives and directs applicants to the applicable guidance contained in subsequent chapters of this GM.
 - (3) Chapter 3 contains guidance for implementation of 21.A.101(a) and (b) to establish the type-certification basis for changed aeronautical products. Chapter 3 describes in detail the various steps of the 'top-down' certification basis development approach. Chapter 3 also addresses 21.A.19 considerations to identify conditions under which an applicant for a type design change is required to submit application for a new TC and provides guidance at which stage of the process this assessment is to be performed.
 - (4) Chapter 4 contains considerations for design related operating requirements, guidance for establishing type-certification basis for changes on certain small aeroplanes and rotorcraft under specified maximum weight ('excepted products'), guidance for use of special conditions under 21.A.101 (d), guidance on the effective period of an application, guidance for establishing the type-certification basis for changes on aircraft designed or modified for a special purpose (to operate under a restricted certificate of airworthiness) and guidance for documentation of revisions to the type-certification basis.
 - (5) Appendix A contains examples of typical type design changes for small aeroplanes, large aeroplanes, rotorcraft, engines, and propellers which are categorised by the Agency into individual tables according to the classifications to the level of design change - substantial, significant, and not significant.
 - (6) Appendix B provides detailed guidance with examples for evaluating when compliance would be impractical under the 'impracticality' exception in the rule.
 - (7) Appendix C provides guidance with examples on use of relevant service experience in the certification process as one way to show that ~~a later amendment~~ the latest certification specifications may not contribute materially to the level of safety, allowing the use of earlier certification specifications.
 - (8) Appendix D contains figures and tables considered useful for understanding of the basic terms used and their mutual relations to assist correct application of this GM.
 - (9) Appendix E contains cross-references to relevant requirements of Part 21 related to application of 21.A.19 and 21.A.101.
- c. This GM describes an acceptable means, but not the only means to comply with 21.A.101 and 21.A.19. However, if an applicant chooses to use the means described in this GM, they must follow it entirely.

2. Audience

This GM is for applicants applying for:

- major changes to type design of products under 21.A.97 and to type design of Auxiliary Power Units (APUs) under 21.A.604(b)),
- supplemental type-certificates (STCs) under 21.A.113, or
- major changes to STCs under 21.117 (b).

3. Applicability

- a. *Reserved.*
- b. This GM applies to major type design changes under 21.A.101 for aeronautical products type-certificated, restricted type-certificated, supplemental type-certificated or ETSO approved (APU) under Part 21 (ref. 21.A.21, 21.A.23, 21.A.115, 21.A.604), with application for the type-certification basis of the airworthiness code of the applicable CS (CS-VLA, CS-22, CS-23, CS-25 etc.).
- c. Minor type design changes are automatically considered not significant under 21.A.101(b) and the existing type-certification basis is considered adequate for their approval under 21.A.95.

- d. *Reserved.*
- e. For the purpose of this GM, the term aeronautical products, or products, means type-certificated or restricted type-certificated aircraft, engines, and propellers or ETSO approved APUs.
- f. This GM is not intended to be used to determine the applicable environmental protection requirements (aircraft noise, fuel venting and exhaust emission requirements) for changed products.

4. Definitions and Terminology

Adequate Type-certification Basis – The type-certification basis for a changed product under 21.A.101 is considered adequate when the Agency determines that it provides adequate standards for the design change, i.e. when the certification specifications of the applicable airworthiness code and prescribed special conditions provide an appropriate level of safety for the changed product and do not result in any unsafe design features.

Aeronautical product – The terms aeronautical product or product(s) used in this guidance material include type-certificated or restricted type-certificated aircraft, engines, propellers and ETSO approved Auxiliary Power Units (APUs).

Affected area, system, part or appliance – any system, part, or appliance which is either physically altered by a proposed design change or, even if not altered physically, its functional characteristics are altered due to the effects of the physical change.

Design change – A change in the type design of an aeronautical product. In the context of this document the terms ‘change’, ‘design change’ and ‘type design change’ are synonymous.

Earlier certification specifications – The certification specifications of the applicable airworthiness code in effect prior to the date of application for the change, but not prior to the existing type-certification basis.

Existing type-certification basis – The certification specifications of the applicable airworthiness code, special conditions and equivalent level of safety findings incorporated by reference in the type-certificate of the product to be changed.

Latest certification specifications – The certification specifications of the applicable airworthiness code in effect on the date of application for the change.

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 were applied.

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

Secondary change – A change is a secondary change if compliance to the latest amendment would not contribute materially to the level of safety and where it is part of and consequential to an overall significant change. A secondary change is a physical change that restores without changing the system, structural capacity, or functionality, but is necessary to support a significant change.

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

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

Substantial change – A change which is so extensive that a substantially complete investigation of compliance with the applicable type-certification basis is required, and consequently a new type certificate, in accordance with 21.A.19.

Type-certification basis – The certification specifications of the applicable airworthiness code as established in 21.A.17 and 21.A.101, as appropriate; special conditions; and equivalent level of safety findings applicable to the product to be certificated.

Chapter 2. Overview of 21.A.19 and 21.A.101**1. 21.A.19**

- a. 21.A.19 requires an applicant to obtain a new type-certificate (TC) for a changed product if the change in design, power, thrust, or weight is found by the Agency so extensive that a substantially complete investigation of compliance with the applicable type-certification basis is required.
- b. Changes that require a substantial re-evaluation of the product's compliance findings are referred to as 'substantial changes'. For guidance, see Section 3 of Chapter 3. Appendix A to this GM provides examples of type design changes that will require application for a new TC.
- c. If the Agency has determined through 21.A.19 that the proposed design change does not require a new TC, see 21.A.101 for the applicable implementing rules to establish the type-certification basis for the proposed design change. For guidance, see Chapter 3 and the examples in Appendix A of this GM.

2. 21.A.101

- a. 21.A.101(a) requires a change to a TC to comply with the **latest** certification specifications of the airworthiness code that is applicable to the changed product and that is in effect at the date of the application for the change, unless the change meets the criteria for the exceptions identified in 21.A.101(b) and (c) or compliance with certification specifications of later effective amendments is chosen by the applicant or required under 21.A.101(e) and (f). The intent of 21.A.101 is to enhance safety through the incorporation of the latest regulatory standards in the type-certification basis for changed products to the greatest extent practicable.
- b. An applicant can comply with certification specifications of an earlier amendment of the airworthiness code consistent with the requirements of 21.A.101(b), when:
 - a change is not significant (see 21.A.101(b)(1)), or
 - an area, system, part or appliance is not affected by the change (see 21.A.101 (b) (2)), or
 - compliance with the latest amendment for a significant change does not contribute materially to the level of safety (see 21.A.101(b)(3)), or
 - compliance with the latest amendment would be impractical (see 21.A.101(b)(3)).
- c. Note that earlier amendments may not precede the corresponding amendment of the airworthiness code incorporated by reference in the type-certificate.
- d. 21.A.101(b) allows a changed product to comply with an earlier amendment of the applicable airworthiness code, provided one of the criteria in 21.A.101(b)(1),(2) or (3) are met and the earlier amendment is considered adequate. However, when a proposed design change involves features or characteristics considered novel or unusual, or the intended use of the changed product is unconventional, or experience from other similar products in service or products having similar design features has shown that unsafe conditions may develop, and the proposed ~~airworthiness standards~~ certification specifications do not contain adequate or appropriate standards for the changed product, later amendments and/or special conditions will be applied.
- e. 21.A.101(b)(1)(i) and (ii) describe the automatic criteria establishing that a change is significant.
- f. 21.A.101(c) provides an exception from the requirements of 21.A.101(a) for a change to certain aircraft with less than specified maximum weight. If an applicant applies for a type design change to an aircraft (other than rotorcraft) of 2 722 kg (6 000 pounds) or less maximum weight, or to a non-turbine powered rotorcraft of 1 361 kg (3 000 pounds) or less maximum weight, the applicant can **show demonstrate** that the changed product complies with the type-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 Chapter 4, Section 2 in this GM for specific guidance on this provision.

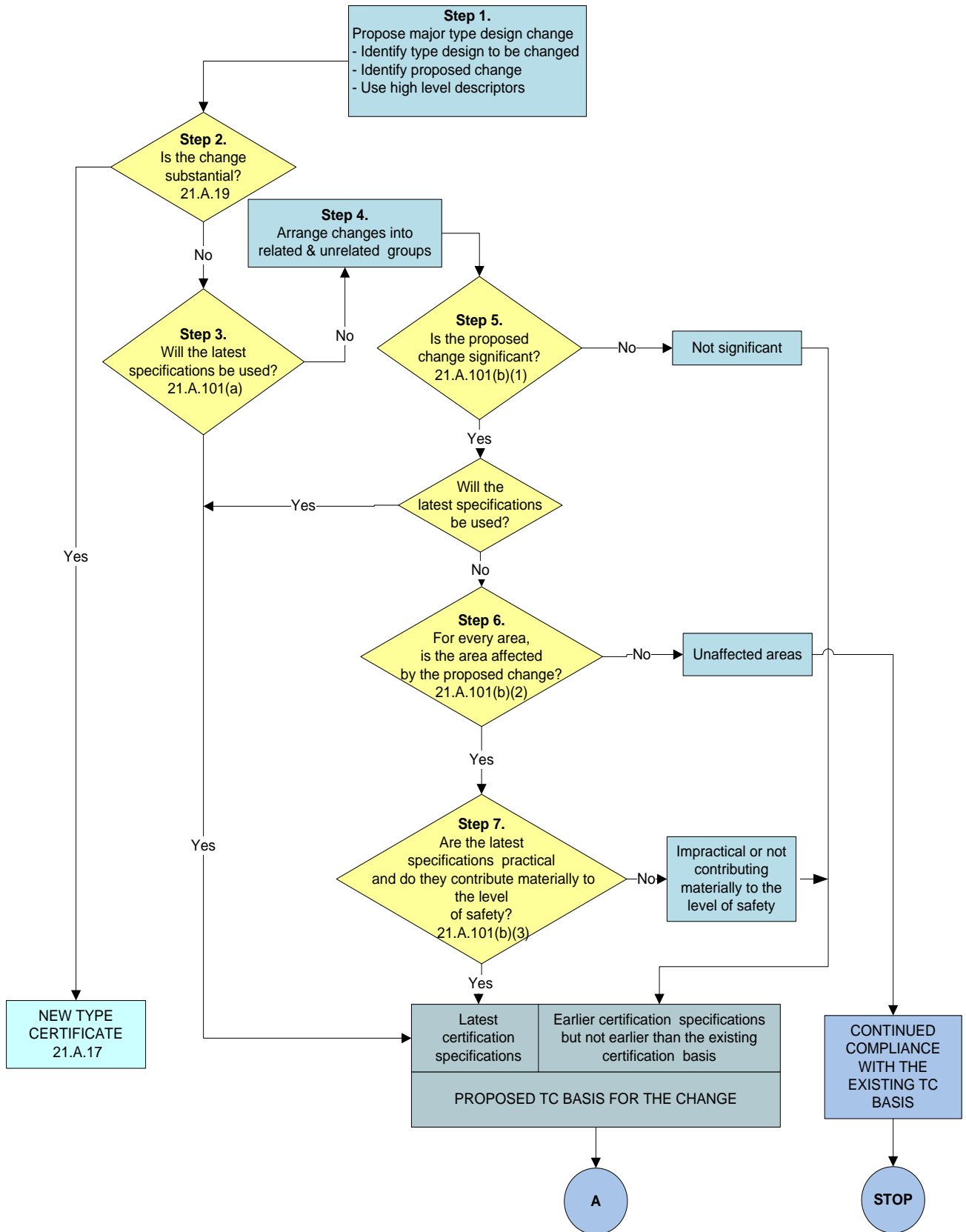
- g. 21.A.101(d) provides for the use of special conditions, under 21.A.16B, when the proposed amendment of the applicable airworthiness code and any later amendment do not provide adequate standards to the proposed change.
- h. 21.A.101(e) prescribes the effective period an application will remain valid for a change. This section is consistent with the requirements of 21.17 for a new TC.
- i. 21.A.101(f) requires that if an applicant chooses (elects) to comply with a certification specification of an amendment to the airworthiness codes that is effective after the filing of the application for a change to a type, the applicant shall also comply with any other certification specification that the Agency finds is directly related.

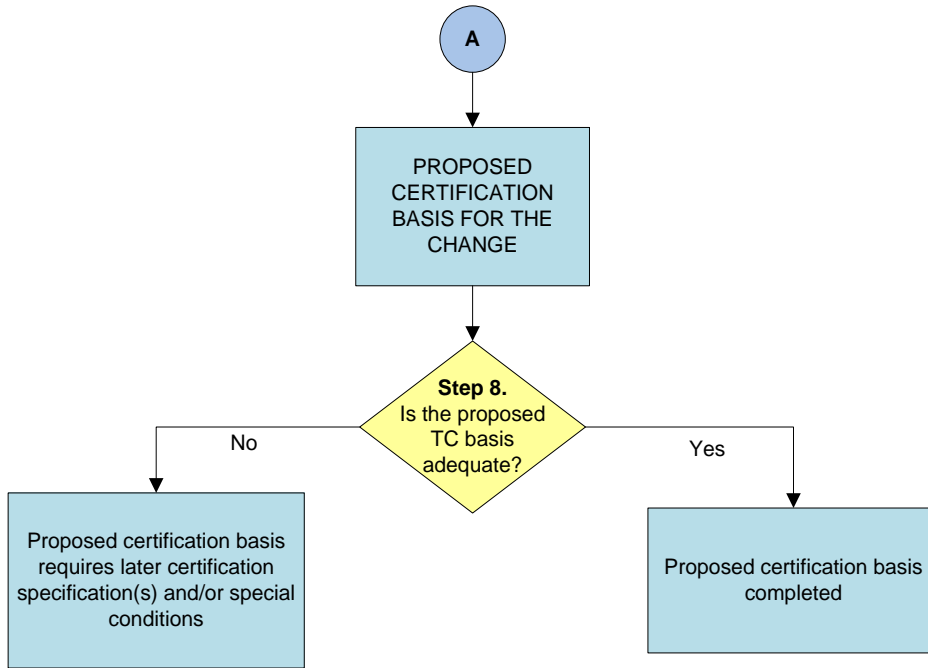
Chapter 3. The process for establishing the type-certification basis for changed products 21.A.101 (a) and (b)

1. Overview

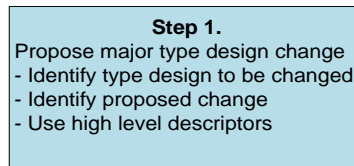
- a. Both the applicant and the Agency have responsibility under 21.A.101(a) and (b). The applicant must **show demonstrate** that the change complies with the latest applicable certification specifications unless use of an exception per 21.A.101(b) is justified. If an exception is proposed, the applicant should make a preliminary classification whether the change is significant or not significant, and propose an appropriate type-certification basis. The Agency determines whether the applicant's classification of the change and proposal for the type-certification basis are consistent with the applicable rules and their interpretation, but should not be dependent on whether the TC holder or applicant for a STC is originating the change. The type-certification basis can vary depending on the magnitude and scope of the change. The steps below present a streamlined approach for making this determination. In addition to assisting in the determination of significance and establishing the type-certification basis, this guidance will help to establish the appropriate amount of coordination required between the applicant and the Agency.
- b. Classifications of typical type design changes are in Appendix A, *Classification of Changes*. See paragraph 6(c) of this chapter for instructions on how to use Appendix A.
- c. In cases where the examples in Appendix A are not applicable for the proposed change, use the following steps in conjunction with Figure 1 on the next page to establish the appropriate type-certification basis for the type design change.

Figure 1. Establishing the type-certification basis for a changed product





2. Step 1 of Figure 1. Identify the proposed type design change to an aeronautical product



- a. Prior to describing the proposed change(s), it is important to clearly identify the type design configuration to be changed. A series of derivative aircraft, engines, or propellers (for example, x-100, x-200, x-300) may evolve based on predecessor type designs, each with its own design changes that make it distinct from the other series. The applicant should identify which model or series within that model is the specific configuration that will be modified.

Note: An STC is not a product; it is a change to a product. When changing or amending an STC the starting point is the existing modified product (TC with existing STC installed). For example, if an applicant were amending an STC for an external cargo locker and the applicant proposed changing the configuration of the locker, then the starting point would be the existing TC with the existing STC installed. The applicant would then compare that configuration (TC with existing STC installed) to the changed product (TC with proposed amended STC installed).

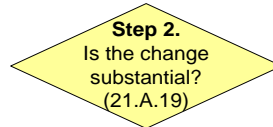
- b. Changes to a product can include physical design changes, changes to an operating envelope and/or performance changes. The change can be a single change or a collection of changes. The purpose of this process step is to identify and describe the change to the aeronautical product. The applicant for a type design change should consider all previous related design changes and the amendment level of the type-certification basis for these changes.

Note 1: By definition all previously incorporated changes have been approved. The purpose of step 1 is to consider the net cumulative effect of the changes since the last time the certification basis for the changed/affected area was upgraded from that of the original type design.

Note 2: Substantiating data for the proposed type design change can include compliance findings from a previously approved design change, in supporting compliance findings for the proposed change. However, for the purpose of classifying the proposed design change, such previously approved design and compliance data should be now considered in relation to the proposed type design change and should be taken into account as a part of the proposed design change classification.

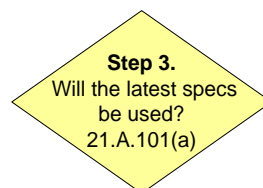
- c. When identifying the changes being proposed as part of a modification, consider previous relevant changes that create a cumulative effect, as these may influence the decisions regarding substantial and significant changes later in the process. By previous relevant changes those design changes are meant whose effects accumulate, such as successive thrust increases, incremental weight increases, or sectional increases in fuselage length. Any previous relevant design changes in the area affected by the current change that did not involve an upgrade of the existing type-certification basis should be taken into account in the next design change proposal.
- (1) **Example 1:** A 5 % weight increase is currently being proposed, but a previous 10 % and another 15 % weight increase has been incorporated into this aircraft without upgrading the existing type-certification basis. In the current proposal for a 5 % weight increase, the cumulative effects of the two previous weight increases that did not involve upgrade of the type-certification basis will now be accounted for as an approximately 30 % increase in weight, for the purpose of making the substantial and/or significant decisions. Note that the cumulative effects to be considered are only those incremental increases from the last time the applicable certification specifications in the type-certification basis were upgraded.
- (2) **Example 2:** The TC for aeroplane model X lists three series, namely X-300, X-200, and X-100. The X-300 is a derivative of the X-200 which is a derivative of the original X-100 series. An applicant proposes a design change to the X-300 series aeroplane. During the review of the X-300 type-certification basis and the certification specifications affected by the proposed change, it was identified that one certification specification, CS-25.571 (damage tolerance), remained at the same amendment level as the X-100 original type-certification basis (derogation from 21.A.101(a) was allowed). Since the amendment level for this particular certification specification was not changed for the two subsequent aeroplane series (X-200 and X-300), the cumulative effects of these two previous design changes that are related to the proposed change and the damage tolerance requirements should now be addressed.
- d. To identify and describe the proposed changes to any aeronautical product, use a high-level description of the design 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 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 design change. Similarly, a thrust increase, a complete new 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.
- e. **Evolutionary Changes.** Evolutionary changes that occur during the course of a certification programme may require re-evaluation of the type-certification basis and may result in re-classification of the change. That is, any evolution in the proposed design change after the type-certification basis has been agreed to (or established) will necessitate a revisit of the type-certification basis to ensure that 'evolved' aspects of the design change are still covered by the agreed upon certification basis.

3. Step 2 of Figure 1. Is the change substantial?



- a. 21.A.19 requires an applicant to apply for a new TC for a changed product if the proposed change in design, power, thrust, or weight is so extensive that a substantially complete investigation of compliance with the applicable [regulations](#) [type-certification basis](#) is required. A new TC could be required for either an extensive change to a previously type-certificated product or for a changed design derived through the cumulative effect of a series of design changes from a previously type-certificated product.
- b. A 'substantially complete investigation' of compliance is required when most of the existing substantiation is not applicable to the changed product. A substantial change proposal will require the need to comply with all the certification specifications applicable to a particular category of product. The number of certification specifications to which compliance must be re-established for the changed product may not necessarily be the sole determination criteria as to whether the change is substantial, but rather the extent of effort to establish compliance, or the depth of investigation required to be done. In other words, the design change may be considered 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.
- c. To address the question if a change is substantial at the beginning of the process, the applicant should evaluate the total or combined effect of all the proposed changes identified in Step 1, including the cumulative effects of previous relevant design changes since the last update of the type-certification basis (as explained in Step 1).
- d. If it is not initially clear that a new TC is required, Appendix A provides some examples of substantial changes to aid in this classification. A substantial change requires application for a new TC under 21.A.17 and 21.A.19. If the change is not substantial, then follow the 21.A.101 process.

4. Step 3 of Figure 1. Will the latest certification specifications be used?



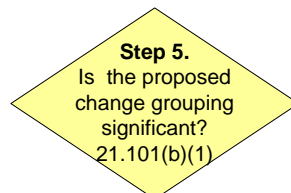
- a. The applicant can [upfront elect to](#) use the latest certification specifications for their proposed type design change. If the latest certification specifications are used, the applicant will meet the intent of 21.A.101 and no further classification (significant or not significant) and justification is needed. However, the decision to voluntarily comply with the latest certification [standards](#) [specifications](#) for a design change sets a new regulatory baseline for all future related changes in the same affected area. Even though one applicant elects to use the latest certification [requirements](#) [specifications](#), another applicant could apply 21.A.101 for a similar design change proposal, and use the exceptions in accordance with 21.A.101(b). If the latest certification specifications are not used, then proceed as follows:

5. Step 4 of Figure 1. Relation of changes

Step 4
Arrange changes into
related & unrelated groups

- a. Once the proposed changes are identified using high-level descriptions, the next step is to determine if any of these changes are related to each other. Related changes are those that cannot exist without one another, are co-dependent, or a prerequisite of one another. For example, a need to carry more passengers could require the addition of a fuselage plug, which will result in a weight increase, and may necessitate a thrust increase. Thus the fuselage plug, weight increase and thrust increase are all related high-level changes that will be needed to achieve the goal of carrying more passengers. A decision to upgrade the cockpit to more modern avionics at the same time as these other design 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 complete new interior may be considered related since a cabin length change will have an impact on occupant safety considerations. 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.
- b. Once the change(s) are organised into groupings of those that are related and those that are unrelated (or stand-alone), the applicant is ready for Step 5 of Figure 1. The grouping of related and unrelated changes is particularly relevant to the 'significant' Yes/No decision, (21.A.101(b)(1)), described in Step 5 of Figure 1. Each group of related changes and each unrelated (stand-alone) change is evaluated on its own merit for significance.
- c. After describing the groupings and the associated or supporting technical details for each change, the applicant should identify areas, systems, parts or appliances of the product that are affected by the design change and the corresponding certification specifications associated with these areas. For each group, the applicant should assess the physical and/or functional effects of the change on other 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, 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.

6. Step 5 of Figure 1. Is the proposed change significant?
(21.A.101(b)(1))



- a. In Step 5 it is the applicant's responsibility to justify that a grouping of related changes or an unrelated change does not qualify as a significant change. Significant changes are product level changes which are distinct from the vast majority of major changes. In general, these changes are either the result of an accumulation of changes or occur through an isolated extensive change that makes the changed product distinct from its predecessors. Step 1 explains the accumulation of changes that should be considered.

21.A.101(b)(1) defines a significant change as existing when one or more of three automatic criteria apply:

- (1) **Changes where the general configuration is not retained (significant change to general configuration).** A change to the general configuration at the product level 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 aircraft model number, although this is not required. For examples, see Appendix A to this GM.
- (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 affect the overall products' operating characteristics or inherent strength and would require extensive reinvestigation to [show demonstrate](#) compliance. For examples, see Appendix A to this GM.
- (3) **Changes that invalidate the assumptions used for certification (significant change to the assumptions used for certification).** A change to the assumptions at the product level associated with the compliance demonstration, performance or operating envelope that by itself is so different that the original assumptions or methodologies of demonstrating compliance are invalidated. For examples, see Appendix A to this GM.

Note: The word 'assumptions' in 21.A.101 bears a meaning different from CS E-30 and CS-P-30. CS-E and CS-P address the conditions that may be imposed on the engine or propeller when it is eventually installed in the aircraft and are published in the installation manual.

- b. The above criteria are used to determine if each change grouping and each stand-alone change is significant. These three criteria are assessed at the product level. In applying the automatic criteria the applicant should focus on the design change itself. Consideration of only the regulatory importance or safety benefit of the latest certification specifications is not a justification by itself to cause a design change to be classified or re-classified as a significant change.
- c. Appendix A includes tables of typical changes for large aeroplanes, small aeroplanes, rotorcraft, and engines/propellers that meet the definition of significant. The appendix also includes typical changes that do not achieve the significant level. In these tables, one or more of the three automatic criteria in 21.A.101(b)(1) apply for each case where the changes are identified as significant. Experience has shown the concept of having only the three automatic criteria seems to fit most projects. The tables can be used in one of two ways:
 - (1) To classify a proposed change that is listed in the table, or
 - (2) In conjunction with the three automatic criteria, to help classify a proposed change not listed in the tables of the appendix by comparing the proposed change to changes which are similar in type and/or magnitude.
- d. Design changes can trigger one or more of the automatic criteria listed in 21.A.101(b)(1)(i) and (ii) for the proposed design change. When assessing the design change grouping, consider the cumulative effect of previous relevant design changes. Design changes may have been incorporated over time with no change in the type-certification basis and the final product may be significantly different than would be represented by the existing type-certification basis.
- e. Each grouping of related changes and each unrelated (stand-alone) change, identified using high-level descriptions, will be evaluated to determine if it is a significant or not significant change. Use the tables in Appendix A as guidance to make the classification of significant or not significant. Only when one or more of the three criteria is met, the type design change can be considered significant for that grouping or unrelated change. The starting point for assessing the cumulative effects of previous relevant design changes is from the last time the applicable certification specifications in the type-certification basis for the affected area, system, part, or appliance were upgraded.

- f. Typically, a change to a single area, system, part or appliance may not result in a product level change. However, there may be distinct cases where the change to a single system or part may, in fact, result in a significant change due to its effect on the product overall. Examples may include addition of winglets, leading edge slats or change in primary flight controls to fly-by-wire system.
- g. A change is a secondary change if compliance to the latest amendment does not contribute materially to the level of safety and where it is part of and consequential to an overall significant change. A secondary change is a physical change that restores without changing the system, structural capacity or functionality, but is necessary to support a significant change. Based on this description, a secondary change is not required to comply with the latest certification specifications because it is considered 'not contributing materially to the level of safety', and therefore eligible for an exception under 21.A.101(b)(4)(3). Determining whether a change meets the description for secondary change, and thus is 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 very likely not a secondary change.
 - (1) In some cases the change which restores functionality may in fact contribute materially to the level of safety by meeting a later amendment. If this is the case, it would not be considered a secondary change.
 - (2) An example of secondary change is lengthening existing control cables passing through the new fuselage plug to restore existing functions to systems that could be situated within or beyond the new plug. The lengthening of these cables can be accepted as not adding system capacity or capability, so these changes can be identified as secondary changes and not be required to meet the latest amendment.
- h. A new model number designation to a changed product is not necessarily indicative that the design change is significant under 21.A.101. Conversely, retaining the existing model designation does not mean that the design change is not significant. All changes are considered in light of the magnitude of the type design change.
- i. Making the determination. The final determination of whether a design change is significant or not significant is retained by the Agency. To assist the applicant in their assessment, the Agency has predetermined the classification of several typical design changes that can be used for reference, and these examples are listed in Appendix A to this GM.
- j. At this point, the determination of significant or not significant for each of the groupings of related changes and each stand-alone change has been made. For significant changes, if the applicant proposes to comply with an earlier requirement, the procedure outlined in paragraph 7 below should be used.

7. Proposing an amendment level for a significant change

- a. If an unrelated (stand-alone) change or a grouping of related changes is classified as significant, the applicant will comply with certification specifications of the latest amendment of the applicable airworthiness code for certification of the changed product, unless the applicant can justify use of one of the exceptions provided in 21.A.101(b)(2) and/or (3) to **show demonstrate** compliance with earlier amendment(s). The final type-certification basis may consist of a combination of certification specifications of the applicable airworthiness code at different amendment levels ranging from the original type-certification basis to the most current amendments.
- b. If the classification of the change is significant, all areas, systems, parts or appliances affected by the change must comply with certification specifications of the applicable airworthiness code at the amendment level in effect on the date of application for the change. The applicant will need to show that an area, system, part or appliance is not

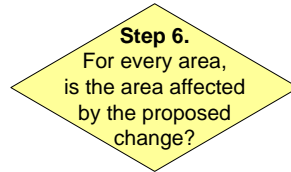
affected by the change to justify use of the exception in 21.A.101(b)(2) (see Section 9 for guidance on whether or not an area is affected by the proposed change).

- c. *Reserved.*
- d. 21.A.101(b)(3) provides two more exceptions applicable to areas, systems, parts or appliances which are affected by the significant change but for which compliance with the latest [requirements](#) [certification specifications](#) would either not contribute materially to the level of safety or would be impractical (see Section 10 for more guidance).
- e. *Reserved.*
- f. The applicant should provide acceptable justification for the application of earlier amendments for areas affected by a significant change. Your justification should show that compliance with later amendment in these areas would not contribute materially to the level of safety or would be impractical. Such justification should address all the aspects of the area, system, part or appliance affected by the significant change.
- g. The final type-certification basis may combine certification specifications at the latest amendment level, earlier (intermediate) amendment levels, and the amendment level of the existing type-certification basis, but cannot contain certification specifications preceding the existing type-certification basis.
- h. Note that should an applicant decide to use the latest certification specifications without any exceptions, no further evaluations and justifications are needed. In such a case, proceed to step 8 (Section 11).

8. Proposing an amendment level for a not significant change

- a. When a change is classified not significant, the rule (21.A.101(b)(1)) allows the use of the earlier certification specifications, but not dated prior to the existing type-certification basis. Within this limit, the applicant is allowed to propose an amendment level for each certification specification for the affected area. However, the applicant should be aware that their proposal for the type-certification basis will be reviewed by the Agency to ensure that the type-certification basis is adequate for the proposed change (see paragraph 8.d).
- b. *Reserved*
- c. When choosing the above option of the existing type-certification basis, an applicant can elect to comply with a specific certification specification or a subset of certification specifications at later amendments. In such a case, the applicant should consult with the Agency to ensure the type-certification basis includes other certification specifications that are directly related. Some later certification specifications may be less restrictive; therefore, the applicant may see advantage in using them on the elect to comply basis. However, the applicant is recommended not to make a final decision until they have learned from the Agency which other certification specifications are considered directly related.
- d. For a design change that contains features which are not covered in the proposed type-certification basis, i.e. when the type-certification basis is not considered 'adequate' (see the definition of 'adequate type-certification basis' in ~~4.d of~~ Chapter 1, [Section 4](#)), the Agency will designate the applicable certification specifications at the appropriate amendment level, beginning with the existing type certification basis and progressing to the most appropriate later amendment level for the change. For a change that contains new design features that are novel or unusual, for which there is no later applicable certification specification, the Agency will designate special conditions.

9. **Step 6 of Figure 1. Is the area affected by the proposed change?**
~~(21A.101(b)(2))~~

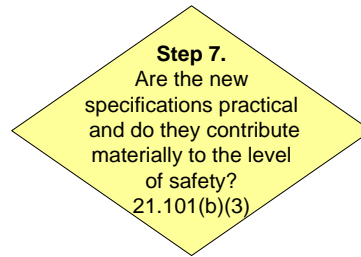


- a. ~~A not affected~~ An unaffected area is any area, system, part, or appliance that is not affected by the proposed type design change. For a type design change, it is important that the effects of such change on other areas, systems, parts, or appliances of the product are properly assessed because 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. If the significant change does not affect the area, then the type-certification basis of that area does not need to be revisited, in other words, the unaffected area continues to comply with the existing amendment level without further substantiation.
- b. To determine whether an area is affected or not, consider the following aspects of a type design change:
- (1) Physical aspects. The physical aspects include direct changes to structures, systems, parts, and appliances (physical aspects may include software/airborne electronic hardware changes and the resulting effect on systems functions).
 - (2) Performance/functional characteristics. The less obvious aspect of the word 'areas' covers general characteristics of the type-certificated product, such as performance features, handling qualities, emergency egress, structural integrity, aeroelastic characteristics, or crashworthiness. These characteristics may be affected by a product level change. For example, adding a fuselage plug could affect performance and handling qualities, and thus specifications associated with these aspects would be considered part of the affected area. Another example is the addition of a fuel tank and new fuel conditioning unit. This change affects the fuel transfer and fuel quantity indication system resulting in the aeroplane's unchanged fuel tanks being affected. Thus, the entire fuel system (changed and unchanged areas) becomes part of the affected area due to the change in functional characteristics.

Note: Substantiating data for the affected area for a proposed type design change can include compliance findings from a previously approved design change, in supporting compliance findings for your proposal. However, your proposal to use previously approved compliance data must be considered part of the entire proposed type design change and should be approved as part of your proposed design change.

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

10. **Step 7 of Figure 1. Are the latest certification specifications practical and do they contribute materially to the level of safety?** ~~(21A.101(b)(3))~~



- a. **Contribute materially to the level of safety.** Compliance with the latest certification specifications could be considered not to 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. The applicant should provide sufficient justification to allow the Agency to make this determination. This exception could be applicable in the situations described in the paragraphs below:

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

- (1) Design features that exceed the existing type-certification basis specifications, but do not meet the latest certification specifications, can be used as a basis for granting an exception under the 'does not contribute materially' exception. These design features, if accepted as a justification for an exception, must be incorporated in the amended type design configuration and recorded in the TCDS or STC, where necessary, as an integral part of the type-certification basis. For example¹, an applicant proposes to install winglets on a Part-25 airplane. Part of the design involves adding a small number of new wing fuel tank fasteners. The latest § 25.981 at amendment 25-102 requires structural lightning protection. The applicant proposes an exception from these latest structural lightning protection **requirements certification specifications** 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 be accepted as an exception to compliance with the latest amendment.
- (2) Consistency of design should be considered when applying the latest certification specifications. Below, an aeroplane example is provided for describing how this provision may be used; however, the rationale in this example may be applied to any product covered by this GM.
 - 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.
 - However, if a fuselage plug is large enough in relation to the original certificated aircraft structure, seats, bins, doors, and cargo compartment, the change may require compliance with the latest certification specifications, comparable with what will be required for a new aeroplane. In these circumstances the proposed type-certification basis should encompass the certification specifications in effect on the date of application for the change.
- (3) Service experience: Relevant service experience, such as fleet performance or

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

utilisation over time (relevant flight hours or cycles), is one way of showing that a later amendment may not contribute materially to the level of safety, so the use of earlier certification specifications could be appropriate. Appendix C provides additional guidance on the use of service experience, along with examples.

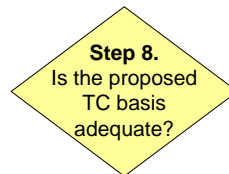
- There may be cases for rotorcraft and small aeroplanes where relevant data may not be sufficient or not available at all because of the reduced utilisation and the different amount and type of data available. In such cases, other service history information may provide sufficient data to justify the 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.
 - The service experience levels necessary to demonstrate the appropriate level of safety as they relate to the proposed design change would have to be reviewed and agreed to by the Agency.
- b. **Impractical.** Compliance with the latest certification specifications may be considered impractical if the applicant can justify that it would result in additional resource requirements that are not commensurate with the incremental safety benefit (difference between the latest and the proposed type-certification basis). The additional resource requirements could include those arising from design changes required for compliance and the effort required to demonstrate compliance, but excludes resource expenditures for prior product changes.
- (1) The position that compliance is impractical should be supported with a substantiating data and analyses. While evaluating the applicant's position and their substantiating data regarding impracticality, the Agency may consider other factors (for example, the costs and safety benefits for a comparable new design).
 - (2) A review of large aeroplane projects showed that in certain cases, where an earlier amendment to applicable certification specifications was allowed, design changes were made to nearly comply with the latest amendments. In these cases, the applicants were able to successfully demonstrate 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 under the 'impracticality' exception.
 - (3) Appendix B provides additional guidance and examples for determining procedures for evaluating impracticality of applying latest certification specifications to a changed product rule.
 - a) The exception of impracticality is a qualitative and/or quantitative cost/safety benefit assessment for which it is difficult to specify clear criteria. Experience to date with applicants has shown that justification of impracticality is more feasible when both applicant and authority agree at an earlier discussion that the effort (in terms of cost, changes in 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 cost analysis could always be used to support an appropriate amendment level).

Note: The impractical exception should not be based on the size of the applicant's company or their financial resources. Costs to comply with a later amendment should be evaluated against the safety benefit of complying with the later amendment. Applicants that may not be able to afford the cost because of reasons such as fewer resources, will not be granted the impractical exception when the cost is comparable to the safety benefit achieved by complying with a later amendment.

 - b) For example, a complex redesign of an area of the baseline aircraft may be required to comply with a new certification specification, and that redesign may make the changed product uncommon with respect to design and

manufacturing processes from the existing family of derivatives. 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 that would be realised by complying with the later amendment would be minimal, and this would be justified with a demonstrated acceptable service experience in relation to the hazard that the new certification specification addresses.

11. Step 8 of Figure 1. Is the proposed type-certification basis adequate?



- a. Regardless of whether the change is significant or not, the applicant's proposed type-certification basis may be deemed inadequate – that is, the change includes features or characteristics that were not foreseen during the initial (or previously approved) type-certification. These features or characteristics, if not adequately addressed, may make the product unsafe for the uses for which certification is requested. This would obstruct issuance of the requested approval for the change. The change must comply with later standards (such as, a later amendment or a special condition). An example is adding a flight critical system such as an electronic air data display on [Part CS-25](#) aeroplane whose existing type-certification basis did not have lightning protection [requirements certification specifications](#). In this case, compliance with the certification specification for lightning protection will be required, even though this is not a significant change.
- b. In cases where inadequate or no [airworthiness standards certification specifications](#) exist for the change in the proposed type-certification basis, but adequate standards exist in a subsequent amendment of the applicable airworthiness code, the subsequent amendment will be made part of the type-certification basis to assure its adequacy.
- c. In cases where no adequate standard exists in any subsequent amendment of the applicable airworthiness code because of one or more reasons specified in 21.A.16B(a), the Agency will prescribe special conditions containing necessary safety standard per 21.A.16B(b). 21.A.101(d) allows for the application of special conditions, or for changes to the existing special conditions, to address the changed designs where the proposed type-certification basis does not provide adequate standards with respect to the proposed change. Reference Section 3 of Chapter 4 for additional information pertaining to special conditions.
- d. *Reserved*
- e. The final type-certification basis may consist of a combination of the certification specifications of the applicable airworthiness code at different amendment levels ranging from the original type-certification basis to the most current amendments, and special conditions.

Chapter 4. Other considerations

1. Design related operating requirements

The use of exceptions under 21.A.101 is not intended to alleviate or preclude compliance with applicable operating rules or directives that prescribe compliance with the applicable additional airworthiness (design-related) specifications for operations.

2. Excepted products under 21.A.101(c)
 - a. An applicant for a design change to an excepted product may ~~show~~ **demonstrate** that the changed product complies with the existing type-certification basis incorporated by reference in the TC. If the Agency finds that the change is significant 'in an area', the Agency will require compliance with a later amendment to the existing type-certification basis that applies to that affected area and any certification specification the Agency finds is directly related. For excepted products, changes that meet one of the following criteria, in the area of change, are automatically considered significant if:
 - The general configuration or the principles of construction are not retained, or
 - The assumptions used for certification of the product to be changed do not remain valid.
 - b. However, the Agency may allow the applicant to comply with an earlier amendment to the airworthiness code initially designated or with the existing type-certification basis if the Agency agrees to the applicant's justification.
 - c. For a design change to an excepted product that contains new features, which are not covered in the existing type-certification basis, the Agency will designate the applicable certification specifications at the appropriate amendment level, beginning with the existing type-certification basis and progressing to the most appropriate later amendment level for the change. 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, the Agency will designate special conditions per 21.101(d).
 - d. The exception provided for excepted products under 21.A.101(c) applies at the aircraft level only. Design changes to type-certificated engines and propellers installed on these excepted aircrafts are assessed as separate products using 21.A.101(a) and (b).
3. Special conditions, 21.A.101(d.101(d) allows for the application of special conditions, or for changes to existing special conditions, to address the changed designs where the proposed type-certification basis does not provide adequate standards for an area, system, part or appliance related to the change and no adequate standard exist in any subsequent amendment of the applicable airworthiness code up to the airworthiness code in effect on the date of the application for 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. The application of special conditions to a design change is not, in itself, a reason for it to be classified as either a substantial change or a significant change. When the change is significant with earlier certification specifications allowed through exceptions, or not significant, the level of safety intended by the special conditions should be consistent with the agreed type-certification basis. Note that special conditions may also be applied under 21.A.16B when the intended use of the changed product is unconventional or experience from other similar products in service or products having similar design features has shown that unsafe conditions may develop.
4. Effective period for an application to change a Type-Certificate (21.A.101(e))

Per 21.A.101(e), an application for, or a change to, a TC for large aeroplanes and large rotorcraft is effective for 5 years, and an application for a change to any other TC is effective for 3 years. This is intended to ensure that the type-certification basis for the changed product is as current as practical. According to 21.A.101(e) (1) and (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 under this subparagraph, the applicant may:

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

1. File a new application for a change to the type-certificate and comply with all the provisions of paragraph 21.A.101 (a) applicable to an original application for a change; or
2. File for an extension of the original application and comply with the provisions of paragraph (a) for an effective date of application, to be selected by the applicant, not earlier than the date which precedes the date of approval of the change by the time period established under this subparagraph for the original application for the change.

This is consistent with the requirements of 21.A.17 for a new TC and defines the process of updating the type-certification basis if these time limits are exceeded.

5. Special purpose aircraft

When a change is proposed to aircraft which is designed or modified for a special purpose to operate in restricted airworthiness category (under a restricted certificate of airworthiness), the process of establishing the type-certification basis of the changed product is in principle the same as for aircraft with a standard certificate of airworthiness. 21.A.101 is equally applicable to those special purpose aircraft, except that the applicable certification specifications, the proposed change must comply with, can exclude the paragraphs of the applicable airworthiness code that the Agency finds inappropriate for the special purpose for which the aircraft is to be used and may include possible alternative specifications to address that special purpose. Nevertheless, the 'top-down' approach under 21.A.101(a) and (b) (and the guidance in Chapter 3 of this GM) generally applies also to special purpose aircraft unless the aircraft is meeting the criteria in 21.A.101(c) for excepted products, for which 'bottom-up' approach applies (see above Section 2 in this Chapter). All the exception routes under 21.A.101(b)(1), (2) and (3) are still available, in particular the 'not materially contributing to the level of safety' and 'impractical' exceptions may be found justifiable considering the intended special purpose of the aircraft.

6. *Reserved*

7. Documentation.

All changes that result in a revision to the product's type-certification basis should be reflected on the amended TC or STC. The resulting type-certification basis should be retained as it forms part of the compliance record required by the applicable Agency's internal working procedures.

Appendix A. to GM 21.A.101 Classification of Changes

The following examples of substantial, significant and not significant changes are adopted by the Federal Aviation Administration (FAA), European Aviation Safety Agency (EASA) and Transport Canada Civil Aviation (TCCA) through an international collaboration. The classification may change due to cumulative effects and/or combinations of individual changes. The 'N/A' indicated in the substantial example tables indicates 'Not Applicable' at the 21.A.19 'Substantial' evaluation phase.

Table 1. Examples of changes for Small Aeroplanes:

The following examples are for SUBSTANTIAL changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Change in wing location (tandem, forward, canard, high/low)	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certification specifications is required.
Fixed wing to tilt wing	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certification specifications is required.
Increase or decrease in the number of engines	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certification specifications is required.
Replacement of piston or turbo-prop engines with turbojet or turbofan engines	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certification specifications is required.
Change in engine configuration (tractor to pusher)	N/A	N/A	N/A	Proposed change in design is so extensive that a

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following examples are for SUBSTANTIAL changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				substantially complete investigation of compliance with the applicable requirements certification specifications is required.
Change from an all metal aeroplane to all composite primary structure (fuselage, wing, empennage).	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certification specifications is required.
Increase from subsonic to supersonic flight regime	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certification specifications is required.

The following examples are for SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Conventional tail to T-tail or Y-tail, or vice versa	Yes	No	Yes	Change in general configuration. Requires extensive structural, flying qualities and performance re-investigation. Requires a new AFM to address performance and flight characteristics.

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following examples are for SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Changes in wing configuration such as change in dihedral, or changes in wing span, flap or aileron span, addition of winglets, or increase of more than 10% of the original wing sweep <u>at the quarter chord</u>	Yes	No	Yes	Change in general configuration. Likely requires extensive changes to wing structure. Requires a new AFM to address performance and flight characteristics. Note: Small changes to wingtip are not significant changes. See table for not significant changes.
Changes to tail configuration such as the addition of tail strakes or angle of incidence of the tail	Yes	No	Yes	Change in general configuration. Likely requires extensive changes to tail structure. Requires a new AFM to address performance and flight characteristics. Note: Small changes to tail are not significant changes.
Tricycle / tail wheel undercarriage change or addition of floats	Yes	No	No	Change in general configuration. Principles of construction and certification assumptions remain valid.
Passenger to freighter configuration conversion which involves the introduction of a cargo door or an increase in floor loading of more than 20%, or provision for carriage of passengers and freight together	Yes	No	Yes	Change in general configuration affecting load paths, aeroelastic characteristics, aircraft related systems, etc. Change in design assumptions.
Replace reciprocating engines with the same number of turbo-propeller engines where the operating envelope	No	No	Yes	Invalidates certification assumptions. Requires a new AFM to address performance and

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following examples are for SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
is expanded				flight characteristics.
Addition of a turbo-charger that changes the power envelope, operating range, or limitations appreciably.	No	No	Yes	Invalidates certification assumptions due to changes in operating envelope and limitations. Requires a new AFM to address performance and flight characteristics.
The replacement of an engine of higher rated power or increase thrust would be considered significant if it would invalidate the existing substantiation, or would change the primary structure, aerodynamics, or operating envelope sufficiently to invalidate the assumptions of certification	No	Yes	Yes	Invalidates certification assumptions. Requires a new AFM to address performance and flight characteristics. Likely changes to primary structure. Requires extensive construction re-investigation.
A change in the type of material, such as composites in place of metal (or one composite fiber material system with another (e.g., carbon for fiberglass), for primary structure would normally be assessed as a significant change	No	Yes	Yes	Change in principles of construction and design from conventional practices. Likely change in design/certification assumptions.
Change involving appreciable increase in design speeds V_d , V_{mo} , V_c , or V_a	No	No	Yes	Certification assumptions invalidated. Requires a new AFM to address performance and flight characteristics.
Short take-off and landing (STOL) kit	No	No	Yes	Certification assumptions invalidated. Requires a new AFM to address

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following examples are for SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				performance and flight characteristics.
A change in the rated power or thrust is likely to be regarded as significant if the design speeds are thereby changed so that compliance needs to be re-justified with a majority of requirements.certification specifications.	No	No	Yes	Certification assumptions invalidated. Requires a new AFM to address performance and flight characteristics.
Fuel state: such as compressed gaseous fuels, or fuel cells. This could completely alter the fuel storage and handling systems and possibly affect the aeroplane structure	No	No	Yes	Changes in design/certification assumptions. Extensive alteration of fuel storage and handling systems.
A design change that alters the aircraft flight characteristics or performance from the type design would normally be significant if it appreciably changes the kinematics or dynamics of the aeroplane.	No	No	Yes	Certification assumptions invalidated. Requires a new AFM to address performance and flight characteristics.
A change in the flight control concept for an aircraft, for example to fly by wire (FBW) and side-stick control, or a change from hydraulic to electronically actuated flight controls, would in isolation normally be regarded as a significant change.	No	No	Yes	Changes in design and certification assumptions. Requires extensive systems architecture and integration re-investigation. Requires a new AFM.
Change to aeroplane's cabin operating altitude, or operating pressure	No	No	Yes	An increase greater than 10 % in maximum cabin pressure differential invalidates

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following examples are for SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				certification assumptions and the fundamental approach used in decompression, structural strength, and fatigue.
Addition of cabin pressurisation system	No	Yes	Yes	Extensive airframe changes affecting load paths, fatigue evaluation, aero elastic characteristics, etc. Invalidates design assumptions.
Changes in types and number of emergency exits or an increase in maximum certificated passenger capacity	No Yes	No	Yes	Emergency egress requirements certification on specifications exceed those previously substantiated. Invalidates assumptions of certification.
A change in the required number of flight crew, which necessitates a complete cockpit re-arrangement, and/or an increase in pilot workload would be a significant change.	No	No	Yes	Extensive changes to avionics and aircraft systems. Invalidates certification assumptions. Requires a new AFM.
Expansion of an aircraft's operating envelope	No	No	Yes	An appreciable expansion of operating capability would normally be a significant change (e.g., an increase in maximum altitude limitation, approval for flight in known icing conditions, or an increase in airspeed limitations). Merely operating a product to an expanded envelope for which it was

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The following examples are for SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				originally designed is generally not a significant change. In this case, the assumptions used for certification of the basic product remain valid and the results can be applied to cover the changed product with predictable effects or can be demonstrated without significant changes to the product .
Replacement of an aviation gasoline engine with an engine of approximately the same horsepower utilising diesel fuel	No	No	Yes	A major change to the aeroplane. The general configuration and principles of construction will usually remain valid; however, the assumptions for certification are invalidated.
Comprehensive flight deck upgrade, such as conversion from entirely federated, independent electro-mechanical flight instruments to highly integrated and combined electronic display systems with extensive use of software and/or complex electronic hardware	No	No	Yes	Affects avionics and electrical systems integration and architecture concepts, or philosophies.
Introduction of autoland	No	No	Yes	Invalidates original design assumptions.
Airframe life extension	No	No	Yes	This modification pertains to fuselage and/or wing limits, and ageing aeroplane concerns. An increase from the original life limit which constitutes a

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The following examples are for SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				re-evaluation of certification design assumptions.
Extensive structural airframe modification, such as a large opening in fuselage	Yes	No	No	Requires extensive changes to fuselage structure, affects aircraft systems, and requires a new AFM to address performance and flight characteristics.
Fuselage stretch or shortening in the cabin or pressure vessel	Yes	No	Yes	Cabin interior changes are related changes 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 existing cabin interior becomes an affected area.
Conversion from normal category to commuter category aeroplane	Yes	No	Yes	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 Agency determination under 21.A.19.

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The following examples are for NOT SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Addition of wingtip modifications (not winglets)	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
Installation of skis or wheel skis	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
FLIR or surveillance camera installation-	No	No	No	Additional flight or structural evaluation may be necessary but the change does not alter basic aeroplane certification.
Litter, berth and cargo tie down device installation	No	No	No	
Increased tire size, including tundra tires	No	No	No	
Replacement of one propeller type with another (irrespective of increase in number of blades)	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
Addition of a turbo-charger that does not appreciably change the power envelope,	No	No	No	

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The following examples are for NOT SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
operating range, or limitations (e.g., a turbo—normalised engine), (e.g., where the additional power is used to enhance high altitude or hot day performance)				
Substitution of one method of bonding for another (e.g., change in type of adhesive)	No	No	No	
Substitution of one type of metal for another	No	No	No	
Any change in construction or fastening not involving primary structure	No	No	No	
A new fabric type for fabric skinned aircraft	No	No	No	
Increase in flap speed or undercarriage limit speed	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
Structural strength increases	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
Instrument Flight Rules (IFR) upgrades involving installation of components (where the original certification does not indicate that the aeroplane is not suitable as an IFR platform, e.g., special handling concerns)	No	No	No	

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The following examples are for **NOT SIGNIFICANT** changes for Small Aeroplanes (CS-23):

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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Fuel lines, where engine horsepower is increased but fuel flow is not increased beyond the certified maximum amount	No	No	No	
Fuel tanks, where fuel is changed from gasoline to diesel fuel and tank support loads are small enough that an extrapolation from the previous analysis would be valid. Chemical compatibility would have to be substantiated.	No	No	No	
Limited changes in a pressurisation system, e.g., number of outflow valves, type of controller, or size of pressurised compartment, but the system must be re-substantiated if the original test data is invalidated.	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
Install a quieter exhaust system	No	No	No	
Changes in engine cooling or cowling	No	No	No	
<p>Fuel type: AvGas to Diesel/Jet A, AvGas to Ethanol/Methanol. Changing to Multiple fuel systems containing fuel types (other than systems used for starting): such systems using as AvGas/Ethanol, or Jet A/Autogas (turbine). Unrestricted mixtures in one fuel system of different fuel types: Such as AvGas/Diesel or Jet A/Ethanol.</p>	No	No	No	<p>Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.</p>

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The following examples are for NOT SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Fuels Changing fuels of substantially the same type: Such as AvGas to AutoGas, AvGas (80/87) to AvGas (100LL), Ethanol to Isopropyl Alcohol, Jet B to Jet A (although Jet A to Jet B may be considered significant due to the fact that Jet B is considered potentially more explosive).	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
Fuels that specify different levels of 'conventional' fuel additives that do not change the primary fuel type. Different additive levels (controlled) of additives (MTBE, ETBE, ethanol, amines, etc.) in AvGas would not be considered a significant change.	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
A change to the maximum take-off weight of less than 5 % 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. (Unless this weight increase would result in a shift to commuter category.)
An additional aileron tab (e.g. on the other wing)	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
Larger diameter flight	No	No	No	

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The following examples are for NOT SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
control cables with no change in routing, or other system design				
Autopilot installation (for Instrument Flight Rules (IFR) use, where the original certification does not indicate that the aeroplane is not suitable as an IFR platform)	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid.
Increased battery capacity or relocate battery	No	No	No	
Replace generator with alternator	No	No	No	
Additional lighting (e.g., navigation lights, strobes)	No	No	No	
Higher capacity brake assemblies	No	No	No	
Increase in fuel tank capacity	No	No	No	<u>Not a product level change</u> , unless it is tied with an increase in gross weight.
Addition of an oxygen system	No	No	No	
Relocation of a galley-	No	No	No	
Passenger to freight (only) conversion with no change to basic fuselage structure-	No	No	No	Although a major change to the aeroplane, likely the original general configuration, principles of construction and certification assumptions remain valid. Requires certification substantiation applicable to freighter <u>requirements, certification specifications.</u>

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The following examples are for NOT SIGNIFICANT changes for Small Aeroplanes (CS-23):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
New cabin interior with no fuselage length change	No	No	No	
Installation of new seat belt or shoulder harness	No	No	No	
A small increase in CG range	No	No	No	At product level, no change in general configuration, principles of construction & certification assumptions.
APU Installation that is not flight essential	No	No	No	Although a major change to the aeroplane level, likely the original general configuration, principles of construction and certification assumptions remain valid.
An alternative autopilot	No	No	No	
Addition of Class B Terrain Awareness and Warning Systems (TAWS)	No	No	No	

Table 2. Examples of changes for Large Aeroplanes (CS-25)

The following examples are for SUBSTANTIAL changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Change in the number or location of engines, e.g., four to two wing-mounted engines or two wing-mounted to two body-mounted engines	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certification on specifications is required.
Change from a high wing to low wing configuration	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certification on specifications is required.
Change from an all metal aeroplane to all composite primary structure (fuselage, wing, empennage)	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certification on specifications is required.
Change of empennage configuration for larger aeroplanes (cruciform vs. 'T' or 'V' tail)	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable regulations certification on specifications is required.
Increase from	N/A	N/A	N/A	Proposed change in

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The following examples are for SUBSTANTIAL changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
subsonic to supersonic flight regime				design is so extensive that a substantially complete investigation of compliance with the applicable regulations certification specifications is required.

The following examples are for SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Reduction in the number of flight crew (In conjunction with flight deck update)	Yes	No	No Yes	Extensive changes to avionics and aircraft systems. Impact to crew workload and human factors, pilot type rating.
Modify an aeroplane for flight in known icing conditions by adding systems for ice detection and elimination	Yes	No	Yes	New aircraft operating envelop. Requires major new systems installation and aircraft evaluation. Operating envelope changed.
Conversion – passenger or combination freighter/passenger to all freighter including cargo door, redesign floor structure and 9g net or rigid barrier	Yes	No	Yes	Extensive airframe changes affecting load paths, aeroelastic characteristics, aircraft related systems for fire protection, etc. Design assumptions changed from passenger to freighter.

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The following examples are for SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Increase in cabin pressurisation system .	No	No	Yes	Typically, a change greater than 10 % in operational cabin pressure differential. May require extensive airframe changes affecting load paths, fatigue evaluation, aeroelastic characteristics, etc. Invalidates design assumptions.
Addition of leading edge slats	Yes	No	No	Requires extensive changes to wing structure, adds aircraft level systems, and requires a new AFM to address performance and flight characteristics.
Fuselage stretch or shortening in the cabin or pressure vessel	Yes	No	No Yes	Cabin interior changes are related changes 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.
Extensive structural airframe modification, such as installation of a large telescope with	Yes	No	No	Requires extensive changes to fuselage structure, affects

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The following examples are for SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
large opening in fuselage				aircraft level systems, and requires a new aeroplane flight manual to address performance and flight characteristics.
Changing the number of axles or number of landing gear done in context with a product level change which involves changing the aeroplane gross weight	Yes	No	No	Requires extensive changes to aircraft structure, affects aircraft I systems and requires AFM changes..
Primary structure changes from metallic material to composite material	No	Yes	No	Change in principles of construction and design from conventional practices.
Airframe life extension	No	No	Yes	This modification pertains to fuselage and/or wing limits, and ageing aeroplane concerns. An increase from the original life limit which constitutes a re-evaluation of certification design assumptions.
Typically, an increase in design weight of more than 10%	No	No	Yes	Requires extensive re-substantiation of aircraft structure, aircraft performance and flying qualities and associated systems.
Installation of winglets.	Yes	No	Yes	
Wing changes in span, sweep, and tip designs or wing chord	Yes	No	Yes	When it requires extensive changes to wing structure, adds aircraft level systems, and requires a new AFM to address performance and

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The following examples are for SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				flight characteristics. (NOTE: Potentially substantial if it is a change from a high wing to a low wing, or a new wing.)
Change in type or number of emergency exits or an increase in the maximum certificated number of passengers demonstrated	Yes	No	Yes	The new emergency egress requirements certificati on specifications exceed those previously substantiated.
Comprehensive flight deck upgrade, such as conversion from entirely federated, independent electro-mechanical flight instruments to highly integrated and combined electronic display systems with extensive use of software and possibly complex hardware	No	No	Yes	Affects avionics and electrical systems integration and architecture concepts and philosophies.
Change in primary flight controls to fly by wire (FBW) system. (Some aeroplanes have some degree of FBW. Achieving full FBW may be a not significant change on some aeroplanes.)	No	No	Yes	When the degree of change is so extensive that it affects basic aircraft systems integration and architecture concepts and philosophies. This drives a complete re-assessment of flight crew workload, handling qualities, and performance evaluation, which are different from the original design assumptions.
Replace reciprocating with turbo-propeller engines	Yes	No	No	Requires extensive changes to airframe structure, adds aircraft level systems, and requires a new AFM

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The following examples are for SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				to address performance and flight characteristics.
Typically a thrust increase of more than 10%	No	No	Yes	Requires extensive re-substantiation of powerplant installation, and has a marked effect on aircraft performance and flying qualities.
Initial installation of an autoland system	No	No	Yes	Baseline aeroplane not designed for autoland operation, potential crew work load and systems compatibility issues
Installation of a new fuel tank, e.g. (horizontal stabilizer tank or auxiliary fuel tank in the fuselage outside the wing in conjunction with increased maximum take-off weight and take-off thrust)	No	No	Yes	Requires changes to airframe, systems and AFM. Results in performance changes.
Main deck cargo door installation	Yes	No	No	Redistribution of internal loads, change in aeroelastic characteristics, system changes.
Expansion of an aircraft's operating envelope	No	No	Yes	An expansion of operating capability would normally be a significant change (e.g. an increase in maximum altitude limitation, approval for flight in known icing conditions, or an increase in airspeed limitations). Merely operating a product to an expanded envelope for which it was originally designed

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The following examples are for SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				is generally not a significant change. In this case, the assumptions used for certification of the basic product remain valid and the results can be applied to cover the changed product with predictable effects or can be demonstrated without significant physical changes to the product.
Conversion from a passenger floor to a cargo floor and installation of a cargo handling system	No	No	Yes	Completely new floor loading and design. Redistribution of internal loads, change in cabin safety requirements certification on specifications , system changes.
Initial installation of an APU essential for aircraft flight operation	No	No	Yes	Changes emergency electrical power requirements certification on specifications , change in AFM and operating characteristics.
Conversion from hydraulically actuated brakes to electrically actuated brakes	No	No	Yes	Assumptions of certification for aeroplane performance are changed.
Change to aeroplane's cabin operating altitude, or operating pressure	No	No	Yes	An increase greater than 10 % in maximum cabin pressure differential invalidates certification assumptions and the fundamental approach used in decompression. structural strength,

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The following examples are for SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				and fatigue analysis.
Installation of engine thrust reversers	Yes	No	Yes	

The following examples are for NOT SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Alternate engine installation or hush kit at same position	No	No	No	Typically it is not significant so long as there is not more than a 10% increase in thrust or a change in the principles of propulsion.
A small change in fuselage length due to re-fairing the aft body or radome	No	No	No	For cruise performance reasons, where such changes do not require extensive structural, systems, aerodynamic or AFM changes.
Re-fairing of wing tip caps (for lights, fuel dump pipes) and addition of splitter plates to the trailing edge thickness of the cruise airfoil	No	No	No	Does not require extensive structural, AFM, or systems changes.
Additional power used to enhance high altitude or hot day performance	No	No	No	Usually no change in basic operating envelope. Existing cert. data can be extrapolated. Could be significant product change if the additional power is provided by installation of a rocket motor or additional, on demand engine due to changes in certification

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The following examples are for NOT SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				assumptions.
Initial installation of an autopilot system	No	No	See note	It may be possible that the modification is adaptive in nature, with no change to original certification assumptions. However, in certain cases the installation of an auto-pilot may include extensive changes and design features which change the assumptions for certification (i.e. installation of the auto-pilot may introduce a number of additional mechanical and electronic failure modes and change the hazard classification of given aircraft level failures).
Change from assembled primary structure to monolithic or integrally machined structure	No	No	No	Method of construction is must be well understood.
Modification to ice protection systems	No	No	No	Re-certification required, but type-certification basis is adequate.
Brakes: design or material change, e.g., steel to carbon	No	No	No	Re-certification required, but type-certification basis is adequate.
Redesign floor structure	No	No	No	By itself, this is not a significant product change. It is significant if part of a cargo conversion of a passenger

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The following examples are for NOT SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				aeroplane.
New cabin interior with no fuselage length change	No	No	No	A new cabin interior includes new ceiling and sidewall panels, stowage, galleys, lavatories, and seats. New and novel features in the cabin interior may require special conditions. Many interior related requirements certificati on specifications are incorporated in operational rules. Even though the design approval holder may not be required to comply with these requirements certificati on specifications , the operator may be required to comply.
A re-arrangement of an interior (e.g. seats, galleys, lavatories, closets, etc.)	No	No	No	Re-arrangement requires the use of the existing floor mounting structure.
Novel or unusual method of construction of a component	No	No	No	Special conditions could be required if there are no existing requirements certificati on specifications that adequately address these features. The component change does not rise to the product level change.
Initial installation of a non-essential APU	No	No	No	A stand-alone initial APU installation on an aeroplane originally designed to use ground/airport supplied electricity, and air-conditioning. In this case, the

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The following examples are for NOT SIGNIFICANT changes for Large Aeroplanes (CS-25):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				APU would be an option to be independent of airport power.

Table 3. Examples of Changes for Rotorcraft (CS-27 and-29)

The following examples are for SUBSTANTIAL changes for Rotorcraft (CS-27 and CS-29):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Change from the number and/or configuration of rotors (e.g. main & tail rotor system to two main rotors	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certificati on specifications is required.
Change from an all-metal rotorcraft to all composite rotorcraft	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable requirements certificati on specifications is required.

The following examples are for SIGNIFICANT changes for Rotorcraft (CS-27 and CS-29):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Comprehensive flight deck upgrade, such as conversion from entirely federated, independent electro-mechanical flight instruments to highly integrated and combined electronic display systems with extensive use of software and/or complex electronic hardware	No	No	Yes	Affects basic avionics and electrical systems integration and architecture concepts and philosophies.
Certification for flight into known icing conditions	No	No	Yes	

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The following examples are for SIGNIFICANT changes for Rotorcraft (CS-27 and CS-29):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
(Fixed) flying controls from mechanical to fly by wire	No	No	Yes	This drives a complete re-assessment of the rotorcraft controllability and flight control failure.
Addition of an engine; e.g., from single to twin or reduction of the number of engines; e.g., from twin to single	Yes	Yes	Yes	May be a substantial change depending upon project details.
A change of rotor drive system primary gearbox splash type lubrication system to a pressure lubricated system due to an increase in horsepower of an engine or changing a piston engine to a turbine engine	No	Yes	Yes	
A fuselage or tail boom modification that changes the primary structure, aerodynamics, and operating envelope sufficiently to invalidate the certification assumptions	Yes	No	Yes	
Application of an approved primary structure to a different approved model (e.g., installation on a former model of the main rotor approved on a new model that results in increase performance	No	Yes	Yes	
Extensive primary structure changes from metallic material to composite material.	No	Yes	Yes	Change in principles of construction and assumptions used for certification for the product level change. Changes of a few individual elements from metal to composite are not

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following examples are for SIGNIFICANT changes for Rotorcraft (CS-27 and CS-29):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				typically considered a significant change .
Emergency Medical Service (EMS) configuration with primary structural changes sufficient to invalidate the certification assumptions	Yes No	No	Yes	Many EMS configurations will not be classified as significant. Modifications made for EMS are typically internal, and the general external configuration is normally not affected. These changes should not automatically be classified as significant.
Skid landing gear to wheel landing gear or wheel landing to skid	Yes	No	Yes	
Change of the number of rotor blades	Yes	No	Yes	
Change tail anti-torque device (e.g., tail rotor, ducted fan or other technology)	Yes	Yes	No	
Passenger configured helicopter to a fire fighting equipment configured helicopter	Yes	No	Yes	Depends on the fire fighting configuration.
Passenger configured helicopter to an agricultural configured helicopter	Yes	No	Yes	Depends on the agricultural configuration.
A new Category A certification approval to an existing configuration	No	No	Yes	
Instrument Flight Rules (IFR) upgrades involving installation of upgraded components for new IFR configuration	No	No	Yes	
Human External Cargo (HEC) certification approval	No	No	Yes	Must comply with the latest HEC certification

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The following examples are for SIGNIFICANT changes for Rotorcraft (CS-27 and CS-29):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				specifications in order to obtain operational approval. HEC include fatigue, Quick Release Systems, <u>High Intensity Radio Frequency (HIRF)</u> , <u>One Engine Inoperative (OEI)</u> performance and OEI procedures.
Reducing the number of pilots for IFR from 2 to 1	No	No	Yes	<u>Significant change, if there are extensive equipment and design changes such that the certification assumptions are invalidated.</u>

The following examples are for NOT SIGNIFICANT changes for Rotorcraft (CS-27 and -29):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Emergency floats	No	No	No	Must comply with the specific applicable <u>requirements certification specifications</u> for emergency floats. This installation, in itself, does not change the rotorcraft configuration, overall performance, or operational capability. Expanding an operating envelope (such as operating altitude and temperature) and mission profile

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The following examples are for NOT SIGNIFICANT changes for Rotorcraft (CS-27 and -29):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				(such as passenger carrying operations to external load operations, or flight over water, or operations in snow conditions) are not by themselves so different that the original certification assumptions are no longer valid at the type-certificated product level.
FLIR or surveillance camera installation	No	No	No	Additional flight or structural evaluation may be necessary but the change does not alter the basic rotorcraft certification.
Helicopter Terrain Awareness Warning System (HTAWS) for operational credit	No	No	No	Certified per rotorcraft HTAWS AC guidance material and ETSO-C194 .
Health Usage Monitoring System (HUMS) for Maintenance Credit	No	No	No	Certified per rotorcraft HUMS AC guidance material.
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, minimum/max external temperatures, speed, ratings structure)	No	No	No	Expanding an operating envelope (such as operating altitude and temperature) and mission profile (such as passenger carrying operations to external load operations, or flight over water, or operations in snow conditions) are not by themselves so different that the original certification assumptions are no

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The following examples are for NOT SIGNIFICANT changes for Rotorcraft (CS-27 and -29):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				longer valid at the type-certificated product level.
Installation of a new engine type, equivalent to the former one; leaving a/c installation and limitations substantially unchanged	No	No	No	Refer to AC 27-1 or AC 29-2 for guidance
Windscreen installation	No	No	No	Does not change the rotorcraft overall product configuration
Snow skis, 'Bear Paws'	No	No	No	Must comply with specific requirements certification specifications associated with the change. Expanding an operating envelope (such as operating altitude and temperature) and mission profile (such as passenger carrying operations to external load operations, or flight over water, or operations in snow conditions) are not by themselves so different that the original certification assumptions are no longer valid at the type-certificated product level.
External Cargo Hoist	No	No	No	Must comply with the specific applicable requirements certification specifications for external loads. This installation, in itself, does not

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following examples are for NOT SIGNIFICANT changes for Rotorcraft (CS-27 and -29):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				change the rotorcraft configuration, overall performance, or operational capability. Expanding an operating envelope (such as operating altitude and temperature) and mission profile (such as passenger carrying operations to external load operations, or flight over water, or operations in snow conditions) are not by themselves so different that the original certification assumptions are no longer valid at the type-certificated product level.
Instrument Flight Rules (IFR) upgrades involving installation of upgraded components to replace existing components.	No	No	No	Not a rotorcraft level change.

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

<p>Reducing the number of pilots for IFR from 2 to 1</p>	<p>No</p>	<p>No</p>	<p>No</p>	<p>May be significant if there are extensive equipment and design changes such that the certification assumptions are invalidated or the general configuration of the rotorcraft is changed.</p>
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Table 4. Examples for Engines (CS-E)

The following are examples of SUBSTANTIAL changes for Engines (CS-E):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Turbine Engines				
Traditional turbofan to geared-fan engine	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable regulations certification specifications is required. Note: There may be certain circumstances where this change would be significant.
Low bypass ratio engine to high bypass ratio engine with an increased inlet area	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable regulations certification specifications is required. Note: There may be certain circumstances where this change would be significant.
Turbojet to Turbofan	N/A	N/A	N/A	Change in general configuration Likely change in model designation Not interchangeable. Assumptions for certification may no longer be valid in terms of lifting, ingestion, icing, blade-out criteria, etc. Note that this change is most likely substantial under 21A.19 Proposed change in design is so

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following are examples of SUBSTANTIAL changes for Engines (CS-E):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				<p><u>extensive that a substantially complete investigation of compliance with the applicable specifications is required.</u></p> <p><u>Note: There may be certain circumstances where this change would be significant.</u></p>
Turbo-shaft to turbo-propeller	N/A	N/A	N/A	<p>Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable <u>regulations certification specifications</u> is required.</p> <p>Note: There may be certain circumstances where this change would be significant.</p>
Conventional ducted fan to unducted fan	N/A	N/A	N/A	<p>Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable <u>regulations certification specifications</u> is required.</p> <p>Note: There may be certain circumstances where this change would be significant.</p>
Turbine engine for subsonic operation to afterburning engine for supersonic operation	N/A	N/A	N/A	<p>Proposed change in design is so extensive that a substantially</p>

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following are examples of SUBSTANTIAL changes for Engines (CS-E):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				complete investigation of compliance with the applicable regulations certificatio n specifications is required.

The following are examples of SIGNIFICANT changes for Engines (CS-E):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Turbine Engines				
Increase/decrease in the number of compressor/turbine stages with resultant change in approved limitations*. (* excludes life limits)	Yes	No	Yes	Change is associated with other changes to the ratings and operating limitations; engine dynamic behaviour in terms of backbone bending, torque spike effects on casing, surge and stall characteristics, etc.
New design fan blade and fan hub, or a bladed fan disk to a blisk or a fan diameter change that could not be retrofitted	Yes	No	Yes	Change is associated with other changes to the engine thrust, ratings and operating limitations; engine dynamic behaviour in terms of backbone bending, torque spike effects on casing, foreign object ingestion behaviour, burst model protection for the aircraft. If there is a diameter change, installation

SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following are examples of SIGNIFICANT changes for Engines (CS-E):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				will be also affected.
Hydro-Mechanical control to FADEC/EEC without hydro-mechanical backup	Yes	No	No	Change in engine control configuration. Not interchangeable. Likely fundamental change to engine operation.
A change in the containment case from hard-wall to composite construction or vice-versa, that could not be retrofitted without additional major changes to the engine or restrictions in the initial limitations in the installation manual	No	Yes	No	Change in methods of construction that have affected inherent strength, backbone bending, blade to case clearance retention, containment wave effect on installation, effect on burst model, torque spike effects.
Replace gas generator (core, turbine/compressor/combustor) with a different one that is associated with changes in approved limitations* * excludes life limits	No	No	Yes	Change is associated with other changes that would affect engine thrust/power and may affect the dynamic behaviour of the engine. Assumptions used for certification may no longer be valid
Piston engines				
Convert from mechanical to electronic control system	Yes	Yes	No	Change in engine configuration: Installation interface of engine changed. Changes to principles of construction: Digital controllers and sensors require new construction techniques and environmental testing.
Add turbocharger that increases performance	Yes	No	Yes	Change in general configuration:

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The following are examples of SIGNIFICANT changes for Engines (CS-E):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
and changes in overall product				Installation interface of engine changed (exhaust system). Certification assumptions invalidated: Change in operating envelope and performance.
Convert from air-cooled cylinders to liquid cooled cylinders.	Yes	No	Yes	Change in general configuration: Installation interface of engine changed (cooling lines from radiator, change to cooling baffles). Certification assumptions invalidated: Change in operating envelope and engine temperature requirements. <u>specifications.</u>
Convert from spark-ignition to compression-ignition	Yes	No	Yes	Change in general configuration: Installation interface of engine changed (no mixture lever). Certification assumptions invalidated: Change in operating envelope and performance.

The following are examples of NOT SIGNIFICANT changes for Engines (CS-E):				
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)(i)	Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Turbine Engines				
Change in the material from one type of metal to another type of metal	No	No	No	No change in performance. Assumptions are still

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The following are examples of NOT SIGNIFICANT changes for Engines (CS-E):				
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)(i)	Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(ii)	Notes
of a compressor drum				valid.
Increase/decrease in the number of compressor/turbine stages without resultant change in performance envelope	No	No	No	No change in performance. Assumptions are still valid.
New components internal to the FADEC/EEC the introduction of which does not change the function of the system	No	No	No	No change in configuration. Retrofitable Assumptions used for certification are still valid. Possible changes in principles of construction are insignificant.
Software changes	No	No	No	
Rub-strip design changes	No	No	No	
A new combustor that does not change the approved limitations, or dynamic behaviour* (* excludes life limits)	No	No	No	
Bearing changes	No	No	No	
New blade designs with similar material that can be retrofitted	No	No	No	
Fan blade re-design that can be retrofitted	No	No	No	
Oil tank re-design	No	No	No	
Change from one hydro-mechanical control to another hydro-mechanical control	No	No	No	
Change to limits on life limited components	No	No	No	
Changes to limits on exhaust gas temperature	No	No	No	
Changes in certification maintenance requirements (CMR) with no configuration	No	No	No	

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The following are examples of NOT SIGNIFICANT changes for Engines (CS-E):				
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)(i)	Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(ii)	Notes
changes				
Bump ratings within the product's physical capabilities that may be enhanced with gas path changes such as blade re-stagger, cooling hole patterns, blade coating changes, etc.	No	No	No	
A change in principal physical properties and mechanics of load transfer of a material of primary structure or highly loaded components. For example, change from traditional metal to either an exotic alloy or a composite material on a highly loaded component.	No	No	No	
Piston engine				
A change in principal physical properties and mechanics of load transfer of a material of primary structure or highly loaded components. For example, change from traditional metal to either an exotic alloy or a composite material on a highly loaded component.	No	No	No	
New or redesigned cylinder head, or valves or pistons.	No	No	No	
Changes in crankshaft	No	No	No	
Changes in crankcase	No	No	No	
Changes in carburettor	No	No	No	
Changes in mechanical fuel injection system	No	No	No	
Changes in mechanical fuel injection pump	No	No	No	
Engine model change to accommodate new	No	No	No	

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The following are examples of NOT SIGNIFICANT changes for Engines (CS-E):				
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)(i)	Have the assumptions used for certification been invalidated? 21.A.101(b)(1)(ii)	Notes
aeroplane installation. No change in principles of operation of major subsystems; no significant expansion in power or operating envelopes or in limitations.				
No change in basic principles of operation, or a simple mechanical change. For example, change from dual magneto to two single magnetos on a model.	No	No	No	
Subsystem change produces no changes in base engine input parameters, and previous analysis can be reliably extended. For example, a change in turbocharger where induction system inlet conditions remain unchanged, or if changed, the effects can be reliably extrapolated.	No	No	No	
Change in material of secondary structure or not highly loaded component. For example, a change from metal to composite material in a non-highly loaded component, such as an oil pan that is not used as a mount pad.	No	No	No	Component Level Change
Change in material that retains the physical properties and mechanics of load transfer. For example, a change in trace elements in a metal casting for ease of pouring or to update to a newer or more readily available alloy with similar mechanical properties.	No	No	No	Component Level Change

Table 5. Examples of Changes for Propellers (CS-P)

The following are examples of SUBSTANTIAL changes for Propellers (CS-P):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Change in the number of blades	N/A	N/A	N/A	Proposed change in design is so extensive that a substantially complete investigation of compliance with the applicable regulations certification specifications is required.

The following are examples of SIGNIFICANT changes for Propellers (CS-P):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Principle of pitch change such as a change from single acting to dual acting	Yes	Yes	Yes	Requires extensive modification of the pitch change system with the introduction of back-up systems. The inherent control system requires re-evaluation.
Introduction of a different principle of blade retention such as a single row to a dual row bearing	Yes	Yes	No	Requires extensive modification of the propeller hub and blade structure. The inherent strength requires re-evaluation.
A hub configuration change such as a split hub to a one-piece hub	Yes	Yes	No	Requires extensive modification of the propeller hub structure. The inherent strength requires re-evaluation.
Changing the method of mounting the propeller to the engine such as a spline to a flange mount	Yes	Yes	No	Requires extensive modification of the propeller hub structure.

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The following are examples of SIGNIFICANT changes for Propellers (CS-P):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
				Note: Such a change could be considered not significant if implemented without a change in general configuration or principals of construction.
Change in hub material from steel to aluminium	Yes	Yes	No	Requires extensive modification of the propeller hub structure and change to method of blade retention. The inherent strength requires re-evaluation.
Change in blade material from metal to composite	Yes	Yes	Yes	Requires extensive modification of the propeller blade structure and change to method of blade retention. Composite construction methods required. The inherent strength requires re-evaluation.
Change from hydro-mechanical to electronic control	Yes	Yes	Yes	Electronic manufacturing and design methods required. Assumptions used for certification are no longer valid or were not addressed in the original certification, i.e., high intensity radio frequency (HIRF) and lightning protection, fault tolerance, software certification and other aspects. The propeller will require special conditions under 21.A.16B.

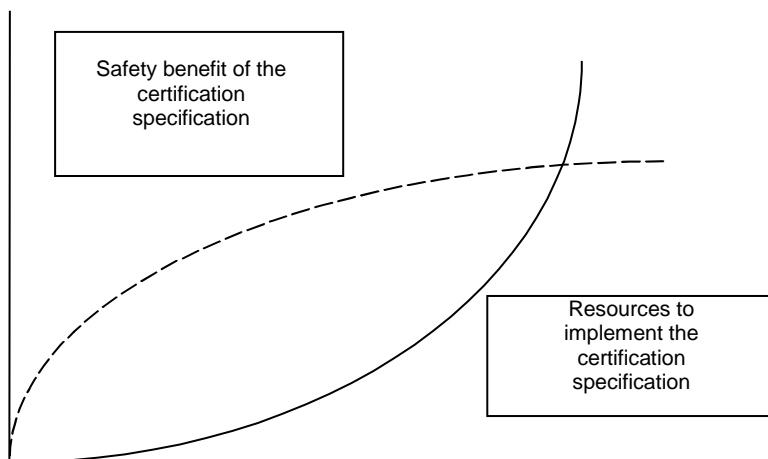
SECTION A — Subpart D — Changes to type-certificates and restricted type certificates

The following are examples of NOT SIGNIFICANT changes for Propellers (CS-P):				
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)(i)	Have the assumptions used for Certification been invalidated? 21.A.101(b)(1)(ii)	Notes
Change in the material of a blade bearing	No	No	No	
Change to a component in the control system	No	No	No	
Change to a de-icer boot	No	No	No	
Changes to the operational design envelope such as an increase in power.	No	No	No	Propeller's operating characteristics and inherent strength require re-evaluation.
Change to the intended usage such as normal to aerobatic category.	No	No	No	Propeller's operating characteristics and inherent strength require re-evaluation.

Appendix B to GM 21.A.101 Procedure for evaluating impracticality of applying latest certification specifications to a changed product

1. Introduction

- a. The basic principle of enhancing the level of safety of changed aeronautical products is to apply the latest certification specifications for significant design 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. It is recognised that the existing fleet and newly produced aeroplanes, engines and propellers are safe, and any unsafe condition is immediately addressed through the airworthiness directive process. These factors form the basis where compliance with the latest certification specification may be considered impractical, thereby allowing compliance with an earlier certification specification. This appendix gives one method of determining if compliance with a later requirement standard is impractical; however, this does not preclude the use of other methods for improving the safety of aeronautical products.
- b. This GM 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 should show that a proposed type-certification basis is able to achieve a positive safety benefit for the overall product.
- c. In this regard, any method used should encourage incorporating safety enhancements that will have the most dramatic impact on the level of safety of the aircraft while considering effective use of resources. This important point is illustrated graphically in the accompanying figure. 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 2. Safety Benefits vs. Resources

- d. Typically, one will find that there are proposals that can achieve a positive safety benefit and 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. 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 standards relative to the respective cost to reach this point.
 - e. This Appendix to GM 21.A.101 provides procedural guidance for determining the practicality of applying a certification specification at a particular amendment level to a changed product. This guidance can be used to evaluate the safety benefit and resource impact of implementing the latest airworthiness certification specifications in the type-certification basis of a changed product. The procedure is generic in nature and describes the steps and necessary inputs that any applicant can use on any project to develop a position.
 - f. 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. It provides a means, but not the only means, for an applicant to present its position in regard to impracticality.
 - g. The type-certification basis for a change to a product will not be at an amendment level earlier than the existing type-certification basis. Therefore, when determining the impracticality of applying a certification specification at the latest amendment level, only the increase in safety benefits and costs beyond compliance with the existing type-certification basis should be considered.
2. Procedure for evaluating Impracticality of applying latest certification specifications to a changed product

The following are steps to determine the impracticality of applying a certification specification at a particular amendment level. The first step will be to identify the regulatory change being evaluated.

- a. Step 1: Identify the regulatory change being evaluated.
In this step, it will be necessary to document:
 - (1) The specific certification specification (for example, CS 25.365);
 - (2) The amendment level of the existing type-certification basis for the certification specification; and
 - (3) The latest amendment level of the certification specification.
- b. Step 2: Identify the specific hazard that the ~~Requirement~~ certification specification addresses
 - (1) Each certification specification and subsequent amendments are intended to address 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 amendment levels of the certification specification at addressing the hazard.
 - (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 available background information from development and adoption of this certification specification (Explanatory Note and Comment/Response Document to the NPA. It may also be helpful to discuss the hazard with the Agency).
- c. Step 3: Review the consequences of the hazard(s)

- (1) Once the hazard has been identified, it is possible to identify the types of consequences that may occur because of the presence of the hazard. More than one consequence can be attributed for the same hazard. Typical examples of consequences would include, but are not be limited to:
 - Incidents where only injuries occurred;
 - Accidents where less than 10 % of the passengers died;
 - Accidents where 10 % or more passengers died; and
 - Accidents where a total hull loss occurred.
 - (2) The background information from development and adoption of the certification specification may provide useful information regarding the consequences of the hazard the requirement is intended to address.
- d. Step 4: Identify the historical and predicted frequency of each consequence
- (1) Another source for determining impracticality is the historical record of the consequences of the hazard that led to a ~~requirement~~ certification specification or an amendment to a ~~requirement~~ certification specification. From these data, a frequency of hazard occurrence can be determined. It is important to recognise that the frequency of occurrence may be higher or lower in the future. Therefore, it is also necessary to predict the frequency of future occurrences.
 - (2) More than one consequence can be attributed for the same hazard. Therefore, when applicable, the combination of consequences and frequencies of those consequences should be considered together.
 - (3) The background information from development and adoption of the certification specification may provide useful information regarding the frequency of occurrence.
- e. Step 5: Determine how effective full compliance with the latest amendment of the ~~Requirement-~~ certification specification would be at addressing the hazard
- (1) When each amendment is promulgated, it is usually expected that compliance with the certification specification would be completely effective at addressing the associated hazard. It is expected that the hazard would be eliminated, avoided, or dealt with. However, in a limited number of situations, this may not be the case. It is also possible that earlier amendment levels may have addressed the hazard but were not completely effective. Therefore, in comparing the benefits of compliance with the existing type-certification basis to the latest amendment level, it is useful to estimate the effectiveness of both amendment levels in dealing with the hazard.
 - (2) It is recognised that the determination of levels of effectiveness is normally of a subjective nature. These are relative assessments of a qualitative nature that should not be treated as absolute determinations. 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.
 - (3) The following five levels of effectiveness are provided as a guideline:
 - (a) Fully effective in all cases.

Compliance with the ~~requirement~~ certification specification eliminates the hazard or provides a means to avoid the hazard completely.
 - (b) Considerable potential for eliminating or avoiding the hazard.

Compliance with the ~~requirement~~ certification specification eliminates the hazard or provides a means to avoid completely the hazard for all probable or likely cases, but it does not cover all situations or scenarios.
 - (c) Adequately deals with the hazard.

Compliance with the ~~requirement~~ 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.

- (d) Hazard only partly addressed.

In some cases compliance with the ~~requirement~~ 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.

- (e) Hazard only partly addressed but action has negative side effect.

Compliance with the ~~requirement~~ certification specification does not eliminate or avoid the hazard or may have negative safety side effects. The action is of questionable benefit.

- f. Step 6: Determine resource costs and cost avoidance

- (1) There is always cost associated with complying with a ~~requirement~~ 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 ~~requirement~~ certification specification. For example, compliance with a ~~requirement~~ 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 facilitate certification of a product by the competent authority of a third country.
- (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 type-certification basis should be considered.
- (3) When evaluating the incremental cost, it may be beneficial for the applicant to compare the increase in cost to comply with the latest certification specifications to the cost to incorporate the same design feature in a new aeroplane. In many cases an estimate for the cost of incorporation in a new aeroplane is provided in the ~~regulatory evaluation~~ Regulatory Impact Assessment (RIA) by the Agency, which was presented when the corresponding certification specification was first promulgated. 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:
 - (a) Costs: The accuracies of fleet size projections, utilisation, etc. may be different than that experienced for derivative 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 requirements, including training, should be considered.
 - Capital: Construction of new, modified or temporary facilities for design, production, tooling, training, or maintenance.
 - Material: Cost associated with product materials, product components, inventory, kits, and spares.
 - Operating Costs: Costs associated with fuel, oil, fees, and expendables.
 - Revenue/Utility Loss: Costs resulting from earning/usage capability reductions from departure delays, product downtime, capability

reductions of performance loss due to seats, cargo, range, or airport restrictions.

(b) Cost Avoidance:

- Avoiding cost of accidents, including investigation of accidents, lawsuits, public relations activities, insurance, and lost revenue.
- Foreign Certification: Achieve a singular effort that would demonstrate compliance to the [requirements](#) [airworthiness standards](#) of most certifying agencies, thus minimising certification costs.

g. Step 7: Document conclusion. Once the information from previous steps has been documented and reviewed, the applicant's position and rationale regarding practicality can be documented. Examples of possible positions would include, but are not limited to:

- (1) Compliance with the latest certification specification is necessary. The applicant would pursue the change at the latest amendment level.
- (2) Compliance with an amendment level between the existing type-certification basis and the latest amendment would adequately address the hazard at an acceptable cost, while meeting the latest amendment level would be impractical. The applicant would then propose the intermediate amendment level of the certification specification.
- (3) The increased level of safety is not commensurate with the increased costs associated with meeting the latest amendment instead of the existing type-certification basis. Therefore, the applicant would propose the existing type-certification basis.
- (4) The results of this analysis were inconclusive. Further discussions with the Agency are warranted.

Note: This process may result in a required type-certification basis that renders the proposed modification economically not viable.

3. Examples of how to certify changed aircraft. The following examples are for large aeroplanes and illustrate the typical process an applicant follows. The process will be the same for all product types.

a. Example 1: CS 25.963 (e) Fuel tank access covers

- (1) This change is part of a significant large aeroplane change that increases passenger payload and gross weight by extending the fuselage by 20 feet. To accommodate the higher design weights and increased braking certification specification, and to reduce runway loading, the applicant will change the landing gear from a two-wheel to four-wheel configuration; this changes the debris scatter on the wing from the landing gear. The new model aeroplane will be required to comply with the latest applicable [regulations](#) [certification specifications](#) based on the date of application.
- (2) The wing will be strengthened locally at the side of the body and at the attachment of engines and landing gear, but the applicant would not like to alter wing access panels and the fuel tank access covers. Although the applicant recognises that the scatter pattern and impact loading on the wing from debris being thrown from the landing gear will change, he proposes that it would be impractical to redesign the fuel tank access covers.
- (3) Step 1: Identify the regulatory change being evaluated
 - (a) The existing certification basis of the aeroplane that is being changed is CS-25 prior to Amendment 3.
 - (b) Amendment 3 to CS-25 added the [requirement](#) [certification specification](#) that fuel tank access covers on large aeroplanes be designed to minimise penetration by likely foreign objects, and be fire resistant.

- (4) Step 2: Identify the specific hazard that the [Regulation certification specification](#) addresses

Fuel tank access covers have failed in service due to impact with high-energy objects such as failed tire tread material and engine debris following engine failures. In one accident, debris from the runway impacted a fuel tank access cover, causing its failure and subsequent fire, which resulted in fatalities and loss of the aeroplane. Amendment 3 ensures that all access covers on all fuel tanks are designed or located to minimise penetration by likely foreign objects, and are fire resistant.

- (5) Step 3: Review the history of the consequences of the hazard(s)
Occurrences with injuries and with more than 10 % deaths.
- (6) Step 4: Identify the historical and predicted frequency of each consequence
- (a) In 200 million departures of large jets:
- One occurrence with more than 10 % deaths; and
 - One occurrence with injuries.
- (b) There is no reason to believe that the future rate of accidents will be significantly different than the historical record.
- (7) Step 5: Determine how effective full compliance with the latest amendment of the [Regulation certification specification](#) would be at addressing the hazard
- (a) Considerable potential for eliminating or avoiding the hazard.
- (b) Compliance with Amendment 3 eliminates the hazard or provides a means to avoid the hazard completely for all probable or likely cases. However, it does not cover all situations or scenarios.
- (8) Step 6: Determine resource costs and cost avoidance
- (a) Costs:
- For a newly developed aeroplane, there would be minor increases in labour resulting from design and fabrication.
 - There would be a negligible increase in costs related to materials, operating costs, and revenue utility loss.
- (b) Cost avoidance:
- There were two accidents in 200 million departures. The applicant believes that it will manufacture more than 2 000 of these aeroplanes or derivatives of these aeroplanes. These aeroplanes would average five flights a day. Therefore, statistically there will be accidents in the future if the hazard is not alleviated. Compliance will provide cost benefits related to avoiding lawsuits, accident investigations, and public relation costs.
 - There are cost savings associated with meeting a single type-certification basis for the Agency and foreign regulations.
- (9) Conclusion
- It is concluded that compliance with the latest certification specification increases the level of safety at a minimal cost to the applicant. Based on the arguments and information presented by the applicant through the Certification Review Item (CRI) process, the Agency determined that meeting the latest amendment would be practical.

b. Example 2: 14 CFR § 25.365 pressurised compartment loads

Note: This example is taken from the FAA certification experience gained before the Agency's start, so references to FAR sections and amendments are kept.

- (1) This example is a passenger to freighter conversion STC.
- (2) This change affects the floor loads on the airplane as well as the decompression venting.
- (3) Step 1: Identify the regulatory change being evaluated
 - (a) The existing certification basis of the airplane that is being changed includes 14 CFR § 25.365 at Amendment ~~25-40~~ 25-0. The initial release of 14 CFR § 25.365 required that the interior structure of passenger compartments be designed to withstand the effects of a sudden release of pressure through an opening resulting from the failure or penetration of an external door, window, or windshield panel, or from structural fatigue or penetration of the fuselage, unless shown to be extremely remote.
 - (b) Amendment 25-54 revised 14 CFR § 25.365 to require that the interior structure be designed for an opening resulting from penetration by a portion of an engine, an opening in any compartment of a size defined by 14 CFR § 25.365(e)(2), or the maximum opening caused by a failure not shown to be extremely improbable. The most significant change is the 'formula hole size' requirement introduced into § 25.365(e)(2) at Amendment 25-54.
 - (c) Amendment 25-71/72 (Amendments 25-71 and 25-72 are identical) extended the requirement to all pressurised compartments, not just passenger compartments, and to the pressurisation of unpressurised areas. Pressurisation of unpressurised areas had previously been identified as an unsafe feature under 14 CFR § 21.21(b)(2).
 - (d) Amendment 25-87 redefined the pressure differential load factor that applies above an altitude of 45 000 feet. Compliance with Amendment 25-87 is not affected since the airplane does not operate above an altitude of 45 000 feet. The applicant proposes to meet the 'pressurisation into unpressurised areas' requirement introduced in Amendment 25-71/72. The applicant does not propose to comply with the formula hole size requirement introduced in § 25.365(e)(2) at Amendment 25-54.
- (4) Step 2: Identify the specific hazard that the regulation addresses

The hazard is a catastrophic structure and/or system failure produced by a sudden release of pressure through an opening in any compartment in flight. This opening could be caused by an uncontained engine failure, an opening of a prescribed size due to the inadvertent opening of an external door in flight, or an opening caused by a failure not shown to be extremely improbable. The opening could be produced by an event that has yet to be identified.
- (5) Step 3: Review the history of the consequences of the hazard(s)

Occurrences with injuries, less than 10 % deaths, and more than 10 % deaths.
- (6) Step 4: Identify the historical and predicted frequency of each consequence
 - (a) In 200 million departures of large jets:
 - Two occurrences with more than 10 % deaths;
 - One occurrence with less than 10 % deaths; and
 - One occurrence with injuries.
 - (b) There is no reason to believe that the future rate of accidents will be significantly different than the historical record.
- (7) Step 5: Determine how effective full compliance with the latest amendment of the regulation would be at addressing the hazard
 - (a) Compliance with the latest amendment eliminates the hazard or provides a means to avoid the hazard completely.

- (b) Design changes made to the proposed derivative airplane bring it closer to full compliance with 14 CFR § 25.365 at Amendment 25-54. The original airplane was shown to meet the requirements for a hole size of 1.1 square feet. Amendment 25-54 would require a hole size of 5.74 square feet, and the current reinforcements for the converted airplane can sustain a hole size of 3.65 square feet in the forward area and 2.65 at the aft area. This is 3.1 and 2.4 times respectively better than the original design condition of Amendment 25-0 and is a significant improvement over the worldwide passenger fleet in service.
- (8) Step 6: Determine resource costs and cost avoidance
 - (a) Costs: There would be savings in both labour and capital costs if compliance were ~~shown~~ demonstrated to Amendment 25-0 instead of Amendment 25-54. Major modifications to the floor beams would be necessary to meet the formula hole size requirement in Amendment 25-54.
 - (b) Cost Avoidance:
 - (1) There were four accidents in 200 million departures. The applicant believes that it will manufacture more than 2 000 of these airplanes or derivatives of these airplanes. These airplanes would average two flights a day. Therefore, statistically there will be accidents in the future if the hazard is not alleviated. Compliance will provide cost benefits related to avoiding lawsuits, accident investigations, and public relation costs.
 - (2) There are cost savings associated with meeting a single certification basis for FAA and foreign regulations.
- (9) Step 7: Document conclusion regarding practicality.

The design complies with 14 CFR § 25.365 at Amendment 25-0, 25-71/72, and 25-87, and is nearly in full compliance with Amendment 25-54 (and certain aspects of Amendments 25-71/72 and 25-87). The design would adequately address the hazard at an acceptable cost. Therefore, based on arguments of impracticality discussed in an issue paper, the FAA accepts the applicant's proposal to comply with 14 CFR § 25.365 at Amendment 25-0.

Appendix C to GM 21.A.101 The use of service experience in the certification process

1. Introduction

Service experience may be utilised to support the application of an earlier ~~airworthiness standard~~ certification specifications if, in conjunction with the applicable service experience and other compliance measures, the ~~earlier standard provides~~ certification specifications provide a level of safety comparable to that provided by the latest certification specifications. It is incumbent on the applicant to provide sufficient substantiation to allow the Agency to make this determination. A statistical approach may be used, subject to the availability and relevance of data, however sound engineering judgement must be used. For service history to be acceptable, the data must be both sufficient and pertinent.

The essentials of the process involve:

- a. A clear understanding of the ~~requirement~~ certification specification change and the purpose for the change and hazard addressed;
- b. A determination based on detailed knowledge of the proposed design feature;
- c. The availability of pertinent and sufficient service experience data, and
- d. A comprehensive review of that service experience data.

2. Guidelines

The Certification Review Item (CRI) procedure (either a stand-alone CRI or included in the CRI A-1) would be used and the applicant should provide documentation to support the following:

- a. The identification of the differences between the certification specification in the existing basis and the certification specification as amended, and the effect of the change in the certification specification.
- b. A description as to what aspect of the latest certification specification the proposed changed product would not meet.
- c. Evidence showing that the proposed type-certification basis for the changed product, together with applicable service experience, provides a level of safety consistent with complying with the latest certification specifications.
- d. A description of the design feature and its intended function.
- e. Data for the product pertinent to the certification specification:
 - (1) Service experience from such sources as the following:
 - (a) Accident reports;
 - (b) Incident reports;
 - (c) Service Bulletins;
 - (d) Airworthiness directives;
 - (e) Repairs;
 - (f) Modifications;
 - (g) Flight hours/cycles for fleet leader and total fleet;
 - (h) World airline accident summary data;
 - (i) Service Difficulty Reports;
 - (j) Reports from accident investigation boards;
 - (k) Warranty, repair and parts usage data.
 - (2) Show that the data presented represents all relevant service experience for the product, including the results of any operator surveys, and is comprehensive enough to be representative.
 - (3) Show that the service experience is relevant to the hazard.
 - (4) Identification and evaluation of each of the main areas of concern, with regard to:
 - (a) recurring and/or common failure modes;
 - (b) cause;
 - (c) probability, by qualitative reasoning; and
 - (d) measures already taken and their effects.
 - (5) Relevant data pertaining to aircraft of similar design and construction may be included.
 - (6) Evaluation of failure modes and consequences through analytical processes. The analytical processes should be supported by:
 - (a) A review of previous test results; **and**
 - (b) Additional detailed testing as required; **or**
 - (c) A review aircraft functional hazard assessments (FHA) and any applicable system safety assessments (SSA) as required.
- f. A conclusion that draws together the data and the rationale.
- g. These guidelines are not intended to be limiting, either in setting 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.

3. Example: [Transport Airplanes: § 25.1141\(f\) Powerplant controls: Auxiliary Power Unit \(APU\) Fuel Valve Position Indication](#)

NOTE: This example is taken from FAA certification experience gained prior to the Agency's start, so references are made to FAR sections and amendments ~~are kept~~.)

- a. The following example, for transport airplanes (14 CFR § 25.1141(f) Auxiliary Power Unit (APU) Fuel Valve Position Indication System), illustrates the typical process an applicant follows. The process will be the same for all product types.
- b. This example comes from a derivative model transport aeroplane where significant changes were made to the main airframe components, engines and systems, and APU. The baseline airplane has an extensive service history. The example shows how the use of service experience supports a finding that compliance with the latest requirement would not contribute materially to the level of safety, and that application of the existing type-certification basis (or earlier amendment) would be appropriate. The example is for significant derivatives of transport airplanes with extensive service history, and illustrates the process, following the guidelines in this appendix, but does not include the level of detail normally required.

- (1) Determine the differences between the requirement in the existing type-certification basis and the requirement as amended, and the effect of the change in the requirement.

The existing type-certification basis of the airplane that is being changed is the initial release of part 25. Amendment 25-40 added the requirement 14 CFR §25.1141(f), which mandates that power-assisted valves must have a means to indicate to the flight crew when the valve is in the fully open or closed position, or is moving between these positions. The addressed hazard would be risk of APU fire due to fuel accumulation caused by excessive unsuccessful APU start attempts.

- (2) What aspect of the proposed changed product would not meet the latest requirements?

The proposed APU fuel valve position indication system does not provide the flight crew with fuel valve position or transition indication, and, therefore, does not comply with the requirements of 14 CFR §25.1141(f).

- (3) Evidence that the proposed type-certification basis for the changed product, together with applicable service experience and other compliance measures provide an acceptable level of safety.

The APU fuel shut-off valve and actuator are unchanged from those used on the current family of airplanes, and have been found to comply with the earlier amendment 25-11 of 14 CFR §25.1141(f). The existing fleet has achieved approximately (#) flights during which service experience of the existing design has been found to be acceptable. If one assumes a complete APU cycle, i.e. start up and shutdown for each flight, the number of APU fuel shut off valve operations would be over 10^8 cycles, which demonstrates that the valve successfully meets its intended function and complies with the intent of the requirement. In addition, the system design for the changed product incorporates features, which increase the level of functionality and safety.

- (4) A description of the design feature and its intended function

The fuel shut off valve, actuator design, and operation is essentially unchanged, with the system design ensuring that the valve is monitored for proper cycling from closed to open at start initiation. If the valve is not in the appropriate position (i.e., closed) then the APU start is terminated, an indication is displayed on the flight deck and any further APU starts are prevented. Design improvements using the

capability of the APU Electronic Control Unit (ECU) have been incorporated in this proposed product change. These design changes ensure that the fuel valve indication system will indicate failure of proper valve operation to the flight crew, but the system does not indicate valve position as required by 14 CFR §25.1141(f).

(5) Data for the product pertinent to the requirement

The FAA and applicant record the data in an issue paper (G-1 or a technical issue paper). An issue paper was co-ordinated which included data, or referenced reports, documenting relevant service experience that has been compiled from incident reports, fleet flight hour/cycle data, and maintenance records. The issue paper also discussed existing and proposed design details, failure modes, and analyses showing to what extent the proposed aeroplane complies with the latest amendment of 14 CFR §25.1141. Information is presented to support the applicant's argument that compliance with the latest amendment would not materially increase the level of safety. Comparative data pertaining to aircraft of similar design and construction are also presented.

(6) Conclusion

Conclusion, drawing together the data and rationale, is documented in the G-1 issue paper. The additional features incorporated in the APU fuel shut-off valve will provide a significant increase in safety to an existing design with satisfactory service experience. The applicant proposes that compliance with the latest amendment would not materially increase the level of safety, and that compliance with 14 CFR §25.1141 at amendment 25-11 would provide an acceptable level of safety for the proposed product change.

Appendix D to GM 21.A.101 Tables and figures to assist CPR understanding

Figure 3: Affected and ~~Not affected~~ Unaffected area

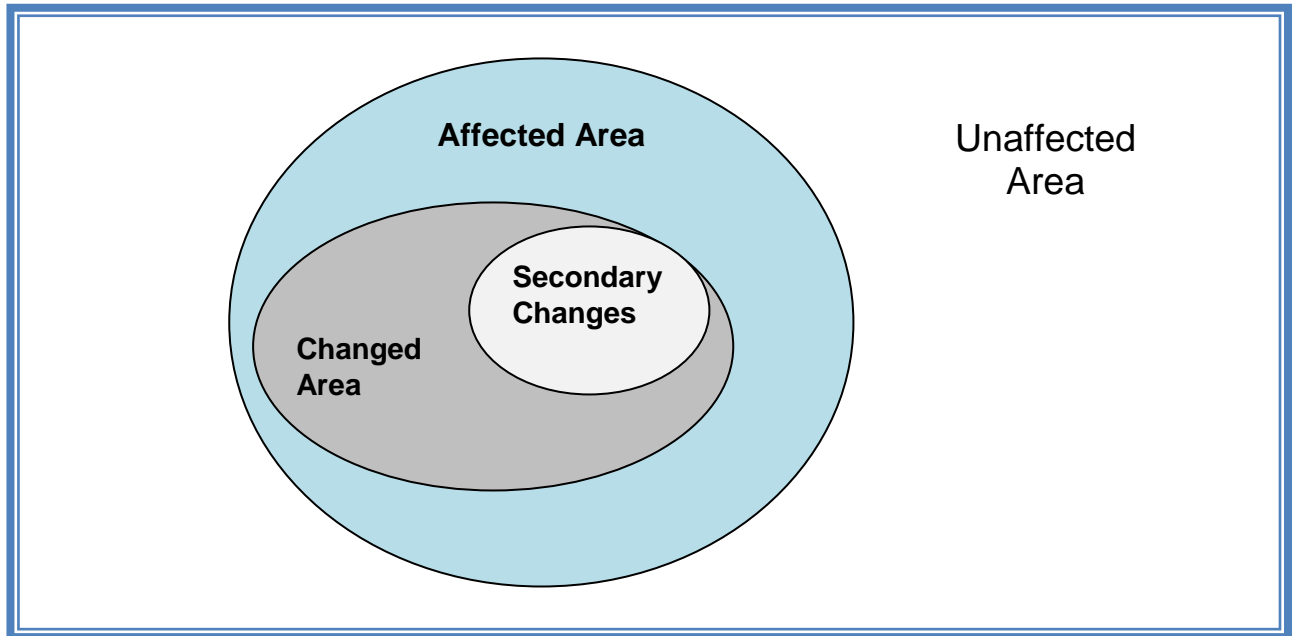


Figure 4: Example of Related and Unrelated changes –Increase in Maximum Number of Passengers

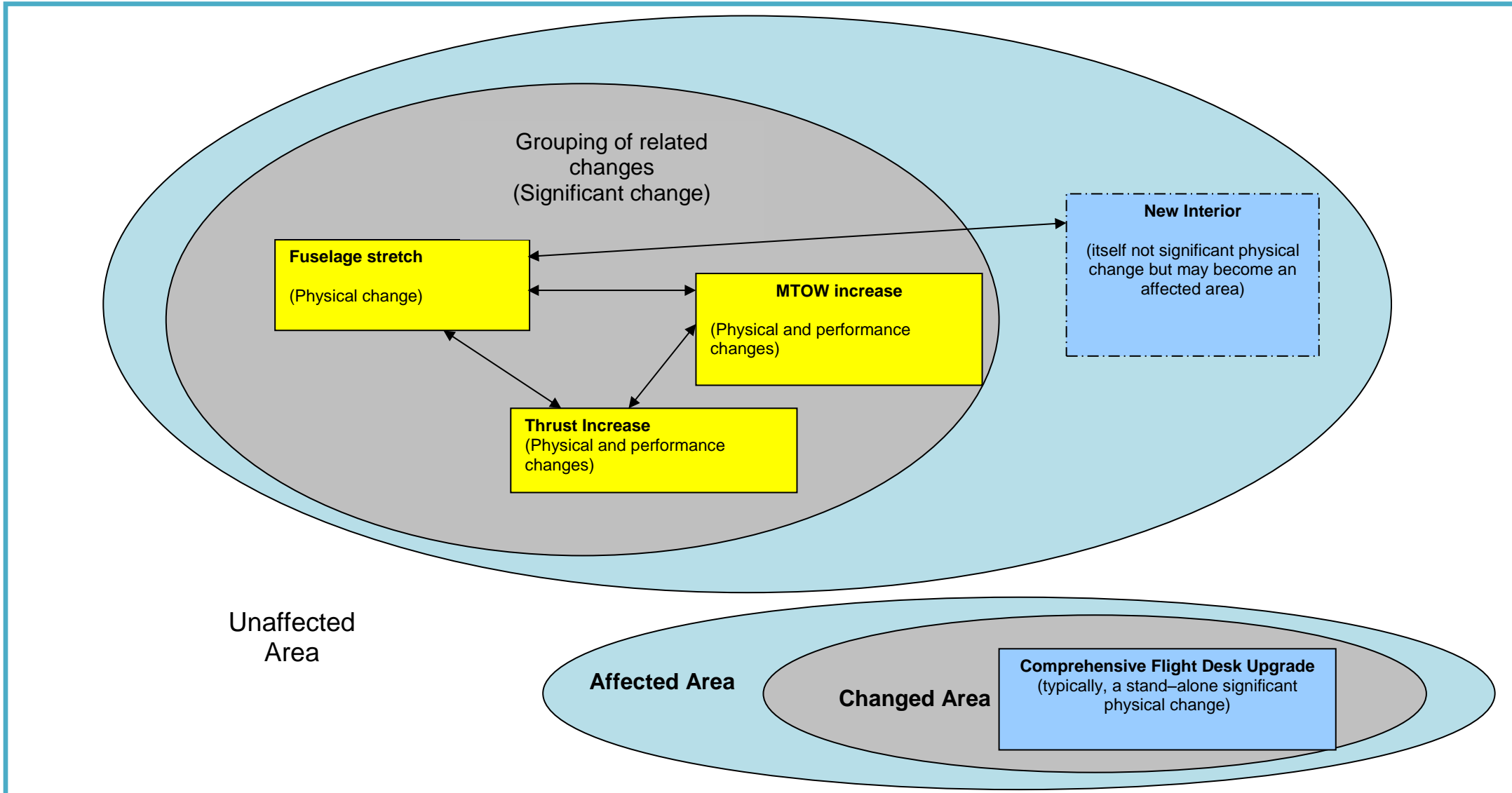


Figure 5: Establishing TC basis for Substantial, Significant and Not significant changes according to 21.A.101 (a) and ((b))

Substantial (21.A.19)	Significant (21.A.101) (a) and (b))			Not significant (21.A.101)(b)(1)		
<p>Full product</p> <p>New <u>showing demonstration</u> on of compliance for full changed product required.</p> <p>Previously approved type design and compliance data may be allowed if valid for the changed product.</p>	<p>Affected area (Changed areas and/or physically unchanged but functionally affected areas)</p> <p>New <u>showing demonstration</u> of compliance is required</p>			<p>Unaffected area</p> <p>No new <u>showing demonstration</u> of compliance is required.</p> <p>Unaffected area continues to comply with the existing TC basis.</p> <p>The applicant may elect to comply with later certification specifications.</p>	<p>Affected area (Changed areas and/or physically unchanged but functionally affected areas).</p> <p>New <u>showing demonstration</u> of compliance is required.</p> <p>The applicant may propose a certification basis using an earlier amendment but not earlier than the existing TC basis.</p>	<p>Unaffected area</p> <p>No new <u>showing demonstration</u> of compliance is required.</p> <p>Unaffected area continues to comply with the existing TC basis.</p> <p>The applicant may elect to comply with later certification specifications.</p>
	<p>Compliance with the latest amendment materially contributes to safety</p>		<p>No material contribution to safety</p>			
	<p>(Practical)</p>	<p>Impractical</p> <p>The applicant may propose a certification basis using an earlier amendment but not earlier than the existing TC basis.</p>	<p>Secondary (and not secondary)</p> <p>The applicant may propose a certification basis using an earlier amendment but not earlier than the existing TC basis.</p>			
TC basis proposed by the Applicant						
<p>Certification specifications of the latest amendment + elects to comply</p>		<p>Certification specifications of an earlier amendment + elects to comply</p>		<p>Elects to comply (later than the existing TC basis</p>	<p>An earlier amendment + elects to comply</p>	<p>Elects to comply (later than the existing TC basis)</p>
TC basis recorded by the Agency						
<p>Certification specifications of the latest amendment + SC (if the latest amendment is not adequate) + elects to comply</p>		<p>Certification specifications of the proposed amendment or, if not adequate, the first appropriate later amendment (if available) or SC + elects to comply</p>	<p>Certification specifications of the proposed amendment (if adequate) or, if not adequate, the first appropriate later amendment (if available) or SC + elects to comply</p>	<p>Elects to comply as proposed</p>	<p>The proposed amendment (if adequate) or First appropriate later amendment (if available) or SC + elects to comply</p>	<p>Elects to comply as proposed</p>

Figure 6: Establishing TC basis for a change on Excepted Products (21.A.101(c))

Affected area (Changed areas and/or physically unchanged but functionally affected areas) New <u>showing demonstration</u> of compliance is required				Unaffected area No new <u>showing demonstration</u> of compliance is required. Unaffected area continues to comply with the existing TC basis. The applicant may elect to comply with later certification specifications.
TC basis proposed by the Applicant				
The existing TC basis + elects to comply				Elects to comply (later than the existing TC basis)
Found by the Agency ‘significant in an area’			(Not significant in an area)	
Compliance with a later amendment materially contributes to safety		No material contribution to safety		
(Practical)	Impractical			
TC basis recorded by the Agency				
Certification specifications of a later amendment designated by the Agency + SC + elects to comply	The existing TC basis or, if not adequate, the first appropriate later amendment (if available) or (if not) SC + elects to comply	The existing TC basis or, if not adequate, the first appropriate later amendment (if available) or (if not) SC + elects to comply	The existing TC basis or, if not adequate, the first appropriate later amendment (if available) or (if not) SC + elects to comply	Elects to comply (later than the existing TC basis)

Appendix E to GM 21.A.101 Related Part 21 Requirements

21.A.16A	Airworthiness codes
21.A.16B	Special conditions
21.A.17	Type-certification basis
21.A.18	Designation of applicable environmental protection requirements and certification specifications
21.A.19	Changes requiring a new type-certificate
21.A.21	Issue of a type-certificate
21.A.23	Issue of a restricted type-certificate
21.A.90 ^A	Scope
21.A.91	Classification of changes in type design
21.A.93	Application
21.A.95	Minor changes
21.A.97	Major changes
21.A.101	Designation of applicable certification specifications and environmental protection requirements
21.A.103	Issue of approval
21.A.111	Scope
21.A.113	Application for a supplemental type-certificate
21.A.114,	<u>Showing Demonstration</u> of compliance
21.A.115	Issue of a supplemental type-certificate
21.A.117	Changes to that part of a product covered by a supplemental type-certificate
21.A.604 ^(b)	ETSO Authorisation for an auxiliary power unit (APU)

[Decision 2010/001/R, 30.03.2010]

[Decision 2011/010/R, 01.12.2011]

Subpart E — Supplemental type-certificates**GM 21.A.112B Demonstration of capability for supplemental type-certificate 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 JA DOA is required for TC)			
Notes :			
* STC which leads to reassess the loads on large parts of primary structure should be in group 1.			
* 2/1 means that an assessment of consequences in terms of handling qualities, performance or complexity of showing demonstration of compliance may lead to classification in group 1.			
	Aircraft		
		Conversion to tail wheel configuration	1
		Auxiliary fuel tank installations	2/1
		Glass fibre wing tips	2/1
		Fairings: nacelle, landing gear	2
		Gap seals: aileron, flap, empennage, doors	2
		Vortex generators	2/1
		Spoiler installation	1
		Increase in MTOW	1
	Structures		

SECTION A — Subpart E — Supplemental type-certificates

Product	Discipline	Kind of STC	Group
		Stretcher installation	2
		Change to seating configuration	2
		Windshield replacement (heated, single piece, etc.)	2
		Light weight floor panels	2
		Ski installations	2/1
	Propulsion		
		Engine model change	1
		Fixed pitch propeller installation	2
		Constant speed propeller installation	2/1
		Installation of exhaust silencer	2
		Installation of Graphic engine monitor	2
		Installation of fuel flow meter	2
		Accessory replacement (alternator, magnetos, etc.)	2
		Inlet modifications: oil cooler; induction air	2
	Equipment		

SECTION A — Subpart E — Supplemental type-certificates

Product	Discipline	Kind of STC	Group
		Avionics upgrades (EFIS, GPS, etc.)	2/1
		Engine instrument replacements	2
		Carburettor ice detection system	2
		Autopilot system installation	1
		Wing tip landing light; recognition lights	2
		WX radar installation	2
		Aeromedical system installations	2
		De- and anti-ice system installations	1
		Emergency power supply installations	2
CS-25			
	Cabin Safety		
<u>Note</u> :	Basically all changes related to cabin configuration should be in Group 2.	Cabin layout (installation of seats (16G), galleys, single class or business / economy class, etc.)	2
		Floor path marking	2
		Crew rest compartment	1
		Change of cargo compartment classification (from class D to class C)	1
	Structure		
<u>Note</u> :	STC which leads to reassess the loads on large parts of primary structure should be in Group 1.	Cargo door	1
		Change from Passenger to Freighter configuration	1
	Avionics		
<u>Notes</u> :	For CS-25 products, the existence of ETSO is not taken into account for the classification ; Impact on aircraft performance, and influence of aircraft performance are criteria to assess the classification ; Subjective assessment of human factors is considered for determination of classification.	CVR	2
		VHF	2
		NAV (ADF, VOR, GPS, BRNAV)	2
		Autopilot, HUD, EFIS, FMS	1
		DFDR	2/1
		Meteo radar	2
		ILS Cat 3	1

SECTION A — Subpart E — Supplemental type-certificates

Product	Discipline	Kind of STC	Group
		RVSM	1
		TCAS, EGPWS	1
		GPWS	2
	Powerplant		
		Auxiliary fuel tanks	1
		Thrust Reverser system	1
		Hushkit	1
		Fire detection	1
		Fuel gauging	1
		Change of Engine or Propeller	1
CS-27 or 29	All disciplines		
<u>Note</u> :		Main rotor or tail rotor blades replacement	1
2/1 means that an assessment of consequences in terms of handling qualities and performance may lead to classification in Group 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
		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
		Stand-by 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

AMC 21.A.114 Compliance demonstration process for Supplemental Type-Certificate

1. AMC/GM to 21.A.20 should be used for a supplemental type-certificate.
2. For major changes approved under a supplemental type-certificate and not requiring long and complex compliance demonstration activities, a certification programme, as described in AMC 21.A.20(b), can be submitted with the application in a simplified format. The certification programme should contain at least the following elements:
 - Purpose of change
 - Description of change
 - Applicability
 - Applicable certification specifications, special conditions, equivalent safety findings and environmental protection requirements
 - The description on how compliance will be demonstrated, with selected means of compliance (see appendix to AMC 21.A.20(b) for the codes to be used) and reference to compliance documents
 - As appropriate, the involvement of the type-certificate holder of the product on which the STC is proposed (see 21.A.113 and 115).
 - If relevant, the delivery schedule of compliance documents.

Subpart F — Production without production organisation approval**GM No. 1 to 21.A.121 Applicability - Individual product, part or appliance**

In this context, 'demonstrating the conformity with the applicable design data of a product, part and appliance' means that conformity with the applicable design data has to be established and shown for each and every product, part or appliance.

[Decision 2007/012/R, 29.11.2007]

GM No. 2 to 21.A.121 Applicability – Applicable design data

Applicable design data is defined as all necessary drawings, specifications and other technical information provided by the applicant for, or holder of a design organisation approval, TC, STC, approval of repair or minor change design, or ETSO authorisation (or equivalent when Part 21 Section A Subpart F is used for production of products, parts or appliances, the design of which has been approved other than according to Part 21), and released in a controlled manner to the manufacturer producing under Part 21 Subpart F. This should be sufficient for the development of production data to enable manufacture in conformity with the design data.

Prior to issue of the TC, STC, approval of repair or minor change design or ETSO authorisation, or equivalent, design data is defined as 'not approved', but parts and appliances may be released with an EASA Form 1 as a certificate of conformity.

After issue of the TC, STC, approval of repair or minor change or ETSO authorisation, or equivalent, this design data is defined as 'approved' and items manufactured in conformity are eligible for release on an EASA Form 1 for airworthiness purposes.

AMC No. 1 to 21.A.122 Eligibility – Link between design and production

An 'arrangement' is considered suitable if it is documented and satisfies the competent authority that co-ordination is satisfactory.

To achieve satisfactory co-ordination the documented arrangements must at least define the following aspects irrespective of whether the design organisation and the person producing or intending to produce under Part 21 Subpart F are separate legal entities or not:

- 1 The responsibilities of a design organisation which assure correct and timely transfer of up-to-date applicable design data (e.g., drawings, material specifications, dimensional data, processes, surface treatments, shipping conditions, quality requirements, etc.);
- 2 The responsibilities and procedures of the manufacturer for receiving, managing and using the applicable design data provided by the design organisation.
- 3 The responsibilities and procedures of the manufacturer for developing, where applicable, its own manufacturing data in compliance with the applicable design data package.
- 4 The responsibilities of the manufacturer to assist the design organisation in dealing with continuing airworthiness matters and for required actions (e.g., traceability of parts in case of direct delivery to users, retrofitting of modifications, traceability of processes' outputs and approved deviations for individual parts as applicable, technical information and assistance, etc.);
- 5 The scope of the arrangements covering Subpart F requirements, in particular: 21.A.126(a)(4) and 21.A.129(d) and (f) and any associated GM or AMC.
- 6 The responsibilities of the manufacturer, in case of products prior to type certification to assist a design organisation in ~~showing~~demonstrating compliance with CS (access and suitability of production and test facilities for manufacturing and testing of prototype models and test specimen);
- 7 The procedures to deal adequately with production deviations and non-conforming parts;
- 8 The means to achieve adequate configuration control of manufactured parts, to enable the manufacturer to make the final determination and identification for conformity or airworthiness release and eligibility status;

- 9 The identification of responsible persons/offices who controls the above.
- 10 The acknowledgment by the holder of the TC/STC/repair or change approval/ETSO authorisation that the approved design data provided, controlled and modified in accordance with the arrangement are recognised as approved.

In many cases the person producing or intending to produce under Part 21 Subpart F may receive the approved design data through an intermediate production organisation. This is acceptable provided an effective link between the design approval holder and the production organisation can be maintained to satisfy the intent of 21.A.122.

When the design organisation and the manufacturer are two separate legal entities a Direct Delivery Authorisation should be available for direct delivery to end users in order to guarantee continued airworthiness control of the released parts and appliances.

Where there is no general agreement for Direct Delivery Authorisation, specific permissions may be granted (see AMC 21.A.4).

AMC No. 2 to 21.A.122 Eligibility – Link between design and production

In accordance with AMC No.1 to 21.A.122 the person producing or intending to produce under Part 21 Subpart F should demonstrate to the authority that it has entered into an arrangement with the design organisation. The arrangement must be documented irrespective of whether the two organisations are separate legal entities or not.

The documented arrangement must facilitate the person producing or intending to produce under Part 21 Subpart F to demonstrate compliance with the requirement of 21.A.122 by means of written documents agreed.

In the case where the design organisation and the person producing or intending to produce under Part 21 Subpart F are part of the same legal entity these interfaces may be demonstrated by company procedures accepted by the competent authority.

In all other cases to define such a design/production interface the following sample format is offered:

Arrangement Sample Form

ARRANGEMENT <i>i.a.w. in accordance with</i> 21.A.122	
The undersigned agree on the following commitments:	Relevant interface procedures
<p>The design organisation [NAME] takes responsibility to:</p> <ul style="list-style-type: none"> • assure correct and timely transfer of up-to-date applicable design data (e.g., drawings, material specifications, dimensional data, processes, surface treatments, shipping conditions, quality requirements, etc.) to the person producing under Part 21 Subpart F [NAME] • provide visible statement(s) of approved design data. 	
<p>The person producing under Part 21 Subpart F [NAME] takes responsibility to</p> <ul style="list-style-type: none"> • assist the design organisation [Name] in dealing with continuing airworthiness matter and for required actions • assist the design organisation [NAME] in case of products prior to type certification in showing<u>demonstrating</u> compliance with airworthiness requirements<u>certification specifications</u> • develop, where applicable, its own manufacturing data in compliance with the airworthiness data package. 	
<p>The design organisation [NAME] and the person producing under Part 21 Subpart F [NAME] take joint responsibility to:</p> <ul style="list-style-type: none"> • deal adequately with production deviations and non-conforming parts in accordance with the applicable procedures of the design organisation and the manufacturer producing under Part 21 Subpart F. • achieve adequate configuration control of manufactured parts, to enable the manufacturer producing under Part 21 Subpart F to make the final determination and identification for conformity or airworthiness release and eligibility status. 	
<p>The scope of production covered by this arrangement is detailed in [DOCUMENT REFERENCE/ATTACHED LIST]</p> <p>[When the design organisation is not the same legal entity as the manufacturer producing under Part 21 Subpart F]</p>	
<p>Transfer of approved design data:</p> <p>The TC/STC/ETSO authorisation holder [NAME] acknowledges that the approved design data provided, controlled and modified in accordance with the arrangement are recognised as approved Agency. <u>by the competent authority and therefore the parts and appliances manufactured in accordance with these data and found in a condition for safe operation may be released certifying that the item was manufactured in conformity to approved design data and is in a condition for safe operation.</u></p> <p>[When the design organisation is not the same legal entity as the manufacturer producing under Part 21 Subpart F]</p>	
<p>Direct Delivery Authorisation:</p> <p>This acknowledgment includes also [OR does not include] the general agreement for direct delivery to end users in order to guarantee continued airworthiness control of the released parts and appliances.</p>	
<p>For the [NAME of the design organisation/DOA holder]</p> <p>Date: xx.xx.xxxx</p> <p>Signature: ([NAME in block letters])</p>	<p>For the [NAME of the person producing under Part 21 Subpart F]</p> <p>Date: xx.xx.xxxx</p> <p>Signature: ([NAME in block letters])</p>

Instructions for completion:

Title: The title of the relevant document must clearly indicate that it serves the purpose of a design/production interface arrangement in accordance with 21.A.122.

Commitment: The document must include the basic commitments between the design organisation and the manufacturer producing under Part 21 Subpart F as addressed in AMC 21.A.4 and AMC No. 1 to 21.A.122.

Relevant Procedures: Identify an entry point into the documentary system of the organisations with respect to the implementation of the arrangement (for example a contract, quality plan, handbooks, common applicable procedures, working plans etc.).

Scope of arrangement: The scope of arrangement must state by means of a list or reference to relevant documents those products, parts or appliances that are covered by the arrangement.

Transfer of approved design data: Identify the relevant procedures for the transfer of the applicable design data required by 21.A.122 and AMC No. 1 to 21.A.122 from the design organisation to the person producing under Part 21 Subpart F. The means by which the design organisation advises the person producing under Part 21 Subpart F whether such data is approved or not approved must also be identified (ref. 21.A.4 / AMC 21.A.4).

Direct Delivery Authorisation: Where the design organisation and the person producing under Part 21 Subpart F are separate legal entities the arrangement must clearly identify whether authorisation for direct delivery to end users is permitted or not.

Where any intermediate production/design organisation is involved in the chain between the original design organisation and the person producing under Part 21 Subpart F, evidence must be available that this intermediate organisation has received authority from the design organisation to grant Direct Delivery Authorisation.

Signature: AMC No. 1 to 21.A.122 requests the identification of the responsible persons/offices who control the commitments laid down in the arrangement. Therefore the basic document must be signed mutually by the authorised representatives of the design organisation and the manufacturer producing under Part 21 Subpart F in this regard.

GM 21.A.124(a) Application – Application form

EASA Form 60 (see AMC 21.B.120(c)(1)) should be obtained from the competent authority and completed by the applicant.

An application may be accepted from:

- An individual applying on his or her own behalf, or
- In the case of an organisation, an individual with the authority to make agreements on behalf of the organisation.

The completed form should be forwarded to the competent authority.

GM 21.A.124(b)(1)(i) Applicability - Inappropriate approval under Subpart G

The issue of a letter of agreement of production under Part 21 Subpart F may be agreed by the competent authority when:

- 1 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), and
- 2 The competent authority determines that Part 21 Section A Subpart G would be inappropriate, and consequently Part 21 Section A Subpart F applies. The main difference between Part 21 Section A Subparts G and F is that Subpart G requires the existence of a Quality System which provides the competent authority with the necessary confidence to grant to the manufacturer the privileges of certifying its own production. There are situations where a Quality System, including independent monitoring and continuous internal evaluation functions, is not justified

and /or feasible. In making the determination that Subpart F may apply, the competent authority may take into account one or a combination of parameters such as the following:

- no flow production (infrequent or low volume of production).
- simple technology (enabling effective inspection phases during the manufacturing process).
- very small organisation.

[Decision 2007/012/R, 29.11.2007]

GM 21.A.124(b)(1)(ii) Certification or approval needed in advance of the issue of a POA

In cases where Part 21 Section A Subpart G is applicable, but when some time is needed for the organisation to achieve compliance with Subpart G, i.e., to establish the necessary documented quality system, the competent authority may agree to use Part 21 Section A Subpart F for a limited period (transient phase).

In cases where Part 21 Section A Subpart G is applicable, such as to produce ETSO articles, a letter of agreement to produce under Part 21 Subpart F should not be given unless an application has been made for organisation approval under Subpart G, and reasonable progress is being made towards compliance with Subpart G. Long-term production under Part 21 Subpart F will not be permitted.

[Decision 2007/012/R, 29.11.2007]

GM 21.A.124(b)(2) Application - Minimum information to include with the application

At this early stage, provision of the complete manual is not necessary, but at least the following items should be covered:

- 1 Table of Contents of the Manual (including list of existing inspection system documents or procedures)
- 2 Description of items to be manufactured (including intended quantities /deliveries)
- 3 List of possible suppliers
- 4 General description of facilities
- 5 General description of production means
- 6 Human resources

GM No. 1 to 21.A.125A Letter of agreement - Meaning of individual

'Individual' means that each part number or type of item (i.e., product, part or appliance) to be produced should be specifically referenced, either directly or through a referenced capability list, in the letter of agreement from the competent authority. The letter may also specify any limitation in the production rate.

[Decision 2007/012/R, 29.11.2007]

GM No. 1 to 21.A.125A(b) Letter of agreement - Contents of the Manual

The manual referred in 21.A.125A(b) should include, at least the following information:

- 1 Declaration by the applicant of undertaking in respect of
 - 1.1 the requirements defined in Part 21 Section A Subpart F
 - 1.2 the procedures contained in the manual and in the documentation mentioned herein
 - 1.3 every legal provision laid down for the carrying on of the business activities (statutory declaration).

- 2 Declaration by the applicant certifying the conformity of the manual to the requirements defined in Part 21 Section A Subpart F
- 3 Jobs, power and responsibilities of the accountable personnel
- 4 Organisation chart, if required by the competent authority
- 5 Description of the resources, including human resources, with an indication of the personnel qualification criteria
- 6 Description of location and equipment
- 7 Description of the scope of work, the production processes and techniques, and reference to the 'capability list'
- 8 Communications with the competent authority, and specifically those required by 21.A.125A(c)
- 9 Assistance and communication with the design approval holder, and the means of compliance with 21.A.125A (c)
- 10 Amendments to the Manual
- 11 Description of the Inspection System (including test, see GM No. 2 to 21.A.125A(b), and 21.A.127 and 21.A.128), and the procedures to meet 21.A.126 and associated GM
- 12 List of suppliers
- 13 Issuing of the Statement of Conformity and competent authority inspection for validation

If the information is listed in the Manual in a different order a cross-reference to the above list should be made available in the Manual.

GM No. 2 to 21.A.125A(b) Letter of agreement - Production Inspection System: Functional Tests

All items produced should be subject to inspection to be carried out at suitable phases which permit an effective verification of conformity with the design data.

These inspections may provide for the execution of tests to measure performances as set out in the applicable design data.

Considerations of complexity of the item and/or its integration in the next level of production will largely determine the nature and time for these tests, for example:

- appliances - will require full functional testing to the specifications
- parts - will at least require basic testing to establish conformity, but due allowance may be made for further testing carried out at the next level of production
- material - will require verification of its stated properties.

GM 21.A.125A(c) Letter of agreement - Assistance

The competent authority should be provided with material which defines the means of providing assistance as required by 21.A.125A(c). Suitable descriptive material should be included in the Manual, as described in GM No. 1 to 21.A.125A(b).

GM No. 1 to 21.A.125B(a) Uncontrolled non-compliance with applicable design data

An uncontrolled non-compliance with applicable design data is a non-compliance:

- a) that cannot be discovered through systematic analysis or
- b) that prevents identification of affected products, parts, appliances, or material.

GM No. 2 to 21.A.125B(a) Examples for level one findings

Examples for level 1 findings are non-compliances with any of the following [paragraphs](#)[points](#), that could affect the safety of the aircraft:

21.A.126, 21.A.127, 21.A.128, 21.A.129.

It should be anticipated that a non-compliance with these paragraphs points is only considered a level one finding when objective evidence has been found that this finding is an uncontrolled non-compliance that could affect the safety of the aircraft.

GM 21.A.126 Production Inspection System

GM 21.A.126 (a) and (b) has have been developed for persons producing under Part 21 Section A Subpart F on the long term basis as defined in 21.A.124(b)(1)(i).

For those persons producing under Part 21 Section A Subpart F as a transient phase under 21.A.124(b)(1)(ii), compliance with 21.A.126 may also be demonstrated to the satisfaction of the competent authority by using the equivalent Part 21 Section A Subpart G AMC/GM.

GM 21.A.126(a)(1) Production Inspection System – Conformity of supplied parts, appliances and material

1. The person producing under Subpart F is responsible for determining and applying acceptance standards for physical condition, configuration status and conformity, as appropriate, of raw materials, subcontracted works, and supplied products, parts, appliances or material, whether to be used in production or delivered to customers as spare parts. This responsibility also includes BFE (Buyer Furnished Equipment) items.
2. Control may be based upon use of the following techniques, as appropriate:
 - 2.1 first article inspection, including destruction if necessary, to verify that the article conforms to the applicable data for new production line or new supplier,
 - 2.2 incoming inspections and tests of supplied parts or appliances that can be satisfactorily inspected on receipt,
 - 2.3 identification of incoming documentation and data relevant to the showing of conformity to be included in the certification documents,
 - 2.4 any additional work, tests or inspection which may be needed for parts or appliances which are to be delivered as spare parts and which are not subject to the checks normally provided by subsequent production or inspection stages.
3. The person producing under Part 21 Subpart F may rely upon an EASA Form 1 issued in accordance with Part 21 if provided as evidence of conformity with applicable design data

For suppliers not holding a POA the inspection system of the person producing under Part 21 Subpart F should establish a system for control of incoming materials and bought or subcontracted items which provides for inspections and tests of such items by the person producing under Part 21 Subpart F at the supplier's facility, if the item cannot or will not be completely inspected upon receipt.

GM 21.A.126(a)(2) Production Inspection System - Identification of incoming materials and parts

All parts and materials coming from external parties should be identified and inspected to ascertain that they have not been damaged during transport or unpacking, that the incoming parts and materials have the appropriate and correct accompanying documentation and that the configuration and condition of the parts or materials is as laid down in that documentation.

Only on completion of these checks and of any incoming further verifications laid down in the procurement specification, may the part or material be accepted for warehousing and used in production.

This acceptance should be certified by an inspection statement.

A suitable recording system should allow reconstruction at any time of the history of every material or part.

The areas where the incoming checks are carried out and the materials or parts are stored pending completion of the checks should be physically segregated from other departments.

GM No. 1 to 21.A.126(a)(3) Production Inspection System - List of specifications

It is the responsibility of:

- 1 The designer, to define all necessary processes, techniques and methods to be followed during manufacture (21.A.31) and this information will be provided as part of the applicable design data.
- 2 The manufacturer, to ensure that all processes are carried out strictly in accordance with the specifications provided as part of the applicable design data.

GM No. 2 to 21.A.126(a)(3) Production Inspection System - Means of checking of the production processes

The Production Inspection System should be provided with appropriate means of checking that production processes, whether performed by the person producing under Part 21 Subpart F or by sub-contractors under its control, are carried out in accordance with applicable data, including:

- 1 A system for the control and authorised amendment of data provided for the production, inspection and test to ensure that it is complete and up-to-date at the point of use
- 2 Availability of personnel with suitable qualification, experience, and training for each required production, inspection, and test task. Special attention should be paid to tasks requiring specialised knowledge and skill, e.g., NDT/NDI, welding...
- 3 A working area where the working conditions and environment are controlled as appropriate in respect of: cleanliness, temperature, humidity, ventilation, lighting, space/access, protection against noise and pollution
- 4 Equipment and tools sufficient to enable all specified tasks to be accomplished in a safe and effective manner without detrimental effect on the items under production. Calibration control of equipment and tools which affect critical dimensions and values must [show/demonstrate](#) compliance with, and be traceable to, recognised national or international standards.

GM 21.A.126(a)(4) Production Inspection System – Applicable design/production data procedures

- 1 When a person producing under Part 21 Subpart F is developing its own manufacturing data from the design data package delivered by a Design holder, procedures should demonstrate the correct transcription of the original design data.
- 2 Procedures should define the manner in which applicable design data is used to issue and update the production/inspection data, which determines the conformity of products, parts, appliances and materials. The procedure should also define the traceability of such data to each individual product, part, appliance or material for the purpose of stating the condition for safe operation and for issuing a Statement of Conformity.
- 3 During execution, all works should be accompanied by documentation giving either directly or by means of appropriate references, the description of the works as well as the identification of the personnel in charge of inspection and execution tasks for each of the different work phases.

GM 21.A.126(b)(1) Production Inspection System - Inspection of parts in process

The purpose of the Production Inspection System is to check at suitable points during production and provide objective evidence that the correct specifications are used, and that processes are carried out strictly in accordance with the specification.

During the manufacturing process, each article should be inspected in accordance with a plan which identifies the nature of all inspections required and the production stages at which they occur. The plan should also identify any particular skills or qualification required of person(s) carrying out the inspections (e.g., NDT personnel). A copy of the plan should be included in, or referenced by, the manual required by 21.A.125A(b).

If the parts are such that, if damaged, they could compromise the safety of the aircraft, additional inspections for such damage should be performed at the completion of each production stage.

GM 21.A.126(b)(2) Production Inspection System – Suitable storage and protection

1. Storage areas should be protected from dust, dirt, or debris, and adequate blanking and packaging of stored items should be practised.

2. All parts should be protected from extremes of temperatures and humidity and, where needed, temperature-controlled or full air-conditioned facilities should be provided.
3. Racking and handling equipment should be provided such as to allow storage, handling and movement of parts without damage.
4. Lighting should be such as to allow safe and effective access and handling, but should also cater for items which are sensitive to light e.g., rubber items.
5. Care should be taken to segregate and shield items which can emit fumes (e.g., wet batteries), substances or radiation (e.g., magnetic items) which are potentially damaging to other stored items.
6. Procedures should be in place to maintain and record stored parts identities and batch information.
7. Access to storage areas should be restricted to authorised personnel who are fully trained to understand and maintain the storage control arrangements and procedures.
8. Provisions should be made for segregated storage of non-conforming items pending their disposition (see GM 21.A.126(b)(4)).

GM 21.A.126(b)(3) Production Inspection System – Use of derived data instead of original design data

Where derived data, e.g., worksheets, process sheets, fabrication/inspection instructions, etc., is used instead of original design drawings, documents identification and control procedures should be used to ensure that the documentation in use is always accurate and current.

GM 21.A.126(b)(4) Production Inspection System – Segregation of rejected material

All materials and parts which have been identified at any stage in the manufacturing process as not conforming to the specific working and inspection instructions must be suitably identified by clearly marking or labelling, to indicate their non-conforming status.

All such non-conforming material or parts should be removed from the production area and held in a restricted access segregated area until an appropriate disposition is determined in accordance with 21.A.126(b)(5).

GM 21.A.126(b)(5) Production Inspection System – Engineering and manufacturing review procedure

1. The procedure should permit to record the deviation, to present it to the Design holder under the provisions of 21.A.122, and to record the results of the review and actions taken consequently as regards the part/product.
2. Any unintentional deviation from the manufacturing/inspection data should be recorded and handled in accordance with Part 21 Section A Subpart D or E as changes to the approved design.

GM 21.A.126(b)(6) Production Inspection System – Recording and record keeping

1. Records within a production environment satisfy two purposes. Firstly, they should, during the production process to ensure that products, parts, or appliances are in conformity with the controlling data throughout the manufacturing cycle. Secondly, certain records of milestone events are needed to subsequently provide objective evidence that all prescribed stages of the production process have been satisfactorily completed and that compliance with the applicable design data has been achieved.

Therefore, the person producing under Part 21 Subpart F should implement a system for the compilation and retention of records during all stages of manufacture, covering short-term and long-term records appropriate to the nature of the product and its production processes.

The management of such information should be subject to appropriate documented procedures in the Manual required by 21.A.125A(b).

All forms of recording media are acceptable (paper, film, magnetic ...) provided they can meet the required duration for archiving under the conditions provided.

2. The related procedures should:
 - 2.1 Identify records to be kept.
 - 2.2 Describe the organisation of and responsibility for the archiving system (location, compilation, format) and conditions for access to the information (e.g., by product, subject).
 - 2.3 Control access and provide effective protection from deterioration or accidental damage.
 - 2.4 Ensure continued readability of the records.
 - 2.5 Demonstrate to the competent authority proper functioning of the records system.
 - 2.6 Clearly identify the persons involved in conformity determination.
 - 2.7 Define an archiving period for each type of data taking into account importance in relation to conformity determination subject to the following:
 - a Data which supports conformity of a product, part, or appliance should be kept for not less than three years from the issue date of the related Statement of Conformity or Authorised Release Certificate.
 - b Data considered essential for continuing airworthiness should be kept throughout the operational life of the product, part or appliance.
 - 2.8 Data related to supplied parts may be retained by the supplier if the supplier has a system agreed under Part 21 Section A Subpart F by the competent authority. The manufacturer should, in each case, define the archiving period and satisfy himself or herself and the competent authority that the recording media are acceptable.

GM 21.A.127 Approved production ground and flight tests

The production ground and flight tests for new aircraft will be specified by the aircraft design organisation.

GM No. 1 to 21.A.128 Acceptable functional test - Engines

The functional test required for a new engine will be specified by the engine design organisation and will normally include at least the following:

- 1 Break-in runs that include a determination of fuel and oil consumption and a determination of power characteristics at rated maximum continuous power or thrust and, if applicable, at rated take-off power or thrust.
- 2 A period of operation at rated maximum continuous power or thrust. For engines having a rated take-off power or - thrust, part of that period should be at rated take-off power or - thrust.

The test equipment used for the test run should be capable of output determination of accuracy sufficient to assure that the engine output delivered complies with the specified rating and operation limitations.

GM No. 2 to 21.A.128 Acceptable functional test –Variable pitch propellers

The functional tests required for a new propeller will be specified by the propeller design organisation and should normally include a number of complete cycles of control throughout the propeller pitch and rotational speed ranges. In addition, for feathering and/or reversing propellers, several cycles of feathering operation and reversing operation from the lowest normal pitch to the maximum reverse pitch, should normally be required.

GM No. 3 to 21.A.128 Acceptable functional test - Engines and Propellers

After functional test, each engine or propeller should be inspected to determine that the engine or propeller is in condition for safe operation. Such inspection will be specified by the design organisation and should normally include internal inspection and examination. The degree of internal

inspections will normally be determined on the basis of the positive results of previous inspections conducted on the first production engines, and on the basis of service experience.

GM 21.A.129(a) Availability for inspection by the competent authority

Each product, part or appliance should be made available for inspection at any time at the request of the competent authority.

It is recommended that a pre-defined plan of inspection points be established and agreed with the competent authority to be used as a basis for such inspections.

The manufacturer should provide such documentation, tools, personnel, access equipment etc. as necessary to enable the competent authority to perform the inspections.

[Decision 2007/012/R, 29.11.2007]

AMC No. 1 to 21.A.129(c) Obligations of the manufacturer – Conformity of prototype models and test specimens

21.A.33 requires determination of conformity of prototype models and test specimens to the applicable design data. For a complete aircraft a 'conformity document', that has to be validated by the competent authority, should be provided as part of the assistance to the design approval applicant. For products other than a complete aircraft, and for parts and appliances, an EASA Form 1 validated by the competent authority may be used as a conformity document as part of the assistance to the design approval applicant.

AMC No. 2 to 21.A.129(c) Obligations of the manufacturer – Conformity with Applicable Design Data

Individual configurations are often based on the needs of the customer and improvements or changes which may be introduced by the type-certificate holder. There are also likely to be unintentional divergences (concessions or non-conformances) during the manufacturing process. All these changes are required to have been approved by the design approval applicant/holder, or when necessary by the Agency.

AMC No. 3 to 21.A.129(c) Obligations of the manufacturer – Condition for safe operation

Before issue of the Statement of Conformity to the competent authority the manufacturer under this Subpart should make an investigation so as to be satisfied in respect to each of the items listed below. The documented results of this investigation should be kept on file by the manufacturer. Certain of these items may be required to be provided (or made available) to the operator or owner of the aircraft, and, for validation of the statement of conformity, to the competent authority.

- 1 Equipment or modifications which do not meet the requirements of the state of manufacture but have been accepted by the competent authority of the importing country.
- 2 Identification of products, parts or appliances which:
 - 2.1 Are not new
 - 2.2 Are furnished by the buyer or future operator (including those identified in 21.A.801 and 805).
- 3 Technical records which identify the location and serial numbers of components that have traceability requirements for continued airworthiness purposes including those identified in 21.A.801 and 21.A.805.
- 4 Log book and a modification record book for the aircraft as required by the Agency.
- 5 Log books for products identified in 21.A.801 installed as part of the type design as required by the Agency.
- 6 A weight and balance report for the completed aircraft.
- 7 A record of missing items or defects which do not affect airworthiness these for example could be furnishing or BFE (Items may be recorded in a technical log or other suitable arrangement such that the operator and Agency are formally aware).

- 8 Product support information required by other associated implementing rules and CS or GM, such as a Maintenance Manual, a Parts Catalogue, or MMEL all of which are to reflect the actual build standard of the particular aircraft. Also an Electrical load analysis and a wiring diagram.
- 9 Records which demonstrate completion of maintenance tasks appropriate to the test flight flying hours recorded by the aircraft. These records should show the relationship of the maintenance status of the particular aircraft to the manufacturers recommended maintenance task list and the Maintenance Review Board (MRB) document/report.
- 10 Details of the serviceability state of the aircraft in respect of, a) the fuel and oil contents, b) provision of operationally required emergency equipment such as life rafts, etc.
- 11 Details of the approved interior configuration if different from that approved as part of the type design.
- 12 An approved Flight Manual which conforms to the build standard and modification state of the particular aircraft should be available.
- 13 Show that inspections for foreign objects at all appropriate stages of manufacture have been satisfactorily performed.
- 14 The registration has been marked on the exterior of the aircraft as required by national legislation. Where required by national legislation fix a fireproof owners nameplate.
- 15 Where applicable, there should be a certificate for noise and, for the aircraft radio station.
- 16 The installed compass and or compass systems have been adjusted and compensated and a deviation card displayed in the aircraft.
- 17 Software criticality list.
- 18 A record of rigging and control surface movement measurements.
- 19 Details of installations which will be removed before starting commercial air transport operations (e.g., ferry kits for fuel, radio or navigation).
- 20 List of all applicable Service Bulletins and airworthiness directives that have been implemented.

[Decision 2010/001/R, 30.03.2010]

AMC No. 1 to 21.A.130(b) Statement of Conformity for Complete Aircraft

1 PURPOSE AND SCOPE

The description under this AMC refers only to the use of the aircraft Statement of Conformity issued under Part 21 Section A Subpart F. Statement of Conformity under Part 21 Subpart F for products other than complete aircraft, and for parts and appliances is described in AMC No. 2 to 21.A.130(b).

Use of the aircraft Statement of Conformity issued by an approved production organisation is described in 21.A.163(b) under Part 21 Section A Subpart G and the completion instructions are to be found in the Appendices to Part 21.

The purpose of the aircraft Statement of Conformity (EASA Form 52) issued under Part 21 Section A Subpart F is to present to the competent authority a complete aircraft. The competent authority only validates the Statement of Conformity if it finds, as described in 21.A.130 and its associated GM, that the aircraft conforms with the type design and is in condition for safe operation.

2 GENERAL

The Statement of Conformity must comply with the format attached including block numbers and the location of each Block. The size of each Block may however be varied to suit the individual application, but not to the extent that would make the Statement of Conformity unrecognisable. If in doubt consult the competent authority.

The Statement of Conformity must either be pre-printed or computer generated but in either case the printing of lines and characters must be clear and legible. Pre-printed wording is permitted in accordance with the attached model but no other certification statements are permitted.

Statements of Conformity must be issued in one or more of the official language(s) of the issuing competent authority with translations in English shown below, if required. Completion may be either machine/computer printed or hand-written using block letters to permit easy reading.

A copy of the Statement of Conformity and all referenced attachments are to be retained by the manufacturer. A copy of the validated Statement of Conformity is to be retained by the competent authority.

3 COMPLETION OF THE AIRCRAFT STATEMENT OF CONFORMITY BY THE ORIGINATOR

There must be an entry in all Blocks to make the document a valid Statement.

A Statement of Conformity must not be issued for validation by the competent authority, unless the design of the aircraft and its installed products are approved.

The information required in Blocks 9, 10, 11, 12, 13 and 14 may be by reference to separate identified documents held on file by the manufacturer, unless the competent authority agrees otherwise.

This Statement of Conformity is not intended to provide for the complete equipment fit required by the applicable operational rules. However, some of these individual items may be included in Block 10 or in the approved type design. Operators are therefore reminded of their responsibility to ensure compliance with the applicable operational rules for their own particular operation.

- Block 1 Enter name of the State of manufacture.
- Block 2 The competent authority under which authority the Statement of Conformity is issued.
- Block 3 A unique serial number should be pre-printed in this Block for Statement control and traceability purposes. Except that in the case of a computer generated document the number need not be pre-printed where the computer is programmed to produce and print a unique number.
- Block 4 The full name and location address of the manufacturer issuing the statement. This Block may be pre-printed. Logos, etc., are permitted if the logo can be contained within the Block.
- Block 5 The aircraft type in full as defined in the type-certificate and its associated data sheet.
- Block 6 The type-certificate reference numbers and issue for the subject aircraft.
- Block 7 If the aircraft is registered then this mark will be the registration mark. If the aircraft is not registered then this will be such a mark that is accepted by the competent authority of the Member State and, if applicable, by the competent authority of a third country.
- Block 8 The identification number assigned by the manufacturer for control and traceability and product support. This is sometimes referred to as a Manufacturers Serial No or Constructors No.
- Block 9 The engine and propeller type(s) in full as defined in the relevant type-certificate and its associated data sheet. Their manufacturer identification No and associated location should also be shown.

SECTION A — Subpart E — Supplemental type-certificates

- Block 10 Approved design changes to the Aircraft Definition.
- Block 11 A listing of all applicable airworthiness directives (or equivalent) and a declaration of compliance, together with a description of the method of compliance on the subject individual aircraft including products and installed parts, appliances and equipment. Any future compliance requirement time should be shown.
- Block 12 Approved unintentional deviation to the approved type design sometimes referred to as concessions, divergences, or non-conformances.
- Block 13 Only agreed exemptions, waivers or derogations may be included here..
- Block 14 Remarks: Any statement, information, particular data or limitation which may affect the airworthiness of the aircraft. If there is no such information or data, state; 'NONE'.
- Block 15 Enter 'Certificate of Airworthiness' or 'Restricted Certificate of Airworthiness' for the Certificate of Airworthiness requested.
- Block 16 Additional requirements such as those notified by an importing country should be noted in this Block.
- Block 17 Validity of the Statement of Conformity is dependent on full completion of all Blocks on the form. A copy of the flight test report together with any recorded defects and rectification details should be kept on file by the manufacturer. The report should be signed as satisfactory by the appropriate certifying staff and a flight crew member, e.g., test pilot or flight test engineer. The flight tests performed are those required by 21.A.127 and GM 21.A.127, to ensure that the aircraft conforms to the applicable design data and is in condition for safe operation.
- The listing of items provided (or made available) to satisfy the safe operation aspects of this statement should be kept on file by the manufacturer.
- Block 18 The Statement of Conformity may be signed by the person authorised to do so by the manufacturer in accordance with 21.A.130(a). A rubber stamp signature should not be used.
- Block 19 The name of the person signing the certificate should be typed or printed in a legible form.
- Block 20 The date the Statement of Conformity is signed must be given.
- Block 21 For production under Part 21 Subpart F, state 'NOT APPLICABLE'

Additionally, for production under Part 21 Section A Subpart F, this Block must include validation by the competent authority. For this purpose, the validation statement below should be included in the Block 21 itself, and not referred in a separate document. The statement can be pre-printed, computer generated or stamped, and should be followed by the signature of the representative of the competent authority validating the certificate, the name and the position/identification of such representative of the competent authority, and the date of such validation by the competent authority.

VALIDATION STATEMENT:

'After due inspection the *<identify the issuing competent authority >* is satisfied that this document constitutes an accurate and valid Statement of Conformity in accordance with Part 21 Section A Subpart F.'

AMC No. 2 to 21.A.130(b) Statement of Conformity for Products (other than complete aircraft), parts, appliances and materials - The Authorised Release Certificate (EASA Form 1)

A. INTRODUCTION

This AMC relates specifically to the use of the EASA Form 1 for manufacturing purposes under Part 21 Subpart F. It can be used as a supplement to the completion instructions in Part 21, Appendix I which covers the use of the EASA Form 1.

1. PURPOSE AND USE

The EASA Form 1 is prepared and signed by the manufacturer. For production under Part 21 Subpart F it is presented for validation by the competent authority.

Under Subpart F the certificate may only be issued by the competent authority.

A mixture of items released under Subpart G and under Subpart F of Part 21 is not permitted on the same certificate.

2. GENERAL FORMAT

Refer to Part 21 Appendix I.

3. COPIES

Refer to Part 21 Appendix I.

The Part 21 Subpart F originator must retain a copy of the certificate in a form that allows verification of original data.

4. ERROR(S) ON THE CERTIFICATE

If an end user finds an error(s) on a certificate, they must identify it/them in writing to the originator. The originator may prepare and sign a new certificate for validation by the competent authority if they can verify and correct the error(s).

The new certificate must have a new tracking number, signature and date.

The request for a new certificate may be honoured without re-verification of the item(s) condition. The new certificate is not a statement of current condition and should refer to the previous certificate in block 12 by the following statement: '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.' Both certificates should be retained according to the retention period associated with the first.

5. COMPLETION OF THE CERTIFICATE BY THE ORIGINATOR

Refer to Part 21 Appendix I for completion of the certificate. Specific Part 21 Subpart F instructions that differ from the Part 21 Appendix I are provided below.

Block 1 – Approving competent authority/Country

State the name and country of the competent authority under whose jurisdiction this certificate is issued. When the competent authority is the Agency, 'EASA' must be stated.

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.

- 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'.

Additionally, for production under Subpart F, this block must include the Statement of Conformity by the manufacturer under 21.A.130. For this purpose, the appropriate Block 13a statement must be included in the block 12 and not referenced in a separate document. The statement may be pre-printed, computer generated or stamped, and must be followed by the signature of the manufacturer's authorised person under 21.A.130(a), the name and the position/identification of such person and the date of the signature.

Block 13b – Authorised Signature

This space shall be completed with the signature of the competent authority representative validating the Block 12 manufacturer Statement of Conformity, under 21.A.130(d). To aid recognition, a unique number identifying the representative may be added.

Block 13c – Approval/Authorisation Number

Enter the authorisation number reference. This number or reference is given by the competent authority to the manufacturer working under Part 21 Subpart F.

[Decision 2010/001/R, 30.03.2010]

Subpart G — Production organisation approval for products, parts and appliances

GM 21.A.131 Scope – Applicable design data

Applicable design data is defined as all necessary drawings, specifications and other technical information provided by the applicant for, or holder of a design organisation approval, TC, STC, approval of repair or minor change design, or ETSO authorisation ~~(or equivalent when Part 21 Section A Subpart G is used for production of products, parts or appliances, the design of which has been approved other than according to Part 21)~~ and released in a controlled manner to a production organisation approval holder. This should be sufficient for the development of production data to enable repeatable manufacture to take place in conformity with the design data.

Prior to issue of the TC, STC, approval of repair or minor change design or ETSO authorisation, or equivalent, design data is defined as 'not approved' but parts and appliances may be released with an EASA Form 1 as a certificate of conformity.

After issue of the TC, STC, approval of repair or minor change or ETSO authorisation, or equivalent, this design data is defined as 'approved' and items manufactured in conformity are eligible for release on an EASA Form 1 for airworthiness purposes.

GM 21.A.133(a) Eligibility – 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 program 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 I to the ~~Basic~~ Regulation (EC) No 216/2008.
- It is not the intent of the competent authority to issue approvals to manufacturing firms that perform only sub-contract work for main manufacturers of products and are consequently placed under their direct surveillance.
- 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.)

[Decision 2007/012/R, 29.11.2007]

AMC No. 1 to 21.A.133(b) and (c) Eligibility – Link between design and production organisations

An arrangement is considered appropriate if it is documented and satisfies the competent authority that co-ordination is satisfactory.

To achieve satisfactory coordination the documented arrangements must at least define the following aspects irrespective of whether the two organisations are separate legal entities or not:

- The responsibilities of a design organisation which assure correct and timely transfer of up-to-date airworthiness data (e.g., drawings, material specifications, dimensional data, processes, surface treatments, shipping conditions, quality requirements, etc.);
- The responsibilities and procedures of a POA holder/applicant for developing, where applicable, its own manufacturing data in compliance with the airworthiness data package;
- The responsibilities of a POA holder/applicant to assist the design organisation in dealing with continuing airworthiness matters and for required actions (e.g., traceability of parts in case of direct delivery to users, retrofitting of modifications, traceability of processes’ outputs and approved deviations for individual parts as applicable, technical information and assistance, etc.);
- The scope of the arrangements must cover Part 21 Subpart G requirements and associated AMC and GM, in particular: 21.A.145(b), 21.A.165(c), (f) and (g);
- The responsibilities of a POA holder/applicant, in case of products prior to type certification to assist a design organisation in **showingdemonstrating** compliance with CS (access and suitability of production and test facilities for manufacturing and testing of prototype models and test specimen);
- The procedures to deal adequately with production deviations and non-conforming parts;
- The procedures and associated responsibilities to achieve adequate configuration control of manufactured parts, to enable the production organisation to make the final determination and identification for conformity or airworthiness release and eligibility status;
- The identification of the responsible persons/offices who control the above;
- The acknowledgment by the holder of the TC/STC/repair or change approval/ETSO authorisation that the approved design data provided, controlled and modified in accordance with the arrangement are recognised as approved.

In many cases the production organisation may receive the approved design data through an intermediate production organisation. This is acceptable provided an effective link between the design approval holder and the production organisation can be maintained to satisfy the intent of 21.A.133.

When the design and production organisations are two separate legal entities a Direct Delivery Authorisation must be available for direct delivery to end users in order to guarantee continued airworthiness control of the released parts and appliances.

Where there is no general agreement for Direct Delivery Authorisation, specific permissions may be granted (refer to AMC 21.A.4).

AMC No. 2 to 21.A.133(b) and (c) Eligibility – Link between design and production organisations

In accordance with AMC No.1 to 21.A.133(b) and (c) the POA holder must demonstrate to the competent authority that it has entered into an arrangement with the design organisation. The arrangement must be documented irrespective of whether the two organisations are separate legal entities or not.

The documented arrangement must facilitate the POA holder to demonstrate compliance with the requirement of 21.A.133(b) and (c) by means of written documents agreed.

In the case where the design organisation and POA holder are part of the same legal entity these interfaces may be demonstrated by company procedures accepted by the competent authority.

In all other cases to define such a design/production interface the following sample format is offered:

Arrangement Sample Form

ARRANGEMENT <i>i.a.w. in accordance with</i> 21.A.133(b) and (c)	
The undersigned agree on the following commitments:	Relevant interface procedures
<p>The design organisation [NAME] takes responsibility to</p> <ul style="list-style-type: none"> • assure correct and timely transfer of up-to-date applicable design data (e.g., drawings, material specifications, dimensional data, processes, surface treatments, shipping conditions, quality requirements, etc.) to the production organisation approval holder [NAME] • provide visible statement(s) of approved design data. 	
<p>The production organisation approval holder [NAME] takes responsibility to</p> <ul style="list-style-type: none"> • assist the design organisation [NAME] in dealing with continuing airworthiness matter and for required actions • assist the design organisation [NAME] in case of products prior to type certification in showing<i>demonstrating</i> compliance with airworthiness requirements<i>certification specifications</i> • develop, where applicable, its own manufacturing data in compliance with the airworthiness data package. 	
<p>The design organisation [NAME] and the POA holder [NAME] take joint responsibility to</p> <ul style="list-style-type: none"> • deal adequately with production deviations and non-conforming parts in accordance with the applicable procedures of the design organisation and the production organisation approval holder • achieve adequate configuration control of manufactured parts, to enable the POA holder to make the final determination and identification for conformity. 	
<p>The scope of production covered by this arrangement is detailed in [DOCUMENT REFERENCE/ATTACHED LIST]</p>	
<p><i>[When the design organisation is not the same legal entity as the production organisation approval holder]</i></p> <p>Transfer of approved design data:</p> <p>The TC/STC/ETSO holder [NAME] acknowledges that the approved design data provided, controlled and modified in accordance with the arrangement are recognised as approved by the competent authority and therefore the parts and appliances manufactured in accordance with these data and found in a condition for safe operation may be released certifying that the item was manufactured in conformity to approved design data and is in a condition for safe operation..</p>	

[When the design organisation is not the same legal entity as the production organisation approval holder]

Direct Delivery Authorisation:

This acknowledgment includes also [OR does not include] the general agreement for direct delivery to end users in order to guarantee continued airworthiness control of the released parts and appliances.

For the *[NAME of the design organisation/DOA holder]*

Date:

XX.XX.XXXX

Signature:

[NAME in block letters]

For the *[NAME of the POA holder]*

Date:

XX.XX.XXXX

Signature:

[NAME in block letters]

Instructions for completion:

Title: The title of the relevant document must clearly indicate that it serves the purpose of a design/production interface arrangement in accordance with 21.A.133(b) and (c).

Commitment: The document must include the basic commitments between the design organisation and the POA holder as addressed in AMC 21.A.4 and AMC No. 1 to 21.A.133(b) and (c).

Relevant Procedures: Identify an entry point into the documentary system of the organisations with respect to the implementation of the arrangement (for example a contract, quality plan, handbooks, common applicable procedures, working plans etc.).

Scope of arrangement: The scope of arrangement must state by means of a list or reference to relevant documents those products, parts or appliances that are covered by the arrangement.

Transfer of applicable design data: Identify the relevant procedures for the transfer of the applicable design data required by 21.A.131 and AMC 21.A.131 from the design organisation to the POA holder. The means by which the design organisation advises the POA holder whether such data is approved or not approved must also be identified (ref. 21.A.4/AMC 21.A.4).

Direct Delivery Authorisation: Where the design organisation and the POA holder are separate legal entities the arrangement must clearly identify whether authorisation for direct delivery to end users is permitted or not.

Where any intermediate production/design organisations are involved in the chain between the original design organisation and the POA holder evidence must be available that this intermediate organisation has received authority from the design organisation to grant Direct Delivery Authorisation.

Signature: AMC No. 1 to 21.A.133(b) and (c) requests the identification of the responsible persons/offices who control the commitments laid down in the arrangement. Therefore the basic document must be signed mutually by the authorised representatives of the design organisation and the POA holder in this regard.

[Decision 2010/001/R, 30.03.2010]

GM 21.A.134 Application – Application form and manner

EASA Form 50 (see AMC 21.B.220(c)) should be obtained from the competent authority, and completed by the accountable manager of the organisation.

The completed form, an outline of the production organisation exposition, and details of the proposed terms of approval are to be forwarded to the competent authority.

GM No. 1 to 21.A.139(a) Quality System

The quality system is an organisational structure with responsibilities, procedures, processes, and resources which implement a management function to determine and enforce quality principles.

The quality system should be documented in such a way that the documentation can be made easily available to personnel who need to use the material for performing their normal duties, in particular:

- procedures, instructions, data to cover the issues of 21.A.139(b)(1) are available in a written form,
- distribution of relevant procedures to offices/persons is made in a controlled manner,
- procedures which identify persons responsible for the prescribed actions are established,
- the updating process is clearly described.

The manager responsible for ensuring that the quality system is implemented and maintained should be identified.

The competent authority will verify on the basis of the exposition and by appropriate investigations that the production organisation has established and can maintain their documented quality system.

GM No. 2 to 21.A.139(a) Quality System – Conformity of supplied parts or appliances

The POA holder is responsible for determining and applying acceptance standards for physical condition, configuration status and conformity of supplied products, parts or appliances, whether to be used in production or delivered to customers as spare parts. This responsibility also includes BFE (Buyer Furnished Equipment) items.

To discharge this responsibility the quality system needs an organisational structure and procedures to adequately control suppliers. Elements of the quality system for the control of suppliers may be performed by other parties provided that the conditions of AMC No. 1 or No. 2 to 21.A.139(b)(1)(ii) are met.

Control can be based upon use of the following techniques (as appropriate to the system or product orientation necessary to ensure conformity):

- qualification and auditing of supplier's quality system,
- evaluation of supplier capability in performing all manufacturing activities, inspections and tests necessary to establish conformity of parts or appliances to type design,
- first article inspection, including destruction if necessary, to verify that the article conforms to the applicable data for new production line or new supplier,
- incoming inspections and tests of supplied parts or appliances that can be satisfactorily inspected on receipt,
- identification of incoming documentation and data relevant to the showing of conformity to be included in the certification documents,
- a vendor rating system which gives confidence in the performance and reliability of this supplier,
- any additional work, tests or inspection which may be needed for parts or appliances which are to be delivered as spare parts and which are not subjected to the checks normally provided by subsequent production or inspection stages.

The POA holder may rely on inspection/tests performed by supplier if it can establish that:

- personnel responsible in charge of these tasks satisfy the competency standards of the POA quality system,
- quality measurements are clearly identified,
- the records or reports showing evidence of conformity are available for review and audit.

The control of suppliers holding a POA for the parts or appliances to be supplied can be reduced, to a level at which a satisfactory interface between the two quality systems can be demonstrated. Thus, for the purpose of showing conformity, a POA holder can rely upon documentation for parts or appliances released under a suppliers 21.A.163 privileges.

A supplier who does not hold a POA is considered as a sub-contractor under the direct control of the POA quality system.

The POA holder retains direct responsibility for inspections/tests carried out either at its own facilities or at supplier's facilities.

[Decision 2010/016/R, 16.12.2010]

GM 21.A.139(b)(1) Quality System – Elements of the quality system

1. The control procedures covering the elements of 21.A.139(b)(1) should document the standards to which the production organisation intends to work.

2. An organisation having a Quality system designed to meet a recognised Standard such as ISO [90029001](#) (relevant to the scope of approval being requested) should expand it to include at least the following additional topics, as appropriate, in order to [showdemonstrate](#) compliance with the requirements of Part 21 Subpart G:

- Mandatory Occurrence Reporting and continued airworthiness as required by 21.A.165(e)
- Control of work occasionally performed (outside the POA facility by POA personnel)
- Co-ordination with the applicant for, or holder of, an approved design as required by 21.A.133(b) and (c) and 21.A.165(g)
- Issue of certifications within the scope of approval for the privileges of 21.A.163
- Incorporation of airworthiness data in production and inspection data as required in 21.A.133(b) and (c) and 21.A.145(b)
- When applicable, ground test and/or production flight test of products in accordance with procedures defined by the applicant for, or holder of, the design approval
- Procedures for traceability including a definition of clear criteria of which items need such traceability. Traceability is defined as a means of establishing the origin of an article by reference to historical records for the purpose of providing evidence of conformity
- Personnel training and qualification procedures especially for certifying staff as required in 21.A.145(d).

3. An organisation having a quality system designed to meet a recognised aerospace quality standard will still need to ensure compliance with all the requirements of Subpart G of Part 21. In all cases, the competent authority will still need to be satisfied that compliance with Part 21 Subpart G is established.

AMC No. 1 to 21.A.139(b)(1)(ii) Vendor and sub-contractor assessment, audit and control – Production Organisation Approval (POA) holder using documented arrangements with other parties for assessment and surveillance of a supplier.

1. General

Note:

For the purpose of this AMC, vendors and sub-contractors are hereafter referred to as 'suppliers', regardless of whether or not they hold a POA and audit and control is hereafter referred to as 'surveillance'.

The production organisation is required by Part 21 to demonstrate that it has established and maintains a quality system that enables the organisation to ensure that each item produced conforms to the applicable design data and is in a condition for safe operation. To discharge this responsibility, the quality system should have, among other requirements, procedures to adequately carry out the assessment and surveillance of suppliers.

The use of Other Parties (OP), such as a consulting firm or quality assurance company, for supplier assessment and surveillance does not exempt the POA holder from its obligations under 21.A.165. The supplier assessment and surveillance, corrective action and follow-up activity conducted at any of its supplier's facilities may be performed by OP.

The purpose of using an OP cannot be to replace the assessment, audit and control of the POA Holder. It is to allow an element (i.e. the assessment of the quality system) to be delegated to another organisation under controlled conditions.

The use of OP to perform supplier assessments and surveillance should be part of the production organisation quality system and fulfil the conditions of this AMC.

This AMC is applicable to a method whereby a POA holder has a documented arrangement with OP for the purpose of assessing and/or surveying a POA's supplier.

2. Approval by the competent authority

Implementing or changing procedures for using OP for supplier assessment and surveillance is a significant change to the quality system and requires approval in accordance with 21.A.147.

3. Conditions and criteria for the use of OP to perform supplier assessment and surveillance

- (a) The POA holder should include the use of OP for supplier assessment and surveillance in the POA holders' quality system to demonstrate compliance with the applicable requirements of Part 21.
- (b) Procedures required for using OP for supplier assessment and surveillance should be consistent with other procedures of the POA holders' quality system.
- (c) Procedures of the POA holder that uses OP to perform supplier assessment and surveillance should include the following:
 - (1) Identification of the OP that will conduct supplier assessment and surveillance.
 - (2) A listing of suppliers under surveillance by the OP. This listing should be maintained by the POA holder and made available to the competent authority upon request.
 - (3) The method used by the POA holder to evaluate and monitor the OP. The method should include the following as a minimum:
 - (i) Verification that standards and checklists used by the OP are acceptable for the applicable scope.
 - (ii) Verification that the OP is appropriately qualified and have sufficient knowledge, experience and training to perform their allocated tasks.
 - (iii) Verification that the OP surveillance frequency of the suppliers is commensurate with the complexity of the product and with the surveillance frequency established by the POA holder's suppliers control programme.
 - (iv) Verification that the suppliers' assessment and surveillance is conducted on-site by the OP.
 - (v) Verification that the OP has access to applicable proprietary data to the level of detail necessary to survey suppliers functions.

Where the POA holder uses an OP accredited by a signatory to the European cooperation for Accreditation (EA) Multilateral Agreement and working in accordance with an aviation standard (e.g. EN 9104 series of requirements) that describes requirements for the other party assessment and surveillance, the items (ii) and (iv) shall be deemed to be complied with.

- (4) A definition to what scope the OP will conduct suppliers surveillance on behalf of the POA holder. If the OP replaces surveillance in part, the POA holder should identify the functions that will continue to be surveyed by the POA holder.
 - (5) The procedures used by the OP to notify the POA holder of non-conformities discovered at the suppliers facility, corrective action and follow-up.
- (d) The POA should make arrangements that allow the competent authority to make investigation in accordance with 21.A.157 to include OP activities.

AMC No. 2 to 21.A.139(b)(1)(ii) Vendor and sub-contractor assessment, audit and control - Production Organisation Approval (POA) holder using other party supplier certification

1. General

Note:

For the purpose of this AMC, vendors and sub-contractors are hereafter referred to as 'suppliers', regardless of whether or not they hold a POA and audit and control is hereafter referred to as 'surveillance'.

Other party supplier certification is a method whereby a supplier contracts with an appropriately recognised or accredited Other Party (OP) for the purpose of obtaining a certification from that OP. Certification indicates that the supplier has satisfactorily demonstrated to meet the applicable standard on a continuing basis. OP certification results in placing the supplier on the OP list of certified organisations, or in the supplier receiving a certificate identifying the requirements that have been met. Periodic follow-up evaluations are conducted by the OP to verify continued compliance with the requirements of the applicable standard.

The production organisation is required by Part 21 to demonstrate that it has established and maintains a quality system that enables the organisation to ensure that each item produced conforms to the applicable design data and is in a condition for safe operation. To discharge this responsibility, the quality system should have, among other requirements, procedures to adequately carry out the assessment and surveillance of suppliers.

The assessment and surveillance of suppliers by an OP should be deemed to satisfy the requirements of 21.A.139(b)(1)(ii) when the conditions of this AMC are satisfied. The assessment and surveillance of suppliers by OP as part of supplier certification does not exempt the POA holder from its obligations under 21.A.165. The supplier assessment and surveillance, corrective action and follow-up activity conducted at any of its supplier's facilities may be performed by OP.

The purpose of using an OP cannot be to replace the assessment, audit and control of the POA Holder. It is to allow an element (i.e. the assessment of the quality system) to be delegated to another organisation under controlled conditions.

The use of suppliers that are certified by OP in accordance with this AMC should be part of a production organisation quality system.

2. Approval by the competent authority

Implementing or changing procedures for using suppliers that are certified by an OP is a significant change to the quality system and requires approval in accordance with 21.A.147.

3. Conditions and criteria for using supplier certification for the supplier assessment and surveillance

- (a) The POA holder should include the use of supplier certification for the supplier assessment and surveillance in the POA holder's quality system to demonstrate compliance with the applicable requirements of Part 21.
- (b) Procedures required for use of supplier certification for the supplier assessment and surveillance should be consistent with other procedures of the POA holders' quality system.
- (c) Procedures of the POA holder that uses supplier certification for the supplier assessment and surveillance should include the following:
 - (1) Listing of the OP that has certified or will certify suppliers and will conduct supplier assessment and surveillance or the scheme under which the accreditation of the OP is controlled. This listing should be maintained by the POA holder and made available to the competent authority upon request.
 - (2) A listing of the certified suppliers under surveillance by the OP and used by the POA holder. This listing should be maintained by the POA holder and made available to the competent authority upon request.

- (3) The method used by the POA holder to evaluate and monitor the certification process of any OP certification body or OP certification scheme used. This applies not only to new suppliers, but also to any decision by the POA holder to rely on OP certification of current suppliers. The method should include the following as a minimum:
- (i) Verification that certification standards and checklists are acceptable and applied to the applicable scope.
 - (ii) Verification that the OP is appropriately qualified and has sufficient knowledge, experience and training to perform its allocated tasks.
 - (iii) Verification that the OP surveillance frequency of the suppliers is commensurate with the complexity of the product and with the surveillance frequency established by the POA holder's suppliers control programme.
 - (iv) Verification that the suppliers' surveillance is conducted on-site by the OP.
 - (v) Verification that the surveillance report will be made available to the competent authority upon request.
 - (vi) Verification that the OP continues to be recognised or accredited.
 - (vii) Verification that the OP has access to applicable proprietary data to the level of detail necessary to survey suppliers functions.

Where the POA holder uses an OP accredited by a signatory to the European cooperation for Accreditation (EA) Multilateral Agreement and working in accordance with an aviation standard (e.g. EN 9104 series of requirements) that describes requirements for the OP certification, the items (ii), (iv) and (v) shall be deemed to be complied with:

- (4) A definition to what scope the OP will conduct suppliers surveillance on behalf of the POA holder. If the OP replaces surveillance in part, the POA holder should identify the functions that will continue to be surveyed by the POA holder.
 - (5) Procedures that ensure that the POA is aware of the loss of an existing certification.
 - (6) Procedures that ensure that the POA holder is aware of non-conformities and has access to detailed information of these non-conformities.
 - (7) Procedures to evaluate the consequences of non-conformities and take appropriate actions.
- (d) The POA should make arrangements that allow the competent authority to make investigation in accordance with 21.A.157 to include OP activities.

[Decision 2010/016/R, 16.12.2010]

GM No. 1 to 21.A.139(b)(2) Quality System – Independent quality assurance function

The quality assurance function which is part of the organisation is required to be independent from the functions being monitored. This required independence relates to the lines of reporting, authority and access within the organisation and assumes an ability to work without technical reliance on the monitored functions.

GM No. 2 to 21.A.139(b)(2) Quality System – Adequacy of procedures and monitoring function

Adequacy of procedures means that the quality system, through the use of the procedures as set forth, is capable of meeting the conformity objectives identified in 21.A.139(a).

The quality assurance function to ensure the above should perform planned continuing and systematic evaluations or audits of factors that affect the conformity (and, where required, safe operation) of the products, parts or appliances to the applicable design. This evaluation should include all elements of the quality system in order to ~~show~~demonstrate compliance with Part 21 Subpart G.

[Decision 2007/012/R, 29.11.2007]

GM 21.A.143 Exposition – Production Organisation Exposition (POE)

The purpose of the POE is to set forth in a concise document format the organisational relationships, responsibilities, terms of reference, and associated authority, procedures, means and methods of the organisation.

The information to be provided is specified in 21.A.143(a). Where this information is documented and integrated in manuals, procedures and instruction, the POE should provide a summary of the information and an appropriate cross-reference.

The competent authority requires the POE to be an accurate definition and description of the production organisation. The document does not require approval in itself, but it will be considered as such by virtue of the approval of the organisation.

When changes to the organisation occur, the POE is required to be kept up to date per a procedure, laid down in the POE. Significant changes to the organisation (as defined in GM 21.A.147(a)) should be approved by the competent authority prior to update of the POE.

When an organisation is approved against any other implementing rule containing a requirement for an exposition, a supplement covering the differences may suffice to meet the requirements of Part 21 Subpart G except that the supplement should have an index identifying where those parts missing from the supplement are covered. Those items then formally become part of the POE. In any combined documents the POE should be easily identifiable.

GM 21.A.145(a) Approval Requirements

A facility is a working area where the working conditions and the environment are controlled as appropriate in respect of: cleanliness, temperature, humidity, ventilation, lighting, space/access, noise, air pollution.

Equipment and tools should be such as to enable all specified tasks to be accomplished in a repeatable manner without detrimental effect. Calibration control of equipment and tools which affect critical dimensions and values should ~~show~~**demonstrate** compliance with, and be traceable to, national or international standards.

Sufficient personnel means that the organisation has for each function according to the nature of the work and the production rate, a sufficient quantity of qualified personnel to accomplish all specified manufacturing tasks and to attest the conformity. Their number should be such that airworthiness consideration may be applied in all areas without undue pressure.

An evaluation of the competence of personnel is performed as part of the quality system. This should include, where appropriate, verification that specific qualification standards have been implemented, for example NDT, welding, etc. Training should be organised to establish and maintain the personal competence levels determined by the organisation to be necessary.

GM 21.A.145(b)(2) Approval Requirements – Airworthiness, noise, fuel venting and exhaust emissions /production data procedures

- 1 When a POA holder/applicant is developing its own manufacturing data, such as computer based data, from the design data package delivered by a design organisation, procedures are required to demonstrate the right transcription of the original design data.
- 2 Procedures are required to define the manner in which airworthiness, noise, fuel venting and exhaust emissions data is used to issue and update the production/quality data, which determines the conformity of products, parts and appliances. The procedure must also define the traceability of such data to each individual product, part or appliance for the purpose of certifying condition for safe operation and issuing a Statement of Conformity or EASA Form 1.

GM 21.A.145(c)(1) Approval Requirements – Accountable manager

Accountable manager means the manager who is responsible, and has corporate authority for ensuring that all production work is carried out to the required standard. This function may be carried out by the Chief Executive or by another person in the organisation, nominated by him or

her to fulfil the function provided his or her position and authority in the organisation permits to discharge the attached responsibilities.

The manager is responsible for ensuring that all necessary resources are available and properly used in order to produce under the production approval in accordance with Part 21 Section A Subpart G.

The manager needs to have sufficient knowledge and authority to enable him or her to respond to the competent authority regarding major issues of the production approval and implement necessary improvements.

The manager needs to be able to demonstrate that he or she is fully aware of and supports the quality policy and maintains adequate links with the quality manager.

GM 21.A.145(c)(2) Approval Requirements – Responsible managers

The person or persons nominated should represent the management structure of the organisation and be responsible for all functions as specified in Part 21 Section A Subpart G. It therefore follows that, depending on the size of the Part 21 Section A Subpart G organisation, the functions may be subdivided under individual managers (and in fact may be further subdivided) or combined in a variety of ways.

The competent authority requires the nominated managers to be identified and their credentials submitted on an EASA Form 4 (see [acceptable means of compliance and guidance material to Annex 1 to Commission Regulation \(EC\) No 2042/2003, Appendix X EASA Form 4](#)) to the Competent Authority [EASA Form 4 for Production Organisations on the EASA website under: <http://easa.europa.eu/certification/application-forms.php>](#) in order that they may be seen to be appropriate in terms of relevant knowledge and satisfactory experience related to the nature of the production activities as performed by the Part 21 Section A Subpart G organisation.

The responsibilities and the tasks of each individual manager are required to be clearly defined, in order to prevent uncertainties about the relations, within the organisation. In the case of organisation structures where staff-members are responsible to more than one person, as for instance in matrix and project organisations, responsibilities of the managers should be defined in such a way that all responsibilities are covered.

Where a Part 21 Section A Subpart G organisation chooses to appoint managers for all or any combination of the identified Part 21 functions because of the size of the undertaking, it is necessary that these managers report ultimately to the accountable manager. In cases where a manager does not directly report to the accountable manager, he or she should have a formally established direct access to the accountable manager.

One such manager, normally known as the quality manager is responsible for monitoring the organisation's compliance with Part 21 Section A Subpart G and requesting remedial action as necessary by the other managers or the accountable manager as appropriate. He or she should have a direct access to the accountable manager.

[Decision 2010/001/R, 30.03.2010]

AMC 21.A.145(d)(1) Approval Requirements – Certifying staff

- 1 Certifying Staff are nominated by the production organisation to ensure that products, parts and/or appliances qualify for Statements of Conformity or Release Certificates. Certifying Staff positions and numbers are to be appropriate to the complexity of the product and the production rate.
- 2 The qualification of certifying staff is based on their knowledge, background and experience and a specific training (or testing) established by the organisation to ensure that it is appropriate to the product, part, or appliance to be released.

- 3 Training must be given to develop a satisfactory level of knowledge of organisation procedures, aviation legislation, and associated implementing rules, CS and GM, relevant to the particular role.
- 4 For that purpose, in addition to general training policy, the organisation must define its own standards for training, including pre-qualification standards, for personnel to be identified as certifying staff.
- 5 Training policy is part of the Quality System and its appropriateness forms part of investigation by the competent authority within the organisation approval process and subsequent surveillance of persons proposed by managers.
- 6 The training must be updated in response to experience gained and changes in technology.
- 7 A feedback system to ascertain that the required standards are being maintained must be put in place to ensure the continuing compliance of personnel to authorisation requirements.
- 8 For release of products, parts or appliances, the responsibilities to issue statements of conformity/release certificates (EASA Form 1) or permit to fly including approval of flight conditions are allocated to the certifying staff identified in 21.A.145 (d)(2).
- 9 The competent authority holds the right to reject those personnel, appointed by the organisation, if found to have inappropriate experience or not to otherwise comply with its requirements.

[Decision 2007/006/R, 5.4.2007; Decision 2007/012/R, 29.11.2007]

AMC 21.A.145(d)(2) Approval Requirements – Record of certifying staff

- 1 The following is the minimum information to be recorded in respect of each certifying person:
 - a Name
 - b Date of Birth
 - c Basic Training and standard attained
 - d Specific Training and standard attained
 - e If appropriate – Continuation Training
 - f Experience
 - g Scope of the authorisation
 - h Date of first issue of the authorisation
 - i If appropriate – expiry date of the authorisation
 - j Identification Number of the authorisation
- 2 The record may be kept in any format and must be controlled by an internal procedure of the organisation. This procedure forms part of the quality system.
- 3 Persons authorised to access the system must be maintained at a minimum to ensure that records cannot be altered in an unauthorised manner and that confidential records cannot become accessible to unauthorised persons.
- 4 The certifying person must be given reasonable access on request to his or her own records.
- 5 Under the provision of 21.A.157 the competent authority has a right of access to the data held in such a system.

- 6 The organisation must keep the record for at least two years after the certifying person has ceased employment with the organisation or withdrawal of the authorisation, whichever is the sooner.

AMC 21.A.145(d)(3) Approval requirements – Evidence of authorisation

- 1 The authorisation document must be in a style that makes its scope clear to the certifying staff and any authorised person who may require to examine the authorisation. Where codes are used to define scope, an interpretation document should be readily available.
- 2 Certifying staff are not required to carry the authorisation document at all times but should be able to make it available within a reasonable time of a request from an authorised person. Authorised persons include the competent authority.

GM 21.A.147(a) Changes to the approved production organisation – Significant changes

- 1 Changes to be approved by the competent authority include:
 - Significant changes to production capacity or methods.
 - Changes in the organisation structure especially those parts of the organisation in charge of quality.
 - A change of the accountable manager or of any other person nominated under 21.A.145 (c)(2).
 - Changes in the production or quality systems that may have an important impact on the conformity/airworthiness of each product, part or appliance.
 - Changes in the placement or control of significant sub-contracted work or supplied parts.
- 2 To ensure that changes do not result in non-compliance with Part 21 Section A Subpart G it is in the interest of both the competent authority and the approval holder to establish a relationship and exchange information that will permit the necessary evaluation work to be conducted before the implementation of a change. This relationship should also permit agreement on the need for variation of the terms of approval (ref 21.A.143(a)(9)).
- 3 Where a change of name or ownership results in the issue of a new approval the investigation will normally take account of the competent authority's knowledge and information from the preceding approval.
- 4 Changes of location are addressed in 21.A.148 and changes of ownership in 21.A.149, change of scope of approval in 21.A.153.

AMC 21.A.148 Changes of location – Management during change of location

- 1 The relocation of any work, to an unapproved location, or a location with inappropriate scope of approval, constitutes a change of significance to the organisation and requires approval by the competent authority as prescribed in 21.A.147. An unapproved relocation will invalidate the production organisation approval, and may necessitate re-application for any similar approval required at the new location. However, suitable transitional arrangements may be agreed with the competent authority, in advance of the relocation, which can allow continuation of the approval.
- 2 When an organisation expands its facility to include a new production location or moves parts of its production to a new location the production organisation approval may continue in force, but the approval does not include the new location until the competent authority has indicated its satisfaction with the arrangements.
- 3 For a change in location, taking an extended period of time, suitable transitional arrangements would require preparation of a co-ordination plan for the removal. The plan must, at least, identify the following:
 - a A clearly identified person, or group of persons, responsible for co-ordinating the removal and acting as focal point for communication with all parties, including the competent authority.

- b The basis of the co-ordination plan, e.g., whether by product or area.
 - c Planned timing of each phase of relocation.
 - d Arrangements for maintaining the standards of the approval up to the point where the production area is closed down.
 - e Arrangements for verifying continued production quality upon resumption of work at the new location.
 - f Arrangements for check and/or re-calibration of inspection aids or production tools and jigs before resuming production.
 - g Procedures which ensure that goods are not released from the new location until their associated production and quality systems have been verified.
 - h Arrangements for keeping the competent authority informed of progress with the relocation.
- 4 From the co-ordination plan, the competent authority can determine the points at which it wishes to conduct investigation.
- 5 If an agreed co-ordination plan is in operation, the competent authority will normally allow the existing approval to remain in force and will, where appropriate, grant an additional approval to cover the new address for the duration of the move.

GM 21.A.149 Transferability

Transfer of approval would normally only be agreed in cases where the ownership changes but the organisation itself remains effectively unchanged. For example:

An acceptable transfer situation could be a change of company name (supported by the appropriate certificate from the National Companies Registration Office or equivalent) but with no changes to site address, facilities, type of work, staff, accountable manager or person nominated under 21.A.145.

Alternatively, in the event of receivership (bankruptcy, insolvency or other equivalent legal process) there may be good technical justification for continuation of the approval provided that the company continues to function in a satisfactory manner in accordance with their POE. It is likely that at a later stage the approval might be voluntarily surrendered or the organisation transferred to new owners in which case the former paragraphs apply. If it does not continue to operate satisfactorily then the competent authority could suspend or revoke the approval under 21.B.245.

In order for the competent authority to agree to a transfer of approval, it will normally prescribe it as a condition in accordance with 21.A.147(b) that the obligations and responsibilities of the former organisation should be transferred to the new organisation, otherwise transfer is not possible and application for a new approval will be required.

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

Terms of approval document(s) will be issued by the competent authority under 21.A.135 to identify the scope of work, the products, and/or categories for which the holder is entitled to exercise the privileges defined in 21.A.163.

The codes shown against each scope of work item are intended for use by the competent authority for purposes such as managing, administering and filing details of approvals. It may also assist in the production and publication of a list of approval holders.

The scope of work, the Products, Parts, or Appliances for which the POA holder is entitled to exercise the privileges defined in 21.A.163 will be described by the competent authority as follows:

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.

SCOPE OF WORK	PRODUCTS/CATEGORIES
A1 Large Aeroplanes A2 Small Aeroplanes A3 Large Helicopters A4 Small Helicopters A5 Gyroplanes A6 Sailplanes A7 Motor Gliders A8 Manned Balloons A9 Airships <u>A10 Light Sport Aeroplanes</u> A11 Very Light Aeroplanes A12 Other	State types ‘ ‘ ‘ ‘ ‘ ‘ ‘ ‘ ‘ ‘
B1 Turbine Engines B2 Piston Engines B3 APU's B4 Propellers	‘ ‘ ‘
C1 Appliances: C2 Parts:	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 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

[Decision 2007/006/R, 5.4.2007; Decision 2007/012/R, 29.11.2007]

[Decision 2010/001/R, 30.03.2010]

AMC 21.A.153 Changes to the terms of approval – Application for a change to the terms of approval

EASA Form 51 (see AMC No 1 to 21.B.240) must be obtained from the competent authority and completed in accordance with the procedures of the POE.

The information entered on the form is the minimum required by the competent authority to assess the need for change of the production organisation approval.

The completed form and an outline of the changed ~~production organisation exposition~~ **POE**, and details of the proposed change to POA terms of approval must be forwarded to the competent authority.

GM 21.A.157 Investigations – Arrangements

The arrangements made by the applicant for, or holder of an approval under Part 21 Section A Subpart G should allow the competent authority to make investigations that include the complete production organisation including partners, sub-contractors and suppliers, whether they are in the State of the applicant or not.

The investigation may include; audits, enquiries, questions, discussions and explanations, monitoring, witnessing, inspections, checks, flight and ground tests and inspection of completed products, parts or appliances produced under the POA.

In order to maintain its confidence in the standards achieved by a POA holder or applicant the competent authority may make an investigation of a sample product part or appliance and its associated records, reports and certifications.

The arrangements should enable the organisation to give positive assistance to the competent authority and co-operate in performing the investigation during both initial assessment and for the subsequent surveillance to maintain the POA.

Co-operation in performing investigation means that the competent authority has been given full and free access to the facilities and to any information relevant to ~~show~~ **demonstrate** compliance to Part 21 Section A Subpart G requirements, and assistance (personnel support, records, reports, computer data, etc., as necessary).

Assistance to the competent authority includes all appropriate means associated with the facilities of the production organisation to allow the competent authority to perform these investigations, such as the availability of a meeting room, office and personnel support, documentation and data, and communication facilities, all properly and promptly available as necessary.

The competent authority seeks to have an open relationship with the organisation and suitable liaison personnel should be nominated to facilitate this, including suitable representative(s) to accompany competent authority staff during visits not only at the organisations own facilities but also at sub-contractors, partners or suppliers.

GM No. 1 to 21.A.158(a) Uncontrolled non-compliance with applicable design data

An uncontrolled non-compliance with applicable design data is a non-compliance:

- that can not be discovered through systematic analysis; or
- that prevents identification of affected products, parts, appliances, or material.

GM No. 2 to 21.A.158(a) Examples of level one findings

Examples of level one findings are non-compliances with any of the following ~~paragraphs~~ **points**, that could affect the safety of the aircraft:

21.A.139, 21.A.145, 21.A.147, 21.A.148, 21.A.151, 21.A.163, 21.A.165(b), (c), (d), (e), (f) and (g).

It should be anticipated that a non-compliance with these ~~paragraphs~~ **points** is only considered a level one finding when objective evidence has been found that this finding is an uncontrolled non-compliance that could affect the safety of the aircraft.

In addition, the failure to arrange for investigations under 21.A.157, in particular to obtain access to facilities, after denial of one written request should be classified as a level one finding.

GM 21.A.159(a)(3) Evidence of a lack of satisfactory control

A positive finding by the competent authority of:

- 1 an uncontrolled non-compliance with type design data affecting the airworthiness of product part or appliance
- 2 an incident/accident identified as caused by POA holder
- 3 non-compliance with the POE and its associated procedures which could affect conformity of manufactured items to design data
- 4 insufficient competence of certifying staff
- 5 insufficient resources in respect of facilities, tools and equipment
- 6 insufficient means to ensure good production work standards
- 7 a lack of effective and timely response to prevent a recurrence of any of point 1 to 6.

AMC No 1 to 21.A.163(c) Computer generated signature and electronic exchange of the EASA Form 1

- 1 Submission to the competent authority

Any POA holder/applicant intending to implement an electronic signature procedure to issue EASA Form 1 and/or to exchange electronically such data contained on the EASA Form 1, should document it and submit it to the competent authority as part of the documents attached with its exposition.

- 2 Characteristics of the electronic system generating the EASA Form 1

The electronic system should:

- guarantee secure access for each certifying staff;
- ensure integrity and accuracy of the data certified by the signature of the Form and be able to show evidence of the authenticity of the EASA Form 1 (recording and record keeping) with suitable security, safeguards and backups;
- be active only at the location where the part is being released with an EASA Form 1;
- not permit to sign a blank form;
- provide a high degree of assurance that the data has not been modified after signature (if modification is necessary after issuance, i.e. re-certification of a part), a new form with a new number and reference to the initial issuance should be made);
- provide for a 'personal' electronic signature, identifying the signatory. The signature should be generated only in the presence of the signatory.

An electronic signature means data in electronic form which are attached to or logically associated with other electronic data and which serve as a method of authentication and should meet the following criteria:

- it is uniquely linked to the signatory;
- it is capable of identifying the signatory;
- it is created using means that the signatory can maintain under their sole control.

The electronic signature is defined as an electronically generated value based on a cryptographic algorithm and appended to data in a way to enable the verification of the data's source and integrity.

POA holders/applicants are reminded that additional national and/or European requirements may need to be satisfied when operating electronic systems. 'Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures', as last amended may constitute a reference.

The electronic system should be based on a policy and management structure (confidentiality, integrity and availability), such as:

- administrators, signatories;
- scope of authorisation, rights;
- password and secure access, authentication, protections, confidentiality;
- track changes;
- minimum blocks to be completed, completeness of information;
- archives;
- etc.

The electronic system generating the EASA Form 1 may contain additional data such as:

- manufacturer code;
- customer identification code;
- workshop report;
- inspection results;
- etc.

3 Characteristics of the computer generated signature

To facilitate understanding and acceptance of the EASA Form 1 released with an electronic signature, the following statement should be in Block 13b: 'Electronic Signature on File'.

In addition to this statement, it is accepted to print or display a signature in any form such as a representation of the hand-written signature of the person signing (i.e. scanned signature) or their name.

When printing the electronic form, the EASA Form 1 should meet the general format as specified in Appendix I to Part 21. A watermark-type 'PRINTED FROM ELECTRONIC FILE' should be printed on the document.

When the electronic file contains a hyperlink to data, required to determine the airworthiness of the item(s), the data associated to the hyperlink, when printed, should be in a legible format and be identified as a reference from the EASA Form 1.

Additional information not required by the EASA Form 1 completion instructions may be added to the printed copies of EASA Form 1 as long as the additional data do not prevent a person from filling out, issuing, printing, or reading any portion of the EASA Form 1. This additional data should be provided only in block 12 unless it is necessary to include it in another block to clarify the content of that block.

4. Electronic exchange of the electronic EASA Form 1

The electronic exchange of the electronic EASA Form 1 should be accomplished on a voluntary basis. Both parties (issuer and receiver) should agree on electronic transfer of the EASA Form 1.

For that purpose, the exchange needs to include:

- all data of the EASA Form 1, including data referenced from the EASA Form 1;
- all data required for authentication of the EASA Form 1.

In addition, the exchange may include:

- data necessary for the electronic format;
- additional data not required by the EASA Form 1 completion instructions, such as manufacturer code, customer identification code.

The system used for the exchange of the electronic EASA Form 1 should provide:

- a high level of digital security; the data should be protected, unaltered or uncorrupted;
- traceability of data back to its source should be possible.

Trading partners wishing to exchange EASA Form 1 electronically should do so in accordance with these means of compliance stated in this document. It is recommended that they use an established, common, industry method such as Air Transport Association (ATA) Spec 2000 Chapter 16.

The applicant(s) is/are reminded that additional national and/or European requirements may need to be satisfied when operating the electronic exchange of the electronic EASA Form 1.

The receiver should be capable of regenerating the EASA Form 1 from the received data without alteration; if not the system should revert back to the paper system.

When the receiver needs to print the electronic form, refer to the subparagraph 3 above.

[Decision 2010/001/R, 30.03.2010]

AMC No 2 to 21.A.163(c) Completion of the EASA Form 1

EASA Form 1 Block 8 'Part Number'

The part number as it appears on the item, is usually defined in the design data; however in the case of a kit of parts, media containing software or any other specific condition of supply may be defined in production data developed from design data. Information about the contents of the kit or media may be given in block 12 or in a separate document cross-referenced from block 12.

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.

- 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 at 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 re-assembly after delivery.
- References to aid traceability, such as batch numbers.

[Decision 2010/001/R, 30.03.2010]

AMC 21.A.163(d) Privileges – Maintenance

The applicant may apply for terms of approval, which cover maintenance of a new aircraft that it has manufactured, as necessary to keep it in an airworthy condition, but not beyond the point at which the applicable operational rules require maintenance to be performed by an approved maintenance organisation. If the production organisation intends to maintain the aircraft beyond that point, it would have to apply for and obtain an appropriate maintenance approval.

When the competent authority is satisfied that the procedures required by 21.A.139 are satisfactory to control maintenance activities so as to ensure that the aircraft is airworthy, this capability will be stated in the terms of approval.

MAINTENANCE OF AIRCRAFT

Examples of such maintenance activities are:

- Preservation, periodic inspection visits, etc.
- Embodiment of a Service Bulletin.
- Application of airworthiness directives.
- Repairs.
- Maintenance tasks resulting from special flights.
- Maintenance tasks to maintain airworthiness during flight training, demo flights and other non-revenue flights.

Any maintenance activities must be recorded in the Aircraft Log Book. It must be signed by certifying staff for attesting the conformity of the work to the applicable airworthiness data.

In some cases the Aircraft Log Book is not available, or the production organisation prefers to use a separate form (for instance for a large work package or for delivery of the aircraft to the customer). In these cases, production organisations must use EASA Form 53 which must subsequently become part of the aircraft maintenance records.

MAINTENANCE OF COMPONENTS OUTSIDE THE POA CAPABILITY

Such maintenance activity outside the capability of the Aircraft POA holder may still be accomplished under the production approval of the original release organisation. In such circumstances the engine(s), propeller(s), parts and appliances will require re-release in accordance with GM 21.A.163(c) (EASA Form 1).

Records relevant to continued airworthiness or retirement lives, such as engine runs, flight hours, landings, etc., which affect part retirement of maintenance schedules must be specified on any re-release.

As an alternative the engine, propeller, part or appliance may be maintained by the holder of an approval in accordance with Part 145, classified and released as 'used'.

AMC 21.A.163(e) Procedure for the issue of a permit to fly including approval of the flight conditions

1 INTENT

This acceptable means of compliance provides means to develop a procedure for the issue of a permit to fly including approval of the flight conditions.

Each POA applicant or holder must develop its own internal procedure following this AMC, in order to obtain the privilege of 21.A.163(e) to issue permits to fly for an aircraft under procedures agreed with its competent authority for production, when the production

organisation itself is controlling under its POA the configuration of the aircraft and is attesting conformity with the design conditions approved for the flight.

2 PROCEDURE FOR THE ISSUE OF A PERMIT TO FLY

2.1 Content

The procedure must address the following points:

- as relevant, in accordance with 21.A.710(b), the approval of flight conditions;
- conformity with approved conditions;
- issue of the permit to fly under the POA privilege;
- authorised signatories;
- interface with the local authority for the flight.

2.2 Approval of the flight conditions (when relevant)

The procedure must include the process to establish and justify the flight conditions, in accordance with 21.A.708 and how compliance with 21.A.710(c) is established, and include the EASA Form 18B as defined in AMC 21.A.709(b) for the approval under the POA privilege.

2.3 Conformity with approved conditions

The procedure must indicate how conformity with approved conditions is made, documented and attested by an authorised person.

2.4 Issue of the permit to fly under the POA privilege

The procedure must describe the process to prepare the EASA Form 20b and how compliance with 21.A.711(c) and (e) is established before signature of the permit to fly.

2.5 Authorised signatories

The person(s) authorised to sign the permit to fly under the privilege of 21.A.163(e) must be identified (name, signature and scope of authority) in the procedure, or in an appropriate document linked to the Production Organisation Exposition.

2.6 Interface with the local authority for the flight

The procedure must include provisions describing the communication with the local authority for compliance with the local requirements which are outside the scope of the conditions of 21.A.708(b) (see 21.A.711(e)).

[Decision 2007/006/R, 5.4.2007]

[Decision 2010/001/R, 30.03.2010]

GM 21.A.165(a) Obligations of the holder – Basic working document

Compliance with the production organisation exposition (POE) is a prerequisite for obtaining and retaining a production organisation approval.

The organisation should make the POE available to its personnel where necessary for the performance of their duties. A distribution list should therefore be established. Where the POE mainly refers to separate manuals or procedures, the distribution of the POE could be limited.

The organisation should ensure that personnel have access to and are familiar with that part of the content of the POE or the referenced documents, which covers their activities.

Monitoring of compliance with the POE is normally the responsibility of the quality assurance function.

GM No. 1 to 21.A.165(c) Obligations of the holder – Conformity of prototype models and test specimens

21.A.33 requires determination of conformity of prototype models and test specimens to the applicable design data. The EASA Form 1 may be used as a conformity certificate as part of the assistance a POA holder/applicant provides to a design approval holder/applicant.

GM No. 2 to 21.A.165(c) Obligations of holder – Conformity with type design

Individual configurations are often based on the needs of the customer and improvements or changes which may be introduced by the type-certificate holder. There are also likely to be unintentional divergencies (concessions or non-conformances) during the manufacturing process. All these changes should have been approved by the design approval holder, or when necessary by the Agency.

GM No. 3 to 21.A.165(c) Obligations of the holder – Condition for safe operation

Before issue of the Statement of Conformity to the competent authority of the Member State of registry, the holder of a production organisation approval should make an investigation so as to be satisfied in respect of each of the items listed below. The documented results of this investigation should be kept on file by the POA holder. Certain of these items may be required to be provided (or made available) to the operator or owner of the aircraft (and in some cases the competent authority of the Member State of registry):

1. Equipment or modifications which do not meet the requirements of the State of manufacture but have been accepted by the competent authority of the importing country.
2. Identification of products, parts or appliances which:
 - are not new;
 - are furnished by the buyer or future operator (including those identified in 21.A.801 and 21.A.805).
3. Technical records which identify the location and serial numbers of components that have special traceability requirements for continued airworthiness purposes including those identified in 21.A.801 and 21.A.805.
4. Log book and a modification record book for the aircraft as required by the Agency.
5. Log books for products identified in 21.A.801 installed as part of the type design as required by the Agency.
6. A weight and balance report for the completed aircraft.
7. A record of missing items or defects which do not affect airworthiness these for example could be furnishing or BFE (Items may be recorded in a technical log or other suitable arrangement such that the operator and Agency are formally aware).
8. Product support information required by other implementing rules and associated CS or GM, such as a Maintenance Manual, a Parts Catalogue, or MMEL all of which are to reflect the actual build standard of the particular aircraft. Also an Electrical load analysis and a wiring diagram.
9. Records which demonstrate completion of maintenance tasks appropriate to the test flight flying hours recorded by the aircraft. These records should show the relationship of the maintenance status of the particular aircraft to the manufacturers recommended maintenance task list and the MRB document/report.
10. Details of the serviceability state of the aircraft in respect of a) the fuel and oil contents, b) provision of operationally required emergency equipment such as life rafts, etc.
11. Details of the approved interior configuration if different from that approved as part of the type design.
12. An approved Flight Manual which conforms to the build standard and modification state of the particular aircraft shall be available.
13. Show that inspections for foreign objects at all appropriate stages of manufacture have been satisfactorily performed.

14. The registration has been marked on the exterior of the aircraft as required by national legislation. Where required by national legislation fix a fireproof owners nameplate.
15. Where applicable there should be a certificate for noise and for the aircraft radio station.
16. The installed compass and or compass systems have been adjusted and compensated and a deviation card displayed in the aircraft.
17. Software criticality list.
18. A record of rigging and control surface movement measurements.
19. Details of installations which will be removed before starting commercial air transport operations (e.g., ferry kits for fuel, radio or navigation).
20. Where maintenance work has been performed under the privilege of 21.A.163(d) issue a release to service that includes a statement that the aircraft is in a condition for safe operation.
21. List of all applicable Service Bulletins and airworthiness directives that have been implemented.

[Decision 2010/001/R, 30.03.2010]

GM No. 4 to 21A.165(c) Airworthiness Release or Conformity Certificate

The EASA Form 1, when used as a release certificate as addressed in 21.A.165(c)(2) and (3), may be issued in two ways:

- As an airworthiness release, only when by virtue of the arrangement described in 21.A.133(b) and (c), it can be determined that the part conforms to the approved design data and is in a condition for safe operation.
- As a conformity certificate, only when by virtue of the arrangement described in 21.A.133(b) and (c), it can be determined that the part conforms to applicable design data which is not (yet) approved, for a reason that is indicated in Block 12. Parts released with an EASA Form 1 as a conformity certificate are not eligible for installation in a type-certificated aircraft.

The EASA Form 1 should only be used for conformity release purposes when it is possible to indicate the reason that prevents its issue as for airworthiness release purposes.

[Decision 2010/001/R, 30.03.2010]

GM 21.A.165(d) and (h) Obligations of the holder – Recording and archiving system

Records within a production environment satisfy two purposes. Firstly, they are required, during the production process to ensure that products, parts, or appliances are in conformity with the controlling data throughout the manufacturing cycle. Secondly, certain records of milestone events are needed to subsequently provide objective evidence that all prescribed stages of the production process have been satisfactorily completed and that compliance with the applicable design data has been achieved.

Therefore, the approved production organisation should implement a system for the compilation and retention of records during all stages of manufacture, covering short-term and long-term records appropriate to the nature of the product and its production processes.

The management of such information should be subject to appropriate procedures in the Quality System required by 21.A.139.

All forms of recording media are acceptable (paper, film, magnetic, ...) provided they can meet the required duration for archiving under the conditions provided.

The related organisation procedures should:

- Identify records to be kept.
- Describe the organisation of and responsibility for the archiving system (location, compilation, format) and conditions for access to the information (e.g., by product, subject).
- Control access and provide effective protection from deterioration or accidental damage.
- Ensure continued readability of the records.
- Demonstrate to the competent authority proper functioning of the records system.
- Clearly identify the persons involved in conformity determination.
- Define an archiving period for each type of data taking into account importance in relation to conformity determination subject to the following:
 - a Data which supports conformity of a product, part, or appliance should be kept for not less than three years from the issue date of the related Statement of Conformity or Authorised Release Certificate.
 - b Data considered essential for continuing airworthiness should be kept throughout the operational life of the product, part or appliance.
- Ensure that the recording and record-keeping system used by the partners, supplier and sub-contractors meet the objective of conformity of the product, part or appliance with the same level of confidence as for their own manufacture. They should define in each case who is to retain the record data (organisation or partner, supplier or sub-contractor). They should also define method for surveillance of the recording/record keeping system of the partners, suppliers or sub-contractors.

Subpart J — Design organisation approval

GM No. 1 to 21.A.239(a) Design assurance system

1. Purpose

This GM outlines some basic principles and objectives of 21.A.239(a).

2. Definitions

2.1 The design assurance system is the organisational structure, responsibilities, procedures and resources to ensure the proper functioning of the design organisation.

2.2 The design assurance means all those planned and systematic actions necessary to provide adequate confidence that the organisation has the capability

- to design products or parts in accordance with the applicable CS and environmental protection requirements,
- to ~~show~~ demonstrate and verify the compliance with these CS and environmental protection requirements, and
- to demonstrate to the Agency this compliance.

2.3 The 'Type Investigation' means the tasks of the organisation in support of the type-certificate, supplemental type-certificate or other design approval processes necessary to ~~show~~ demonstrate and verify and to maintain compliance with the applicable CS and environmental protection requirements.

3. Design Assurance

The complete process, starting with the CS and environmental protection requirements and product specifications and culminating with the issuing of a type-certificate, is shown in the diagram on Figure 1. This identifies the relationship between the design, the Type Investigation and design assurance processes.

Effective design assurance demands a continuing evaluation of factors that affect the adequacy of the design for intended applications, in particular that the product, or part, complies with applicable CS and environmental protection requirements and will continue to comply after any change.

Two main aspects should therefore be considered:

- How the planned and systematic actions are defined and implemented, from the very beginning of design activities up to continued airworthiness activities;
- How these actions are regularly evaluated and corrective actions implemented as necessary.

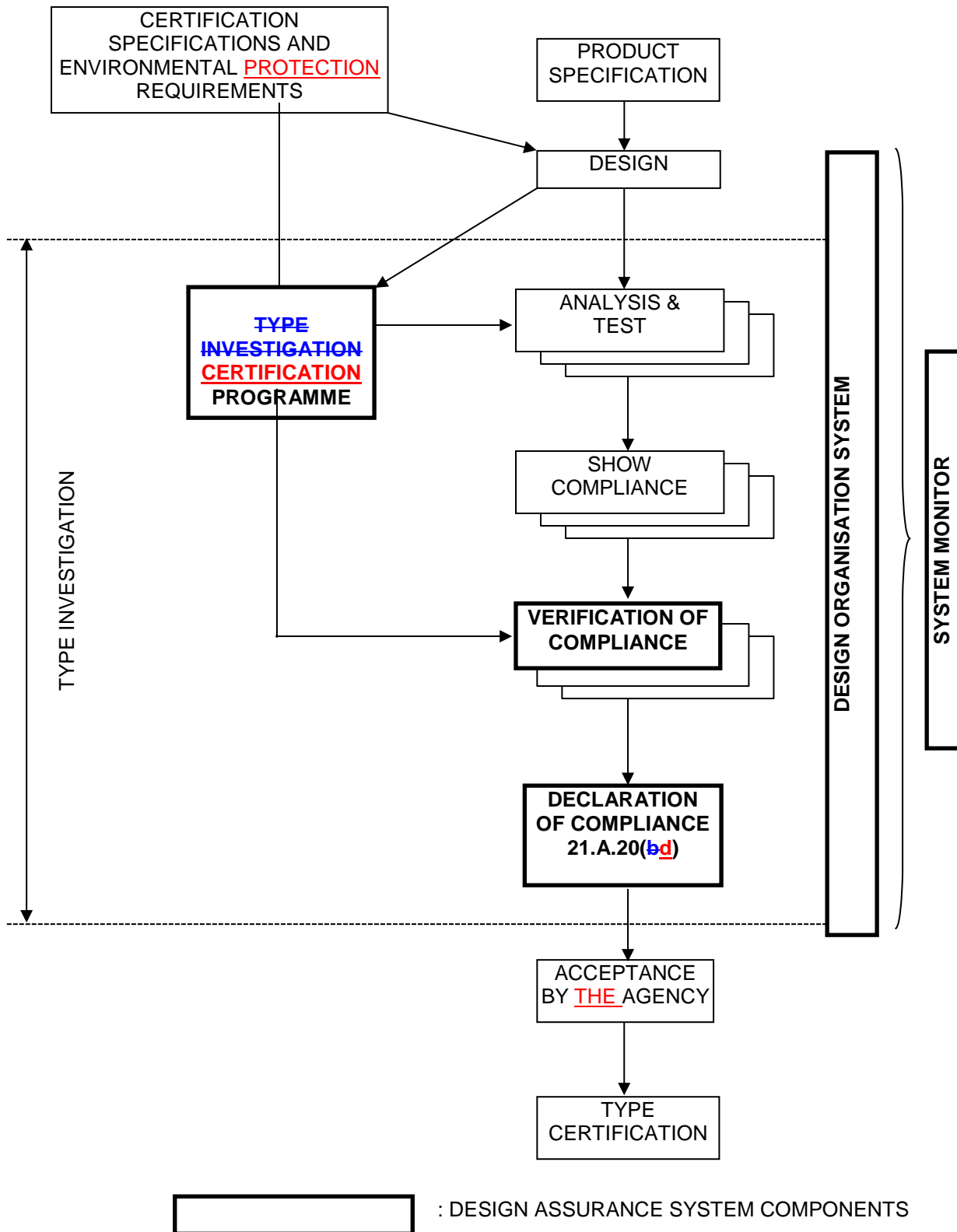


Figure 1 - RELATIONSHIPS BETWEEN DESIGN, DESIGN ASSURANCE AND TYPE INVESTIGATION

3.1 Planned and Systematic Actions

For design organisations carrying out Type Investigation of products, the planned and systematic actions should cover the following tasks and procedures should be defined accordingly:

3.1.1 General

- a. To issue or, where applicable, supplement or amend the handbook in accordance with 21.A.243, in particular to indicate the initiation of design activities on a product.
- b. To assure that all instructions of the Handbook are adhered to.
- c. To conduct Type Investigation.
- d. To nominate staff as 'compliance verification engineers' responsible to approve compliance documents as defined in paragraph 3.1.3.
- e. To nominate personnel belonging to the Office of Airworthiness responsible as defined in paragraph 3.1.4.
- f. In the case of an applicant for a supplemental type-certificate, to obtain the agreement of the type-certificate holder for the proposed supplemental type-certificate to the extent defined in 21.A.115.
- g. To ensure full and complete liaison between the type design organisation and related organisations having responsibility for products manufactured to the type-certificate.
- h. To provide the assurance to the Agency that prototype models and test specimens adequately conform to the type design (see 21.A.33(b)(1)).

3.1.2 Chief Executive and Head of design organisation (or his or her Deputy)

- a. The Chief Executive should provide the necessary resources for the proper functioning of the design organisation.
- b. The Head of the design organisation, or an authorised representative, should sign a declaration of compliance (see 21.A.20(bd) and 21.A.97(a)(3)) with the applicable CS and environmental protection requirements after verification of satisfactory completion of the Type Investigation. In accordance with 21.A.20(ee) and 21.A.97(a)(4), his or her signature on the declaration of compliance confirms that the procedures as specified in the handbook have been followed (see also GM 21.A.A265(b)).
- c. The functions of Chief Executive and Head of the design organisation may be performed by the same person.

3.1.3 Compliance Verification

- a. Approval by signing of all compliance documents, including test programmes and data, necessary for the verification of compliance with the applicable CS and environmental protection requirements as defined in ~~Type Investigation~~the certification programme.
- b. Approval of the technical content (completeness, technical accuracy...), including any subsequent revisions, of the manuals approved by the Agency (Aircraft Flight Manual, the Airworthiness Limitations section of the Instructions for Continued Airworthiness and the Certification Maintenance Requirements (CMR) document, where applicable).

3.1.4 Office of Airworthiness

- a. Liaison between the design organisation and the Agency with respect to all aspects of ~~Type Investigation~~the certification programme.
- b. Ensuring that a handbook is prepared and updated as required in 21.A.243.

SECTION A — Subpart J — Design organisation approval

- c. Co-operation with the Agency in developing procedures to be used for the type certification process.
- d. Issuing of guidelines for documenting compliance.
- e. Co-operation in issuing guidelines for the preparation of the manuals required by the applicable implementing rules, Service Bulletins, drawings, specifications, and standards.
- f. Ensuring procurement and distribution of applicable CS and environmental protection requirements and other specifications.
- g. Co-operating with the Agency in proposing the type-certification basis
- h. Interpretation of CS and environmental protection requirements and requesting decisions of the Agency in case of doubt.
- i. Advising of all departments of the design organisation in all questions regarding airworthiness, environmental protection approvals and certification.
- j. Preparation of the ~~Type Investigation~~certification programme and co-ordination of all tasks related to Type Investigation in concurrence with the Agency.
- k. Regular reporting to the Agency about Type Investigation progress and announcement of scheduled tests in due time.
- l. Ensuring co-operation in preparing inspection and test programmes needed for demonstration of compliance.
- m. Establishing the compliance checklist and updating for changes.
- n. Checking that all compliance documents are prepared as necessary to ~~show~~demonstrate compliance with all CS and environmental protection requirements, as well as for completeness, and signing for release of the documents.
- o. Checking the required type design definition documents described in 21.A.31 and ensuring that they are provided to the Agency for approval when required.
- p. Preparation, if necessary, of a draft for a type-certificate data sheet and/or type-certificate data sheet modification.
- q. Providing verification to the head of the design organisation that all activities required for Type Investigation have been properly completed.
- r. Approving the classification of changes in accordance with 21.A.91 and granting the approval for minor changes in accordance with 21.A.95(b).
- s. Monitoring of significant events on other aeronautical products as far as relevant to determine their effect on airworthiness of products being designed by the design organisation.
- t. Ensuring co-operation in preparing Service Bulletins and the Structural Repair Manual, and subsequent revisions, with special attention being given to the manner in which the contents affect airworthiness and environmental protection and granting the approval on behalf of the Agency.
- u. Ensuring the initiation of activities as a response to a failure (accident/incident/in-service ~~experience~~occurrence) evaluation and complaints from the operation and providing of information to the Agency in case of airworthiness impairment (continuing airworthiness).
- v. Advising the Agency with regard to the issue of airworthiness directives in general based on Service Bulletins.
- w. Ensuring that the manuals approved by the Agency, including any subsequent revisions (the Aircraft Flight Manual, MMEL, the Airworthiness Limitations section of the Instructions for Continued Airworthiness and the Certification Maintenance Requirements (CMR) document, where applicable) are checked

to determine that they meet the respective requirements, and that they are provided to the Agency for approval.

3.1.5 Maintenance and Operating Instructions

- a. Ensuring the preparation and updating of all maintenance and operating instructions (including Services Bulletins) needed to maintain airworthiness (continuing airworthiness) in accordance with relevant CS. For that purpose, the applicant should:
 - establish the list of all documents it is producing to comply with the Appendix referred to in CS 23.1529, CS 25.1529, CS 27.1529, CS 29.1529, CS-E 25 or CS-P 40 (NPA P-3);
 - define procedures and organisation to produce and issue these documents, using where applicable and so elected 21.A.263(c)(3) privilege.
- b. In accordance with 21.A.57, 21.A.61, 21.A.107, 21.A.119, 21.A.120 and 21.A.449, ensuring that these documents are provided to all affected operators and all involved authorities.

3.2 Continued effectiveness of the design assurance system. The organisation should establish the means by which the continuing evaluation (system monitoring) of the design assurance system will be performed in order to ensure that it remains effective.

GM No. 2 to 21.A.239(a) Design assurance system for minor changes to type design or minor repairs to products

1. Purpose

This GM outlines some basic principles and objectives in order to comply with 21.A.239(a) for organisations designing only minor changes to type design or minor repairs to products.

2. Design assurance system

The design assurance system should include the following:

- an organisational structure to:
 - control the design
 - ~~show~~ **demonstrate** compliance with applicable CS and environmental protection requirements
 - independently check ~~showings~~ **demonstrations** of compliance
 - liaise with the Agency
 - continuously evaluate the design organisation
 - control sub-contractors
- procedures and responsibilities associated with the functions listed above, taking due account of Part 21 requirements applicable to design and approval of minor changes to type design or minor repairs to products.

AMC 21.A.239(a)(3) Design assurance system - Independent system monitoring

The system monitoring function required by 21.A.239(a)(3) may be undertaken by the existing quality assurance organisation when the design organisation is part of a larger organisation.

AMC 21.A.239(b) Design assurance system - Independent checking function of the ~~showing~~ **demonstration of compliance**

1. The independent checking function of the ~~showing~~ **demonstration** of compliance should consist of the verification by a person not creating the compliance data. Such person may work in conjunction with the individuals who prepare compliance data.

2. The verification should be shown by signing compliance documents, including test programmes and data.
3. For a product, there is normally only one compliance verification engineer nominated for each relevant subject. A procedure should cover the non-availability of nominated persons and their replacement when necessary.
4. For STC cases, when compliance statement and associated documentation are produced by the TC holder, and when these data are approved under the system of the authority of TC holder, then the STC applicant does not need to provide, within its own DOA, the independent checking function required in 21.A.239(b) for these data.

GM 21.A.239(c) Design assurance system

In meeting the requirements of 21.A.239(c) the applicant for a design organisation approval under Subpart J may adopt the following policy:

- 1 The satisfactory integration of the Partner/Sub-contractor and applicant's design assurance systems should be demonstrated for the activities covered under the applicant's terms of approval.
- 2 In the event that a Partner/Sub-contractor holds a design organisation approval (DOA), then in accordance with 21.A.239(c), the applicant may take this into account in demonstrating the effectiveness of this integrated system.
- 3 When any Partner/Sub-contractor does not hold a DOA then the applicant will need to establish to its own satisfaction and the satisfaction of the Agency, the adequacy of that partner's/sub-contractor's design assurance system in accordance with 21.A.243(b).

AMC No. 1 to 21.A.243(a) Data requirements

The handbook should provide the following information for each product covered by the design organisation approval.

1. A description of the tasks which can be performed under the approval, according to the following classification:
 - a. General areas, like subsonic turbojet aeroplanes, turbopropeller aeroplanes, small aeroplanes, rotorcraft.
 - b. Technologies handled by the organisation (composite, wood or metallic construction, electronic systems, etc.)
 - c. A list of types and models for which the design approval has been granted and for which privileges may be exercised, supported by a brief description for each product.
 - d. For repair design, classification and (if appropriate) approval activities it is necessary to specify the scope of activity in terms of structures, systems, engines, etc.
2. A general description of the organisation, its main departments, their functions and the names of those in charge; a description of the line management and of functional relationships between the various departments.
3. A description of assigned responsibilities and delegated authority of all parts of the organisation which, taken together, constitute the organisation's design assurance system together with a chart indicating the functional and hierarchical relationship of the design assurance system to Management and to other parts of the organisation; also the chains of responsibilities within the design assurance system, and the control of the work of all partners and sub-contractors.
4. A general description of the way in which the organisation performs all the design functions in relation to airworthiness and environmental protection approvals including:
 - a. The procedures followed and forms used in the Type Investigation process to ensure that the design of, or the change to the design of, the product as applicable is identified and documented, and complies with the applicable CS and environmental protection requirements, including specific requirements for import by importing authorities

- b. The procedures for classifying design changes as 'major' or 'minor' and for the approval of minor changes.
 - c. The procedures for classifying and approving unintentional deviations from the approved design data occurring in production (concessions or non-conformance's).
 - d. The procedure for classifying and obtaining approval for repairs.
5. A general description of the way in which the organisation performs its functions in relation to the continuing airworthiness of the product it designs, including co-operation with the production organisation when dealing with any continuing airworthiness actions that are related to production of the product, part or appliance, as applicable.
 6. A description of the human resources, facilities and equipment, which constitutes the means for design, and where appropriate, for ground and flight testing.
 7. An outline of a system for controlling and informing the Staff of the organisation of current changes in engineering drawings, specifications and design assurance procedures.
 8. A description of the recording system for:
 - a. The type design, including relevant design information, drawings and test reports, including inspection records of test specimens.
 - b. The means of compliance.
 - c. The compliance documentation (compliance check list, reports...).
 9. A description of the record keeping system to comply with 21.A.55 and 21.A.105.
 10. A description of the means by which the organisation monitors and responds to problems affecting the airworthiness of its product during design, production and in service in particular to comply with 21.A.3 (see also GM No. 1 to 21.A.239, paragraphs 3.1.4(s) and (u)).
 11. The names of the design organisation authorised signatories. Nominated persons with specific responsibilities such as mentioned in 21.A.33 and 21.A.35 should be listed.
 12. (Reserved).
 13. A clear definition of the tasks, competence and areas of responsibility of the Office of Airworthiness.
 14. A description of the procedures for the establishment and the control of the maintenance and operating instructions (see 21.A.57, 21.A.61, 21.A.107, 21.A.119, 21.A.120 and 21.A.449).
 15. A description of the means by which the continuing evaluation (system monitoring) of the design assurance system will be performed in order to ensure that it remains effective.

AMC No. 2 to 21.A.243(a) Data requirements - Model content of handbook for organisations designing minor changes to type design or minor repairs to products

Part 1. Organisation

- 1.1 Objective of handbook and binding statement
- 1.2 Responsible person for administration of handbook
- 1.3 Amendment procedure
- 1.4 List of effective pages
- 1.5 Distribution list
- 1.6 Presentation of design organisation (including locations)
- 1.7 Scope of work (with identification of type and models of products)
- 1.8 Organisation charts
- 1.9 Human resources
- 1.10 Management staff
- 1.11 Certifying personnel (see GM No. 2 to 21.A.243(d), paragraph 2)

1.12 Independent system monitoring

Part 2. Procedures

2.1 Management of changes to type design and design of repairs

- configuration control
- classification
- approval of minor changes to type design and minor repairs

2.2 Control of design sub-contractors

2.3 Collecting/Investigating of failures, malfunctions and defects

2.4 Co-ordination with production

2.5 Documentation control

- in relations with the changes and repairs
- in relation with failures/malfunctions and defects (i.e. Services Bulletins)

2.6 Record keeping

GM No. 1 to 21.A.243(d) Statement of qualifications and experience

1. Purpose

This GM provides guidelines on the following points:

- Who are the persons covered by 21.A.243(d)?
- What is requested from the applicant for these persons?

2. Who are the persons?

Three different types of functions are named or implicitly identified in the requirements of Part 21 Subpart J or in associated AMC and GM, using qualified and experienced personnel:

- the Chief Executive [see GM No. 1 to 21.A.239(a), para. 3.1.2, GM 21.A.249, GM 21.A.265(b)]
- the other management staff:
 - the Head of the design organisation [see GM No. 1 to 21.A.239(a), para.3.1.2, GM No. 1 21.A.245, para.4.1, GM 21.A.265(b)]
 - the Chief of the Office of Airworthiness, or [see GM No. 1 to 21.A.245, para. 4.2]
 - the Chief of the independent monitoring function of the design assurance system [see 21.A.239(a)(3) and AMC No. 1 to 21.A.243(a), para.2]
- the personnel making decisions affecting airworthiness and environmental protection:
 - compliance verification engineers [see GM No. 1 to 21.A.239(a), para.3.1.3; AMC 21.A.239(b)]
 - personnel of the Office of Airworthiness making decisions affecting airworthiness and environmental protection, especially those linked with the 21.A.263 privileges (signing documents for release, approving classification of changes and repairs, and granting the approval of minor changes and minor repairs, granting the approval of SBs, and ~~documentary changes~~ minor revisions to the aircraft flight manual) [see GM No. 1 to 21.A.239(a), para. 3.1.4]

3. Kind of statement

3.1 Chief Executive

The Chief Executive should provide the necessary resources for the proper functioning of the design organisation.

A statement of the qualification and experience of the Chief Executive is normally not required.

3.2 Other management staff

The person or persons nominated should represent the management structure of the organisation and be responsible through the Head of design organisation to the Chief Executive for the execution of all functions as specified in Part 21, Subpart J. Depending on the size of the organisation, the functions may be subdivided under individual managers.

The nominated managers should be identified and their credentials furnished to the Agency-

Agency on EASA Form ~~Four [EASA form expected]~~ [4-DOA](#) (see [format in EASA administrative procedures](#)) [EASA website](#):

<http://easa.europa.eu/certification/application-forms.php>) in order that they may be seen to be appropriate in terms of relevant knowledge and satisfactory experience related to the nature of the design activities as performed by the organisation.

The responsibilities and the tasks of each individual manager should be clearly defined, in order to prevent uncertainties about the relations, within the organisation. Responsibilities of the managers should be defined in a way that all responsibilities are covered.

3.3 Personnel making decisions affecting airworthiness and environmental protection

For these personnel, no individual statement is required. The applicant should show to the Agency that there is a system to select, train, maintain and identify them for all tasks where they are necessary.

The following guidelines for such a system are proposed:

- These personnel should be identified in the handbook, or in a document linked to the handbook. This, and the corresponding procedures, should enable them to carry out the assigned tasks and to properly discharge associated responsibilities.
- The needs, in terms of quantity of these personnel to sustain the design activities, should be identified by the organisation.
- These personnel should be chosen on the basis of their knowledge, background and experience.
- When necessary, complementary training should be established, to ensure sufficient background and knowledge in the scope of their authorization. The minimum standards for new personnel to qualify in the functions should be established. The training should lead to a satisfactory level of knowledge of the procedures relevant for the particular role.
- Training policy forms part of the design assurance system and its appropriateness forms part of investigation by the Agency within the organisation approval process and subsequent surveillance of persons proposed by the organisation.
- This training should be adapted in response to experience gained within the organisation
- The organisation should maintain a record of these personnel which includes details of the scope of their authorisation. The personnel concerned should be provided with evidence of the scope of their authorisation.
- The following minimum information should be kept on record:
 - a) Name
 - b) Date of birth
 - c) Experience and training
 - d) Position in organisation
 - e) Scope of the authorisation
 - f) Date of first issue of the authorisation
 - g) If appropriate, date of expiry of the authorisation

- h) Identification number of the authorisation.

The record may be kept in any format and should be controlled.

- Persons authorised to access the system should be maintained at a minimum to ensure that records cannot be altered in an unauthorised manner or that such confidential records do not become accessible to unauthorised persons.
- Personnel should be given access to their own record.
- Under the provision of 21.A.257 the Agency has a right of access to the data held in such a system.
- The organisation should keep the record for at least two years after a person has ceased employment with the organisation or withdrawal of the authorisation, whichever is the sooner.

GM No. 2 to 21.A.243(d) Data requirements - Statement of the qualification and experience- Organisations designing minor changes to type design or minor repairs to products

For organisations designing minor changes to type design or minor repairs to products, the statement of the qualifications and experience required by 21.A.243(d) should be addressed as follows :

1. The nominated managers should be identified and their credentials submitted to the Agency on EASA Form [Four \[EASA form expected\] \(see format in EASA administrative procedures\) 4 - DOA \(see EASA website: <http://easa.europa.eu/certification/application-forms.php>\)](#) in order that they may be seen to be appropriate in terms of relevant knowledge and satisfactory experience related to the nature of the design activities as performed by the organisation.
2. The persons responsible to:
 - classify changes to type design or repairs
 - verify compliance [21.A.239(b)]
 - approve minor changes to type design and minor repairs [21.A.263(c)(2)]
 - issue information or instructions [21.A.263(c)(3)]

should be selected by the organisation in accordance with a procedure and criteria agreed with the Agency.

GM No. 1 to 21.A.245 Requirements for approval

See 21.A.245

- 1 *General.* The data submitted in accordance with 21.A.243 should show that sufficient skilled personnel are available and suitable technical and organisational provisions have been made for carrying out the Type Investigation defined by GM No. 1 to 21.A.239(a), paragraph 2.3.
- 2 *Personnel.* The applicant should show that the personnel available to comply with 21.A.245(a) are, due to their special qualifications and number, able to provide assurance of the design or modification of a product, as well as the compilation and verification of all data needed to meet the applicable CS and environmental protection requirements while taking into account the present state of the art and new experience.
- 3 *Technical.* The applicant should have access to:
 - a. Workshops and production facilities which are suitable for manufacturing prototype models and test specimens.
 - b. Accommodation and test facilities which are suitable for carrying out tests and measurements needed to demonstrate compliance with the CS and environmental protection requirements. The test facilities may be subjected to additional technical conditions related to the nature of tests performed.
- 4 *Organisation.* The data submitted in accordance with 21.A.243 should show that:
 - 4.1 The Head of the design organisation for which an application for approval has been made, has the direct or functional responsibility for all departments of the organisation which are responsible for the design of the product. If the departments responsible for design are functionally linked,

the Head of the design organisation still carries the ultimate responsibility for compliance of the organisation with Part 21 Subpart J.

- 4.2 An Office of Airworthiness, or equivalent function, has been established and staffed on a permanent basis to act as the focal point for co-ordinating airworthiness and environmental protection matters (see GM No. 1 to 21.A.239 (a) paragraph 3.1.4); it reports directly to the Head of the design organisation or is integrated into an independent quality assurance organisation reporting to the Head of the design organisation.
- 4.3 [Reserved]
- 4.4 Responsibilities for all tasks related to Type Investigations are assigned in such a way that gaps in authority are excluded.
- 4.5 The responsibility for a number of tasks as in paragraph 4.4 may be assigned to one person especially in the case of simple projects.
- 4.6 Co-ordination between technical departments and the persons in charge of the system monitoring required by 21.A.239(a)(3) has been established :
 - a. to ensure quick and efficient reporting and resolution of difficulties encountered using the handbook and associated procedures
 - b. to maintain the design assurance system
 - c. to optimise auditing activities.

GM No. 2 to 21.A.245 Requirements for approval - Organisations designing minor changes to type design or minor repairs to products

The data submitted in accordance with 21.A.243 should show that:

1. The manager responsible for design has the direct or functional responsibility for all departments of the organisation which are involved in the design of minor changes to type design or minor repairs to products.
2. Person(s) have been nominated to liaise with the Agency and to co-ordinate airworthiness and environmental protection matters. Their position in the organisation should allow direct report to the manager responsible for design.
3. Responsibilities for all tasks related to the design and approval of minor changes to type design or minor repairs to products are assigned to ensure that all areas are covered
4. The responsibility for a number of tasks as in paragraph 3 may be assigned to one person especially in the case of simple projects.

GM 21.A.247 Significant changes in the design assurance system

In addition to a change in ownership (see 21.A.249), the following changes to the design assurance system should be considered as 'significant' to the showing demonstration of compliance or to the airworthiness or environmental protection of the products:

1. Organisation
 - Relocation to new premises (see also GM 21.A.249)
 - Change in the industrial organisation (partnership, suppliers, design work sharing) unless it can be shown that the independent checking function of the showing demonstration of compliance is not affected
 - Change in the parts of the organisation that contribute directly to the airworthiness or environmental protection (independent checking function, office of airworthiness [or equivalent])
 - Change to the independent monitoring principles (see 21.A.239(a)(3))
2. Responsibilities
 - Change of the management staff

- the Head of the design organisation [GM No. 1 to 21.A.239(a), para.3.1.2, GM No. 1 to 21.A.245, para.4.1, GM 21.A.265(b)]
 - the Chief of the Office of Airworthiness [GM No. 1 to 21.A.245, para. 4.2]
 - the Chief of the independent monitoring function of the design assurance system [21.A.239(a)(3) and AMC No. 1 to 21.A.243(a), para.2]
 - New distribution of responsibilities affecting airworthiness or environmental protection
 - For organisations designing minor changes to type design or minor repairs to products, change of the persons identified in GM No. 2 to 21.A.243(d).
3. Procedures
- Change to the principles of procedures related to :
- the type certification
 - the classification of changes and repairs as ‘ major ‘ or ‘ minor ‘ [21.A.263(c)(1)]
 - the treatment of major changes and major repairs
 - the approval of the design of minor changes and minor repairs [21.A.263(c)(2)]
 - the issue of information and instructions under the privilege of 21.A.263(c)(3)
 - the approval of minor revisions to the Aircraft Flight Manual [21.A.263(c)(4)]
 - the approval of the design of major repairs [21.A.437 or 21.A.263(c)(5)]
 - continued airworthiness (see 21.A.3)
 - the configuration control, when airworthiness or environmental protection is affected
 - the acceptability of design tasks undertaken by partners or sub-contractors [21.A.239(c)].
4. Resources
- Substantial reduction in number and/or experience of staff (see 21.A.245(a)).

GM 21.A.249 Transferability

1. Transfer of the approval would normally only be agreed in cases where the organisation itself remains substantially unchanged.
2. An acceptable transfer situation could be for example a change of company name (supported by the appropriate certificate from the National Companies Registration Office or equivalent) but with no changes to site address or Chief Executive. However, if the same legal entity were to relocate to new premises with a new Chief Executive and/or new departmental heads, then a substantial investigation by the Agency would be necessary such that the change would be classified as a re-approval.
3. In the event of receivership there may be good technical justification for continuation of the approval provided that the company continues to function in a satisfactory manner. It is likely that at a later stage the approval might be surrendered by the receiver or transferred to another legal entity in which case the former paragraphs apply.

GM No. 1 to 21.A.251 Terms of approval

1. The terms of approval are stated on the certificate of approval issued by the Agency. The certificate states the scope of work and the products, changes or repairs thereof, with the appropriate limitations for which the approval has been granted. For design organisation approval covering type certification or ETSO authorisation for APU, the list of product types covered by the design assurance system should be included.
2. Approval of a change in the terms of approval in accordance with 21.A.253 will be confirmed by an appropriate amendment of the certificate of approval.
3. The certificate references the handbook of the approved design organisation, provided in accordance with 21.A.243. This handbook defines the tasks which may be performed under the approval.

4. Scopes of work are, for example, 'subsonic turbojet aeroplanes', 'turbopropeller aeroplanes', 'small aeroplanes', 'rotorcraft'... Technologies are quoted in the scope of work when it is considered by the Agency as a limitation for the design organisation approval.
5. For repair design activities, the certificate states the scope of work with the appropriate limitations for which the approval has been granted.

GM No. 2 to 21.A.251 Terms of approval - Organisations designing minor changes to type design or minor repairs to products

Terms of approval issued for organisations designing minor changes to type design or minor repairs to products should contain:

1. Scope of work

This design organisation approval has been granted for:

- designing minor changes to type design or minor repairs to [aircraft, engine, propeller] in accordance with the applicable CS and environmental protection requirements,
- ~~—showing~~demonstrating and verifying the compliance with these CS and environmental protection requirements.

2. Category of products

Any other indication if the Agency has found a limitation related to aircraft systems or technologies and reducing the scope as defined in paragraph 1.

3. Privileges

The holder of this approval is entitled to:

List of the privileges granted with the approval, pursuant to 21.A.263(c)(1), (2) and (3).

GM 21.A.257(a) Investigations

Arrangements that allow the Agency to make investigations include the complete design organisation including partners, sub-contractors and suppliers, whether they are in the State of the applicant or not, assisting and co-operating with the Agency in performing inspections and audits conducted during initial assessment and subsequent surveillance.

Assistance to the Agency includes all appropriate means associated with the facilities of the design organisation to allow the Agency to perform these inspections and audits, such as a meeting room and office support.

GM 21.A.263(b) DOA privilege related to compliance documents

A compliance document is the end result of a certification process, where the ~~showing~~demonstration of compliance is recorded. For each specific certification process, the Agency is involved in the process itself at an early stage, especially through the establishment of the certification programme. The inspections or tests under 21.A.257(b) may be performed at various stages of the whole certification process, not necessarily when the compliance document is presented.

Therefore, according to the scheduled level of involvement, the Agency should agree with the DOA holder documents to be accepted without further Agency verification under the DOA privilege of 21.A.263(b).

AMC 21.A.263(b)(1) Compliance documents with conditions related to engine or propeller without a type-certificate or with unapproved changes and fitted on aircraft for which a permit to fly is requested

The establishment of flight conditions may include conditions related to engines/propellers without a type-certificate or with unapproved changes and fitted on the aircraft for which a permit to fly is requested. These conditions (i.e. installation, operating, maintenance conditions or limitations) are defined by the organisation responsible for the design of the engine/propeller and provided to the organisation responsible for the design of the aircraft.

When the organisation responsible for the design of the engine/propeller has a DOA, the establishment and substantiation of these conditions must be done under the relevant DOA procedures. For that purpose, the associated documentation must be processed like any other compliance document. It must be provided to the organisation responsible for the design of the aircraft that will use it for the establishment of the aircraft flight conditions.

[Decision 2007/006/R, 5.4.2007]

AMC No. 1 to 21.A.263(c)(1) Procedure for the classification of changes to type design and repairs as minor and major

1. INTENT

This acceptable means of compliance provides means to develop a procedure for the classification of changes to type design and repairs.

Each DOA applicant must develop its own internal classification procedure following this AMC, in order to obtain the associated 21.A.263(c)(1) privilege.

2. PROCEDURE FOR THE CLASSIFICATION OF CHANGES TO TYPE DESIGN AND REPAIRS

2.1 Content

The procedure must address the following points:

- the identification of changes to type design or repairs
- classification
- justification of the classification
- authorised signatories
- supervision of changes to type design or repairs initiated by sub-contractors.

For changes to type design, criteria used for classification must be in compliance with 21.A.91 and GM 21.A.91.

For repairs, criteria used for classification must be in compliance with 21.A.435 and GM 21.A.435.

2.2 Identification of changes to type design or repairs

The procedure must indicate how the following are identified:

- major changes to type design or major repairs
- those minor changes to type design or minor repairs where additional work is necessary to ~~show~~demonstrate compliance with the CS and environmental protection requirements
- other minor changes to type design or minor repairs requiring no further ~~showing~~demonstration of compliance.

2.3 Classification

The procedure must show how the effects on airworthiness and environmental protection are analysed, from the very beginning, by reference to the applicable requirements.

If no specific CS or environmental protection requirements are applicable to the change or repairs, the above review must be carried out at the level of the part or system where the change or repair is integrated and where specific CS or environmental protection requirements are applicable.

2.4 Justification of the classification

All decisions of classification of changes to type design or repairs as 'major' or 'minor' must be recorded and, for those which are not straightforward, also documented. These records must be easily accessible to the Agency for sample check.

2.5 Authorised signatories

All classifications of changes to type design or repairs must be accepted by an appropriate authorised signatory.

The procedure must indicate the authorised signatories for the various products listed in the terms of approval.

For those changes or repairs that are handled by sub-contractors, as described under paragraph 2.6, it must be described how the DOA holder manages its classification responsibility.

2.6 Supervision of changes to type design or repairs initiated by sub-contractors

The procedure must indicate, directly or by cross-reference to written procedures, how changes to type design or repairs may be initiated and classified by sub-contractors and are controlled and supervised by the DOA holder.

AMC No. 2 to 21.A.263(c)(1) Privileges - Organisations designing minor changes to type design or minor repairs to products : classification procedure

1. Content

The procedure must address the following points:

- configuration control rules, especially the identification of changes to type design or repairs
- classification, in compliance with 21.A.91 and GM 21.A.91 for changes and GM 21.A.435 for repairs
- justification of the classification
- authorised signatories.

2. Identification of changes to type design or repairs

The procedure must indicate how the following minor changes to type design or minor repairs are identified:

- those minor design changes to type design or minor repairs where additional substantiation data is necessary to show demonstrate compliance with the CS or environmental protection requirements
- other minor design changes to type design or minor repairs requiring no further showing demonstration of compliance.

3. Classification

The procedure must show how the effects on airworthiness and environmental protection are analysed, from the very beginning, by reference to the applicable requirements.

If no specific requirements are applicable to the change or the repair, the above review must be done at the level of the part or system where the change or repair is integrated and where specific CS or environmental protection requirements are applicable.

For repair, see also GM 21.A.435.

4. Justification of the classification

All decisions of classification of changes to type design or repairs as 'minor' must be recorded and, for those which are not straightforward, also documented. These records must be easily accessible to the Agency for sample check.

It may be in the format of meeting notes or register.

5. Authorised signatories

All classifications of changes to type design or repairs must be accepted by an appropriate authorised signatory.

The procedure must indicate the authorised signatories for the various products listed in the terms of approval.

AMC No. 1 to 21.A.263(c)(2) Procedure for the approval of minor changes to type design or minor repairs

1. INTENT

This acceptable means of compliance provides means to develop a procedure for the approval of minor changes to type design or minor repairs.

Each DOA applicant must develop its own internal procedures following this AMC, in order to obtain the associated privilege under 21.A.263(c)(2).

2. PROCEDURE FOR THE APPROVAL OF MINOR CHANGES TO TYPE DESIGN OR MINOR REPAIRS

2.1 Content

The procedure must address the following points:

- compliance documentation
- approval under the DOA privilege
- authorised signatories
- supervision of minor changes to type design or minor repairs handled by sub-contractors.

2.2 Compliance documentation

For those minor changes to type design or minor repairs where additional work to [showdemonstrate](#) compliance with the applicable CS and environmental protection requirements is necessary, compliance documentation must be established and independently checked as required by 21.A.239(b).

The procedure must describe how the compliance documentation is produced and checked.

2.3 Approval under the DOA privilege

2.3.1 For those minor changes to type design or minor repairs where additional work to [showdemonstrate](#) compliance with the applicable CS and environmental protection requirements is necessary, the procedure must define a document to formalise the approval under the DOA privilege.

This document must include at least:

- identification and brief description of the change or repair and reasons for change or repair
- applicable CS or environmental protection requirements and methods of compliance
- reference to the compliance documents
- effects, if any, on limitations and on the approved documentation
- evidence of the independent checking function of the [showingdemonstration](#) of compliance
- evidence of the approval under the privilege of 21.A.263(c)(2) by an authorised signatory
- date of the approval.

For repairs, see AMC 21.A.433(a).

2.3.2 For the other minor changes to type design or minor repairs, the procedure must define a means to identify the change or repair and reasons for the change or repair, and to formalise its approval by the appropriate engineering authority under an authorised signatory. This function may be delegated by the Office of Airworthiness but must be controlled by the Office of Airworthiness, either directly or through appropriate procedures of the DOA holder's design assurance system.

2.4 Authorised signatories

The persons authorised to sign for the approval under the privilege of 21.A.263(c)(2) must be identified (name, signature and scope of authority) in appropriate documents that maybe linked to the handbook.

2.5 Supervision of minor changes to type design or minor repairs handled by sub-contractors

For the minor changes to type design or minor repairs described in 2.3.2, that are handled by sub-contractors, the procedure must indicate, directly or by cross-reference to written procedures how these minor changes to type design or minor repairs are approved at the sub-contractor level and the arrangements made for supervision by the DOA holder.

AMC No. 2 to 21.A.263(c)(2) Privileges - Organisations designing minor changes to type design or minor repairs to products : procedure for the approval of minor changes to type design or minor repairs

1. Content

The procedure must address the following points:

- compliance documentation
- approval under the DOA privilege
- authorised signatories.

2. Compliance documentation

For those minor changes to type design or minor repairs where additional work to ~~show~~demonstrate compliance with the applicable CS and environmental protection requirements is necessary, compliance documentation must be established and independently checked as required by 21.A.239(b).

The procedure must describe how the compliance documentation is produced and checked.

3. Approval under the DOA privilege

3.1. For those minor changes to type design or minor repairs where additional work to ~~show~~demonstrate compliance with the applicable CS or environmental protection requirements is necessary, the procedure must define a document to formalise the approval under the DOA privilege.

This document must include at least:

- identification and brief description of the change or the repair and reason for change or repair
- applicable CS or environmental protection requirements and methods of compliance
- reference to the compliance documents
- effects, if any, on limitations and on the approved documentation
- evidence of the independent checking function of the ~~showing~~demonstration of compliance
- evidence of the approval under the privilege of 21.A.263(c)(2) by an authorised signatory
- date of the approval

For repairs, see also AMC 21.A.433(a).

3.2. For the other minor changes to type design or minor repairs, the procedure must define a means to identify the change or repair and reasons for the change or repair, and to formalise its approval by the appropriate engineering authority under an authorised signatory. This function must be controlled through appropriate procedures of the DOA holder's design assurance system.

4. Authorised signatories

The persons authorised to sign for the approval under the privilege of 21.A.263(c)(2) must be identified (name, signature and scope of authority) in appropriate documents that may be linked to the handbook.

GM 21.A.263(c)(3) Issue of information or instructions

1. INTENT

This GM provides guidelines to address the various aspects the DOA should cover in order to have a comprehensive procedure for the issue of information or instructions.

2. SCOPE

The information or instructions referred to in 21.A.263(c)(3) are issued by a DOA holder to make available to the owners or operators of a product with all necessary data to implement a change on the product or a repair, or to inspect it. Some are also issued to provide maintenance organisations and other interested persons with all necessary maintenance data for the performance of maintenance, including implementation of a change on the product or a repair, or inspection, in accordance with 21.A.61, 21.A.107, 21.A.120 or 21.A.449 (Instructions for Continued Airworthiness).

This information or instructions may be issued in a format of a Service Bulletin as defined in ATA 100 system, or in Structural Repair Manuals, Maintenance Manuals, Engine and Propeller Manuals etc.

The preparation of this data involves design, production and inspection. As the overall responsibility, through the privilege, is allocated to the DOA holder, the three aspects should be properly handled under the DOA to obtain the privilege 'to issue information or instructions containing a statement that the technical content is approved', and a procedure should exist.

3. PROCEDURE

For the information and instructions issued under 21.A.263(c)(3), the DOA holder should establish a procedure addressing the following points :

- preparation
- verification of technical consistency with corresponding approved change(s) , repair(s) or approved data, including effectivity, description, effects on airworthiness and environmental protection, especially when limitations are changed
- verification of the feasibility in practical applications
- authorised signatories.

The procedure should include the information or instructions prepared by sub-contractors or vendors, and declared applicable to its products by the DOA holder.

4. STATEMENT

The statement provided in the information or instructions should also cover the information or instructions prepared by sub-contractors or vendors and declared applicable to its products by the DOA holder.

The technical content is related to the design data and accomplishment instructions, and its approval means that:

- the design data has been appropriately approved ; and
- the instructions provide for practical and well defined installation/inspection methods, and, when accomplished, the product is in conformity with the approved design data.

Note : Information and instructions related to required actions under 21.A.3B(b) (airworthiness directives) are submitted to the Agency to ensure compatibility with Airworthiness directive content (see 21.A.265(e)), and contain a statement that they are, or will be, subject to an airworthiness directive issued by the Agency.

GM 21.A.263(c)(4) Procedure for the approval of documentary changesminor revisions to the aircraft flight manual

1. INTENT

This GM provides guidelines to develop a procedure for the approval of documentary changesminor revisions to the aircraft flight manual (AFM).

Each DOA applicant/holder should develop its own internal procedure, based on these guidelines, in order to obtain the associated privilege under 21.A.263(c)(4).

2. ~~DEFINITION OF DOCUMENTARY CHANGES~~.MINOR REVISIONS TO THE AFM

~~Examples of documentary changes to the AFM that may be approved under the DOA privilege:~~

2.1 The following revisions to the AFM are defined as minor revisions:

- (a) Revisions to the AFM associated with changes to type design classified as minor in accordance with 21.A.91
- (b) Revision to the AFM not associated with changes to type design (also identified as stand-alone revisions), that falls under one of the following:
 - Changes to limitations or procedures that are achieved without altering or exceeding certification data (e.g. weight, structural, noise, etc.)
 - Consolidation of two or more previously approved and compatible AFMs into one, or compilation of different parts taken from previously approved and compatible AFMs that are directly applicable to the subject aircraft
 - The introduction of compatible and previously approved AFM amendments, revisions, appendices or supplements.
- (c) Administrative revisions to the AFM, defines as follows:

(1) A—FOR AFM ISSUED BY THE TYPE-CERTIFICATE HOLDER

- Editorial ~~changes~~revisions or corrections to the AFM
- Changes to parts of the AFM that are not required to be approved by EASA
- ~~— Changes to weight limitations that are within all previously EASA approved limitations (e.g., structural, noise, etc.)~~
- ~~— The addition of compatible and previously EASA approved AFM Temporary changes, appendices or Supplements.~~
- Conversions of previously FAA or EASA approved combinations of units of measurement added to the AFM in a previously approved manner.
- The addition of aircraft serial numbers to an existing AFM where the aircraft configuration, as related to the AFM, is identical to aircraft already in that AFM.
- The removal of reference to aircraft serial numbers no longer applicable to that AFM.
- The translation of an EASA approved AFM into the language of the State of Design or the State of Registration.

(2) B—FOR AFM SUPPLEMENTS ISSUED BY STC HOLDERS

- Editorial ~~changes~~revisions or corrections to the AFM supplement.
- Changes to parts of the AFM that are not required to be approved by EASA

~~Changes to weight limitations parts of the AFM that are within all previously EASA approved limitations (e.g., structural, noise, etc.) not required to be approved by EASA~~

- Conversions of previously FAA or EASA approved combinations of units of measurement added to the AFM supplement in a previously approved manner.
- The addition of aircraft serial numbers to an existing AFM supplement where the aircraft configuration, as related to the AFM supplement, is identical to aircraft already in that AFM supplement.
- The addition of a new STC to an existing AFM supplement, when this supplement is fully applicable to the new STC
- The removal of reference to aircraft serial numbers no longer applicable to that AFM supplement.
- The translation of an EASA approved AFM into the language of the State of Design or the State of Registration.

2.2 No other revision can be classified as minor, unless specifically agreed by the Agency.

3. PROCEDURE FOR THE APPROVAL OF ~~DOCUMENTARY CHANGES~~ MINOR REVISIONS TO THE AFM

3.1 Content

The procedure should address the following points:

- preparation of all revisions to the AFM ~~changes~~,
- classification as ~~documentary AFM change~~ minor of the revision to the AFM,

~~verification by the airworthiness function, especially regarding the classification of the AFM change,~~

- approval of the revisions to the AFM ~~changes~~,
- approval statement ~~and authorised signatories,~~

~~distribution.~~

3.2 Preparation

The procedure should indicate how revisions to the AFM ~~changes~~ are prepared and how the co-ordination with people in charge of design changes is performed.

3.3 Classification

The procedure should indicate how revisions to the AFM ~~changes~~ are classified as ~~documentary changes~~ minor, in accordance with the criteria of paragraph 2.

All decisions of classification of minor revisions to the AFM that are not straightforward must be recorded and documented. These records must be easily accessible to the Agency for sample check.

All classifications of minor revisions to AFM must be accepted by an appropriate authorised signatory.

The procedure must indicate the authorised signatories for the various products listed in the terms of approval.

~~Changes to the AFM of an editorial nature should be non-technical and should normally only affect existing approved data.~~

~~3.4 Verification by Office of airworthiness function~~

~~The procedure should indicate how people in charge of Office of airworthiness function will:~~

- ~~_____ verify the classification as documentary changes~~
- ~~_____ review the content of the AFM changes.~~

3.54 Approval

~~Any change to the AFM should be approved, either by the Agency, or under the privilege of 21A.263(c)(4) for documentary AFM changes.~~

~~For documentary AFM changes, t~~ The procedure should indicate how the approval under the privilege of 21.A.263(c)(4) will be formalised.

The authorised signatories should be identified (name, signature), together with the scope of authorisation, in a document that can be linked to the DOA handbook.

3.65 Approval statement ~~and authorised signatories~~

Revisions of the AFM under the privilege of 21.A.263(c)(4) containing only documentary changes should be issued with the approval statement defined in 21A.263(c)(4) on the front page and/or in the log of revisions.

~~When approval status is shown on each page, a simplified statement such as "Approved under the authority of DOA nr.[EASA].J.[xyz]" may be used.~~

~~The authorised signatories should be identified (name, signature), together with the scope of authorisation, in a document that can be linked to the DOA handbook.~~

~~3.7 Maintaining, updating and distribution~~

~~The procedure should indicate how the master copy of the AFM is maintained and updated, and how approved revisions are distributed, taking account of 21A.57 or 21A.119.~~

AMC 21.A.263(c)(6) Procedure for the approval of the conditions for issue of a permit to fly

1. INTENT

This AMC provides means to develop a procedure to determine that an aircraft can fly, under the appropriate restrictions compensating for noncompliance with the certification specifications applicable to the aircraft category.

Each DOA applicant or holder must develop its own internal procedure following this AMC, in order to obtain the privilege to make this determination and approve associated conditions without Agency involvement, under 21.A.263(c)(6). When the privilege does not apply, the DOA holder will prepare all necessary data required for the determination in accordance with the same procedure required for the privilege, and will apply for Agency approval.

2. PROCEDURE FOR THE APPROVAL OF THE CONDITIONS FOR ISSUE OF A PERMIT TO FLY

2.1 Content

The procedure must address the following points:

- decision to use the privilege
- management of the aircraft configuration

- determination of the conditions that must be complied with to perform safely a flight
- documentation of flight conditions substantiations
- approval under the DOA privilege, when applicable
- authorised signatories.

2.2 Decision to use the privilege of 21.A.263(c)(6)

The procedure must include a decision to determine:

- flights for which the privilege of 21.A.263(c)(6) will be exercised; ~~and~~
- ~~– flights for which the approval of flight conditions by the Agency will be required according to the criteria of 21A.263(c)(6).~~

2.3 Management of the aircraft configuration

The procedure must indicate:

- how the aircraft, for which an application for permit to fly is made, is identified;
- how changes to the aircraft will be managed.

2.4 Determination of the conditions that must be complied with to perform safely a flight

The procedure must describe the process used by the DOA holder to justify that an aircraft can perform the intended flight(s) safely. This process should include:

- identification of deviations from applicable certification specifications or non-compliance with Part 21 conditions for the issue of a certificate of airworthiness;
- analysis, calculations, tests or other means used to determine under which conditions or restrictions the aircraft can perform safely a flight;
- the establishment of specific maintenance instructions and conditions to perform these instructions;
- independent technical verification of the analysis, calculations, tests or other means used to determine under which conditions or restrictions the aircraft can perform the intended flight(s) safely;
- statement by the office of airworthiness (or equivalent), that the determination has been made in accordance with the procedure and that the aircraft has no features and characteristics making it unsafe for the intended operation under the identified conditions and restrictions;
- approval by an authorised signatory.

2.5 Documentation of flight conditions substantiations

1. The analysis, calculations, tests, or other means used to determine under which conditions or restrictions the aircraft can perform safely a flight, must be compiled in compliance documents. These documents must be signed by the author and by the person performing the independent technical verification.
2. Each compliance document must have a number and issue date. The various issues of a document must be controlled.
3. The data submitted and approved by the type-certificate holder can be used as substantiations. In that case, the independent technical verification referred to in 2.4 is not required.

2.6 Approval under the DOA privilege

2.6.1 Initial approval

The procedure must include the following EASA Form 18A to support the approval under the DOA privilege:

FLIGHT CONDITIONS FOR A PERMIT TO FLY – APPROVAL FORM	
1. Applicant: Approval No: <i>[Name and organisation approval number of organisation providing the flight conditions and associated substantiations]</i>	2. Approval form No: Issue: <i>[number and issue, for traceability purpose]</i>
3. Aircraft manufacturer/type	4. Serial number(s)
5. Purpose <i>[Purpose in accordance with 21.A.701(a)]</i>	
6. Aircraft configuration The above aircraft for which a permit to fly is requested is defined in <i>[add reference to the document(s) identifying the detailed configuration of the aircraft]</i> <i>[For change(s) affecting the initial approval form: description of change(s). This form must be re-issued]</i>	
7. Substantiations <i>[References to the document(s) justifying that the aircraft (as described in 56.) can perform the intended flight(s) safely under the defined conditions or restrictions.]</i> <i>[For change(s) affecting the initial approval form: reference(s) to additional substantiation(s). This form must be re-issued]</i>	
8. Conditions/Restrictions The above aircraft must be used with the following conditions or restrictions: <i>[Details of these conditions/restrictions, or reference to relevant document, including specific maintenance instructions and conditions to perform these instructions]</i>	
9. Statement The determination of the flight conditions has been made in accordance with the relevant DOA procedure agreed by the Agency. The aircraft as defined in block 6 above has no features and characteristics making it unsafe for the intended operation under the identified conditions and restrictions. <i>[strikethrough what is not applicable]</i>	
10a. Approved under the authority of DOA EASA.21J.xyz <i>[when privilege of 21.A.263(c)(6) applies]</i> 10b. Submitted under the authority of DOA EASA.21J. xyz <i>[when privilege of 21.A.263(c)(6) does not apply]</i>	
11. Date of issue	12. Name and signature <i>[Authorised signatory]</i>
13. EASA approval and date <i>[when privilege of 21.A.263(c)(6) does not apply]</i>	

EASA Form 18A Issue 23

When the privilege of 21.A.263(c)(6) is not applicable, the signed form should be presented by the office of airworthiness (or equivalent) to the Agency.

2.6.2 Approval of changes

Except for changes that do not affect the conditions approved for the issue of the permit to fly, the procedure must specify how changes will be approved by the DOA Holder. The [form of paragraph 2.6.4 EASA Form 18A](#) must be updated.

2.7 Authorised signatories

The person(s) authorised to sign the approval form must be identified (name, signature and scope of authority) in the procedure, or in an appropriate document linked to the DOA handbook.

[Decision 2007/006/R, 5.4.2007]

[Decision 2010/001/R, 30.03.2010]

AMC 21.A.263(c)(7) Procedure for the issue of a permit to fly

1. INTENT

This acceptable means of compliance provides means to develop a procedure for the issue of a permit to fly.

Each DOA applicant or holder must develop its own internal procedure following this AMC, in order to obtain the privilege of 21.A.263(c)(7) to issue permits to fly for aircraft it has designed or modified, or for which it has approved under 21.A.263(c)(6) the conditions under which the permit to fly can be issued, and when the design organisation itself is controlling under its DOA the configuration of the aircraft and is attesting conformity with the design conditions approved for the flight.

2. PROCEDURE FOR THE ISSUE OF A PERMIT TO FLY

2.1 Content

The procedure must address the following points:

- conformity with approved conditions;
- issue of the permit to fly under the DOA privilege;
- authorised signatories;
- interface with the local authority for the flight.

2.2 Conformity with approved conditions

The procedure must indicate how conformity with approved conditions is made, documented and attested by an authorised person.

2.3 Issue of the permit to fly under the DOA privilege

The procedure must describe the process to prepare the EASA Form 20b and how compliance with 21.A.711(b) and (e) is established before signature of the permit to fly.

2.4 Authorised signatories

The person(s) authorised to sign the permit to fly under the privilege of 21.A.263(c)(7) must be identified (name, signature and scope of authority) in the procedure, or in an appropriate document linked to the DOA handbook.

2.5 Interface with the local authority for the flight

The procedure must include provisions describing the communication with the local authority for compliance with the local requirements which are outside the scope of the conditions of 21.A.708(b) (see 21.A.711(e)).

[Decision 2007/006/R, 5.4.2007]

[Decision 2010/001/R, 30.03.2010]

AMC 21.A. 265(a) Administration of the Handbook

1. The handbook of the applicant must be in the language which will permit the best use of it by all personnel charged with the tasks performed for the purpose of the design organisation. The applicant may be requested to provide an English translation of the handbook and other supporting documents as necessary for the investigation.
2. The handbook must be produced in a concise form with sufficient information to meet 21.A.243 relevant to the scope of approval sought by the applicant. The handbook must include the following:
 - a. Organisation name, address, telephone, telex and facsimile numbers.
 - b. Document title, and company document reference No (if any).
 - c. Amendment or revision standard identification for the document.
 - d. Amendment or revision record sheet.
 - e. List of effective pages with revision/date/amendment identification for each page.
 - f. Contents list or index.
 - g. A distribution list for the Handbook.
 - h. An introduction, or foreword, explaining the purpose of the document for the guidance of the organisation's own personnel. Brief general information concerning the history and development of the organisation and, if appropriate, relationships with other organisations which may form part of a group or consortium, must be included to provide background information for the Agency.
 - i. The certificate of approval must be reproduced in the document.
 - j. Identification of the department responsible for administration of the Handbook.

Note: In the case of an initial or revised approval it is recognised that certificate will be issued after EASA agreement to the handbook content in draft form. Arrangements for formal publication in a timely manner must be agreed before the certificate of approval is issued.
3. An updating system must be clearly laid down for carrying out required amendments and modifications to the handbook.
4. The handbook may be completely or partially integrated into the company organisation manual. In this case, identification of the information required by 21.A.243 must be provided by giving appropriate cross-references, and these documents must be made available, on request, to the Agency.

GM 21.A.265(b) Use of the Handbook

1. The handbook should be signed by the Chief Executive and the Head of the design organisation and declared as a binding instruction for all personnel charged with the development and type investigation of products.
2. All procedures referenced in the handbook are considered as parts of the handbook and therefore as basic working documents.

Subpart K — Parts and appliances

AMC 21.A.303(c) Standard Parts

1. In this context a part is considered as a 'standard part' where it is designated as such by the design approval holder responsible for the product, part or appliance, in which the part is intended to be used. In order to be considered a 'standard part', all design, manufacturing, inspection data and marking requirements necessary to demonstrate conformity of that part should be in the public domain and published or established as part of officially recognised Standards, or
2. For sailplanes and powered sailplanes, where it is a non-required instrument and/or equipment certified under the provision of CS 22.1301(b), if that instrument or equipment, when installed, functioning, functioning improperly or not functioning at all, does not in itself, or by its effect upon the sailplane and its operation, constitute a safety hazard.

'Required' in the term 'non-required' as used above means required by the applicable [airworthiness code certification specifications](#) (CS 22.1303, 22.1305 and 22.1307) or required by the relevant operating regulations and the applicable Rules of the Air or as required by Air Traffic Management (e.g. a transponder in certain controlled airspace).

Examples of equipment which can be considered standard parts are electrical variometers, bank/slip indicators ball type, total energy probes, capacity bottles (for variometers), final glide calculators, navigation computers, data logger / barograph / turnpoint camera, bug-wipers and anti-collision systems.

Equipment which must be approved in accordance to the [airworthiness code certification specifications](#) shall comply with the applicable ETSO or equivalent and is not considered a standard part (e.g. oxygen equipment).

[Decision 2006/13/R, 27.12.2006]

GM No. 2 to 21.A.303(c) Officially recognised Standards

In this context 'officially recognised Standards' means:

1. Those standards established or published by an official body whether having legal personality or not, which are widely recognised by the air transport sector as constituting good practice.
2. The standard used by the manufacturer of the equipment as mentioned in paragraph 2 of AMC 21.A.303(c).

[Decision 2006/13/R, 27.12.2006]

Subpart M — Repairs**GM 21.A.431(a) Scope**

Manuals and other instructions for continued airworthiness (such as the Manufacturers Structural Repair Manual, Maintenance Manuals and Engine Manuals provided by the holder of the type-certificate, supplemental type-certificate, ~~design approval~~ or APU ETSO authorisation as applicable) for operators, contain useful information for the development and approval of repairs.

When these data are explicitly identified as approved, they may be used by operators without further approval to cope with anticipated in-service problems arising from normal usage provided that they are used strictly for the purpose for which they have been developed.

Approved data is data which is approved either by the Agency, or by an appropriately approved design organisation.

NB: Flow Chart 1 addresses the procedures that should be followed for products where the State of design is a Member State

Flow Chart 2 addresses procedures that should be followed for products where the State of design is not a Member State.

When specific repair data is approved outside of the Community, conditions for acceptance may be defined in the bilateral arrangements between the Community and the competent authority of a third country. In the absence of such arrangement, the repair data shall follow the approval route as if it was designed and approved within the Community.

GM 21.A.431(d) Repairs to ETSO articles other than an APU

A repair to an ETSO article ~~under 21A.611 has to~~ other than an APU can be either be seen:

1. Under 21.A.611 in the context of an ETSO authorisation, i.e., when an article as such is specifically approved under Subpart O, with dedicated rules that give specific rights and obligations to the designer of the article, irrespective of any product type design or change to the type design. For a repair to such an article, irrespective of installation on any aircraft, Subpart O, and 21.A.611 in particular, should be followed; or
2. When an airline or a maintenance organisation is designing a new repair (based on data not published in the TC holder or Original Equipment Manufacturer documentation) on an article installed on an aircraft, such a repair can be considered as a repair to the product in which the article is installed, not to the article taken in isolation. Therefore Subpart M can be used for the approval of this repair, that will be identified as 'repair to product x affecting article y', but not 'repair to article y'.

AMC 21.A.433 (a) and 21.A.447 Repair design and record keeping

1. Relevant substantiation data associated with a new major repair design and record keeping should include:
 - a. damage identification and reporting source,
 - b. major repair design approval sheet identifying applicable ~~requirements~~ specifications and references of justifications,
 - c. repair drawing and/or instructions and scheme identifier,
 - d. correspondence with the TC, STC, ~~design approval~~ or ETSO ~~APU~~ ETSO authorisation holder, if its advice on the design has been sought,
 - e. structural justification (static strength, fatigue, damage tolerance, flutter etc.) or references to this data,
 - f. effect on the aircraft, engines and/or systems, (performance, flight handling, etc., as appropriate)

- g. effect on maintenance programme,
 - h. effect on Airworthiness limitations, the Flight Manual and the Operating Manual,
 - i. weight and moment change,
 - j. special test requirements.
2. Relevant minor repair documentation includes paragraphs 1(a) and (c). Other points of paragraph 1 may be included where necessary. If the repair is outside the approved data, justification for classification is required.
 3. Special consideration should be given to repairs that impose subsequent limitations on the part, product or appliance, (e.g., engine turbine segments that may only be repaired a finite number of times, number of repaired turbine blades per set, oversizing of fastener holes, etc.).
 4. Special consideration should also be given to Life Limited parts and Critical Parts, notably with the involvement of the type-certificate or STC holder, when deemed necessary under 21.A.433 (b).
 5. Repairs to engine or APU critical parts would normally only be accepted with the involvement of the TC holder.

GM 21.A.435(a) Classification of repairs

1. Clarification of the terms Major/Minor

In line with the definitions given in 21.A.91, a new repair is classified as 'major' if the result on the approved type design has an appreciable effect on structural performance, weight, balance, systems, operational characteristics or other characteristics affecting the airworthiness of the product, part or appliance. In particular, a repair is classified as major if it needs extensive static, fatigue and damage tolerance strength justification and/or testing in its own right, or if it needs methods, techniques or practices that are unusual (i.e., unusual material selection, heat treatment, material processes, jiggling diagrams, etc.)

Repairs that require a re-assessment and re-evaluation of the original certification substantiation data to ensure that the aircraft still complies with all the relevant requirements, are to be considered as major repairs.

Repairs whose effects are considered minor and require minimal or no assessment of the original certification substantiation data to ensure that the aircraft still complies with all the relevant requirements, are to be considered 'minor'.

It is understood that not all the certification substantiation data will be available to those persons/organisations classifying repairs. A qualitative judgement of the effects of the repair will therefore be acceptable for the initial classification. The subsequent review of the design of the repair may lead to it being re-classified, owing to early judgements being no longer valid.

2. Airworthiness concerns for Major/Minor classification

The following should be considered for the significance of their effect when classifying repairs. Should the effect be considered to be significant then the repair should be classified 'Major'. The repair may be classified as 'Minor' where the effect is known to be without appreciable consequence.

- i) Structural performance

Structural performance of the product includes static strength, fatigue, damage tolerance, flutter and stiffness characteristics. Repairs to any element of the structure should be assessed for their effect upon the structural performance.

- ii) Weight and balance

The weight of the repair may have a greater effect upon smaller aircraft as opposed to larger aircraft. The effects to be considered are related to overall aircraft centre of

gravity and aircraft load distribution. Control surfaces are particularly sensitive to the changes due to the effect upon the stiffness, mass distribution and surface profile which may have an effect upon flutter characteristics and controllability.

iii) Systems

Repairs to any elements of a system should be assessed for the effect intended on the operation of the complete system and for the effect on system redundancy. The consequence of a structural repair on an adjacent or remote system should also be considered as above, (for example: airframe repair in area of a static port).

iv) Operational characteristics

Changes may include:

- stall characteristics
- handling
- performance and drag
- vibration

v) Other characteristics

- changes to load path and load sharing
- change to noise and emissions
- fire protection / resistance

Note: Considerations for classifying repairs 'Major/Minor' should not be limited to those listed above.

3. Examples of 'Major' repairs

- i) A repair that requires a permanent additional inspection to the approved maintenance programme, necessary to ensure the continued airworthiness of the product. Temporary repairs for which specific inspections are required prior to installation of a permanent repair do not necessarily need to be classified as 'Major'. Also, inspections and changes to inspection frequencies not required as part of the approval to ensure continued airworthiness do not cause classification as 'Major' of the associated repair.
- ii) A repair to life limited or critical parts.
- iii) A repair that introduces a change to the Aircraft Flight Manual.

GM 21.A.437 Issue of repair design approval

1) Approval by DOA holder

Approval of repairs through the use of procedures agreed with the Agency, means an approval issued by the DOA holder without requiring Agency involvement. The Agency will monitor application of this procedure within the surveillance plan for the relevant organisation. When the organisation exercises this privilege, the repair release documentation should clearly show that the approval is under their DOA privilege.

2) Previously approved data for other applications

When it is intended to use previously approved data for other applications, it is expected that applicability and effectiveness would be checked with an appropriately approved design organisation. After damage identification, if a repair solution exists in the available approved data, and if the application of this solution to the identified damage remains justified by the previous approved repair design, (structural justifications still valid, possible airworthiness limitations unchanged), the solution can be considered approved and can be used again.

3) Temporary repairs.

These are repairs that are life limited, to be removed and replaced by a permanent repair after a limited service period. These repairs should be classified under 21.A.435 and the service period defined at the approval of the repair.

4) Fatigue and damage tolerance.

When the repaired product is released into service before the fatigue and damage tolerance evaluation has been completed, the release should be for a limited service period, defined at the issue of the repair.

GM 21.A.437(a) Issue of repair design approval

- 1) Products first type-certificated by the Agency or first type-certificated by a Member State (covering products type-certificated through JAA procedures or under national regulations and products certificated nationally without a type-certificate).
 - i) Agency approval is required in cases of major repairs proposed by design organisation approval holders, not being the TC, STC or STCAPU ETSO authorisation holder, and in cases of minor repairs proposed by persons not holding a design organisation approval.
 - ii) Agency approval may be required in cases of major repairs proposed by design organisation approval holders, being the TC, STC or STCAPU ETSO authorisation holder, if the major repair is:
 - related to new interpretation of the airworthiness—requirementcertification specification as used for type certification.
 - related to different means of compliance from that used for type certification.
 - related to the application of airworthiness requirementscertification specification different from that used for type certification.

Note: This should be established at the time of DOA approval.

2) Products first type-certificated by the competent authority of a third country.

Agency approval is always required for major repairs on products first type-certificated by the competent authority of a third country. Approval privileges extended to TC holders (noted in 21.A.437(b) are not extended to TC holders of products first type-certificated by the competent authority of a third country. Type-certificate holders of those types may need to be involved when an arrangement with the TC holder has been determined necessary under 21.A.433(b).

For repairs approved outside of the Community conditions for acceptance may be defined in the bilateral arrangement between the Community and the competent authority of a third country. In the absence of such arrangement, the repair data shall follow the approval route as if it was designed and approved within the EU.

AMC 21.A.437(b) Issue of repair design approval

In order for the approved design organisation that is also the type-certificate, supplemental type-certificate or APU ETSO authorisation holder to approve 'Major' repair design the following should be considered applicable:

- i) The type-certificate, supplemental type-certificate or APU ETSO authorisation holder being approved under Part 21 Subpart J.
- ii) Procedures having been established that comply with Part 21 Subpart M as agreed with the Agency.
- iii) The type-certification basis for the product, part or appliance to be repaired having been identified together with all other relevant requirements.
- iv) All records and substantiation data including documents showingdemonstrating compliance with all relevant airworthiness—requirementscertification specifications being held for reviews by the Agency.

- v) A summary list of all major repair approvals being provided to the Agency on a regular basis as agreed with the Agency.
- vi) Whether the repair design is affected by the presence of any supplemental type-certificate.

GM 21.A.439 Production of repair parts

A maintenance body, (organisation or person), may manufacture parts for repair purposes when in accordance with Subpart F or when approved under Subpart G of Part 21. In addition, a maintenance organisation may manufacture parts for its own repair purposes when expressly authorised by the competent authority of the Member State in accordance with the applicable implementing rules.

GM 21.A.441 Repair Embodiment

Repairs should be accomplished by an organisation or person in accordance with the relevant implementing rules.

The holder of a production organisation approval under Subpart G of Part 21 may accomplish repairs to new aircraft, within its terms of approval, under the privilege of 21.A.163(d).

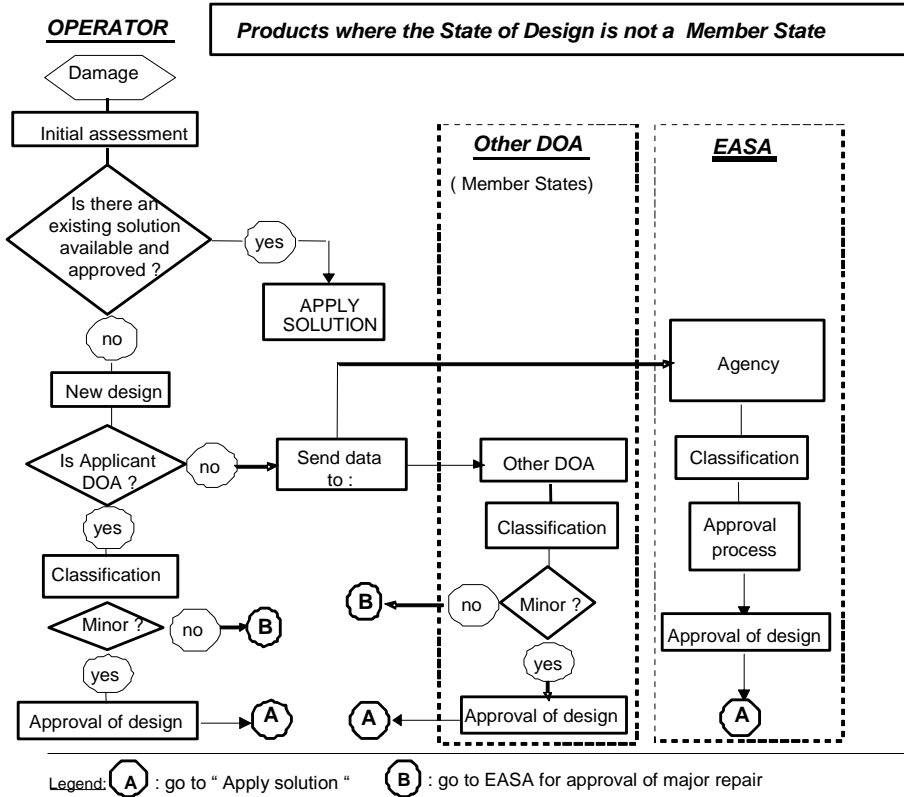
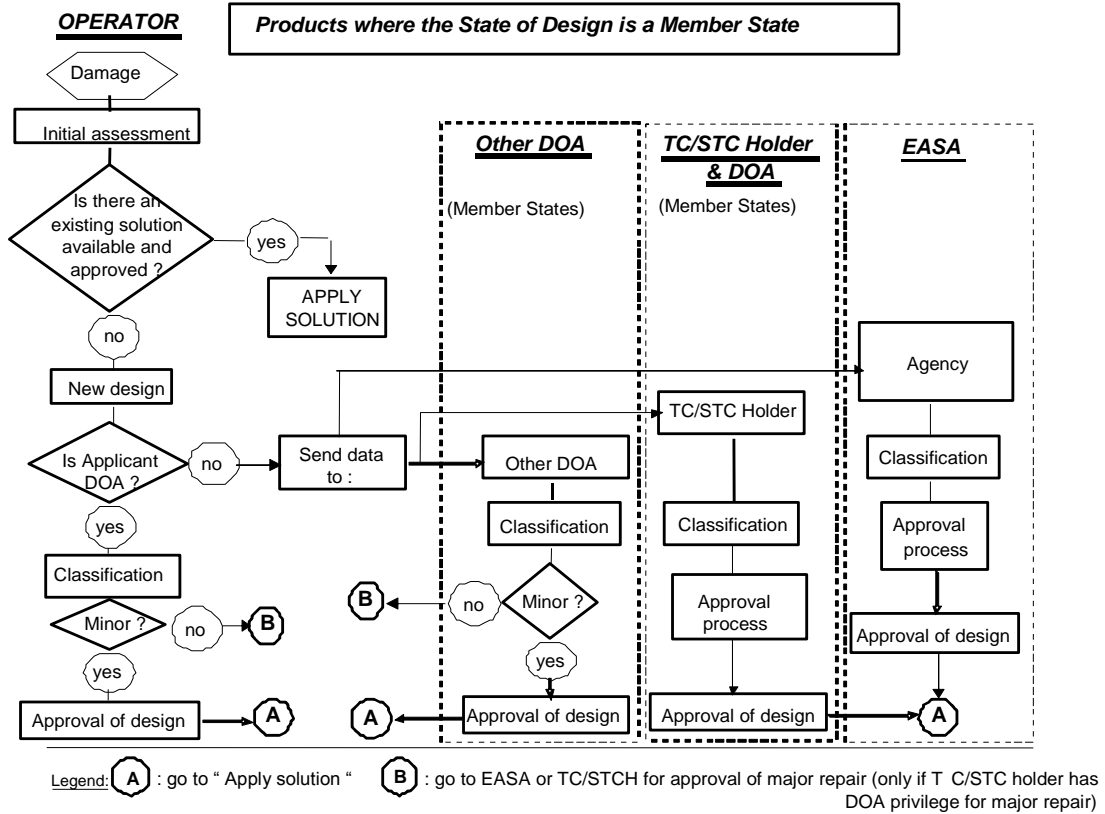
GM 21.A.443 Limitations

Instructions and limitations associated with repairs should be specified and controlled by those procedures required by the applicable operations rules.

GM 21.A.445 Unrepaired damage

This is not intended to supersede the normal maintenance practices defined by the type-certificate holder, (e.g., blending out corrosion and re-protection, stop drilling cracks, etc.), but addresses specific cases not covered in the manufacturer's documentation.

SECTION A — Subpart M — Repairs



Subpart O — European Technical Standard Order Authorisations**AMC 21.A.602B(b)(2) Procedures for ETSO authorisations**

1. Scope
 - 1.1 A manual of procedures must set out specific design practices, resources and sequence of activities relevant for the specific projects, taking account of Part 21 requirements.
 - 1.2 These procedures must be concise and limited to the information needed for quality and proper control of activities by the applicant/holder, and by the Agency.
2. Management of the ETSO authorisation process
- 2.4 ~~For ETSO authorisation, a A procedure explaining how the application to the Agency certification process to obtain an ETSOA will be made following the principles of AMC 21A.14(b), paragraph 2.1, 2.2 and 2.3, with the necessary adaptation related to Part 21 Section A Subpart O context certification process to obtain an ETSOA will be made,~~ must be established.
3. Management of design changes
 - 3.1 A procedure ~~following the principles of AMC 21A.14(b), paragraphs 3.2 and 3.3, with the necessary adaptation to take~~**taking** into account 21.A.611, must be established for the classification and approval of design changes on articles under ETSO authorisation
 - 3.2 Repairs and production deviations from the approved design data
~~A p~~**P**rocedure ~~following the principles of paragraph 3.1 must be established~~ for the classification and approval of repairs and unintentional deviations from the approved design data occurring in production (concessions or non-conformance's) **must be established.** ~~For repairs, the procedure must be established in accordance with Part 21 Section A Subpart M and associated AMC or GM. For deviations, the procedure must be established in accordance with 21A.610~~
4. Obligations addressed in 21.A.609

The applicant should establish the necessary procedures to show to the Agency how it will fulfil the obligations under 21.A.609.

For issue of information and instructions, a procedure following the principles of AMC 21.A.14(b), paragraph 4 must be established.
5. Control of design sub-contractors

The applicant must establish the necessary procedures to show to the Agency how it will control design sub-contractors.

AMC 21.A.608 Declaration of Design and Performance

STANDARD FORM

DDP No.

ISSUE No.

1. Name and address of manufacturer.
2. Description and identification of article including:
 - Type No
 - Modification Standard
 - Master drawing record
 - Weight and overall dimensions
3. Specification reference, i.e., ETSO No. and Manufacturer's design specification.
4. The rated performance of the article directly or by reference to other documents.
5. Particulars of approvals held for the equipment.
6. Reference to qualification test report.
7. Service and Instruction Manual reference number.
8. Statement of compliance with the appropriate ETSO and any deviations therefrom.
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 requirementsspecifications 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.

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 applicable issue of EUROCAE ED-12/RTCA industry document DO-178, referred in the latest edition of AMC 20-115)

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.)

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

.....(name of manufacturer)

(Manufacturer's name) cannot accept responsibility for equipment used outside the limiting conditions stated above without their agreement.

Date:Signed.....(Manufacturer's authorised representative)

[Decision 2010/016/R, 16.12.2010]

GM to 21.A.611 Design changes

A change to an ETSO article can either be seen:

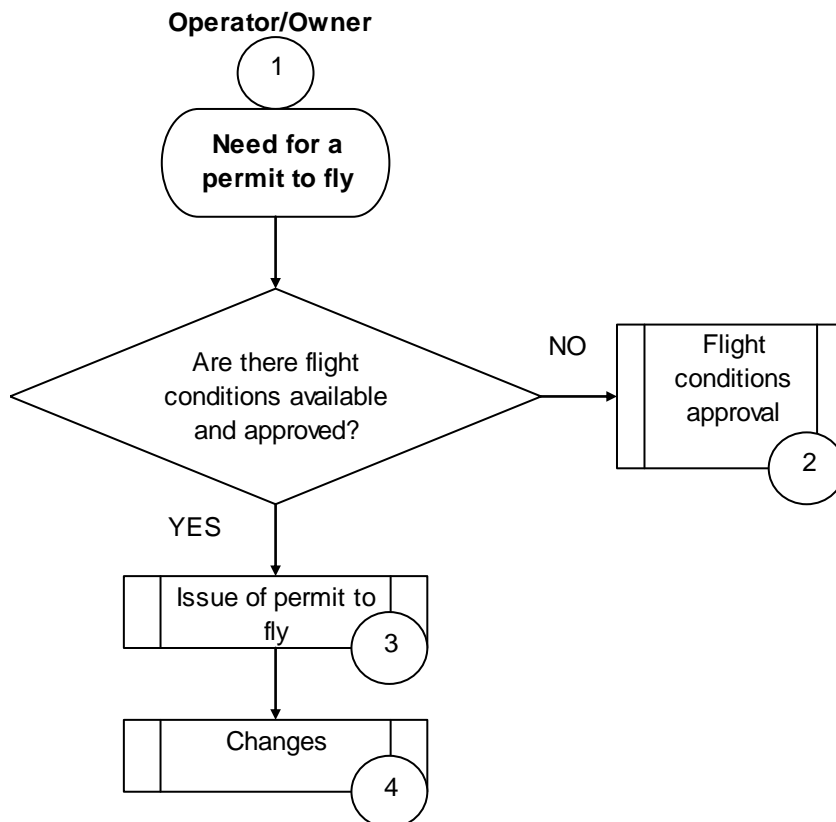
- under this 21.A.611 in the context of an ETSO authorisation, i.e., when an article as such is specifically approved under Subpart O, with dedicated rules that give specific rights and obligations to the designer of the article, irrespective of any product type design or change to the type design. For a change to such an article, irrespective of installation on any aircraft, Subpart O, and this 21.A.611 in particular, should be followed; or
- when an airline or a maintenance organisation is designing a change (based on data not published in the TC holder or Original Equipment Manufacturer documentation) on an article installed on an aircraft, such a change can be considered as a change to the product in which the article is installed, not to the article taken in isolation. Therefore Subpart D can be used for the approval of this change that will be identified as 'change to product x affecting article y', but not 'change to article y'.

[Decision 2009/011/R, 24.8.2009]

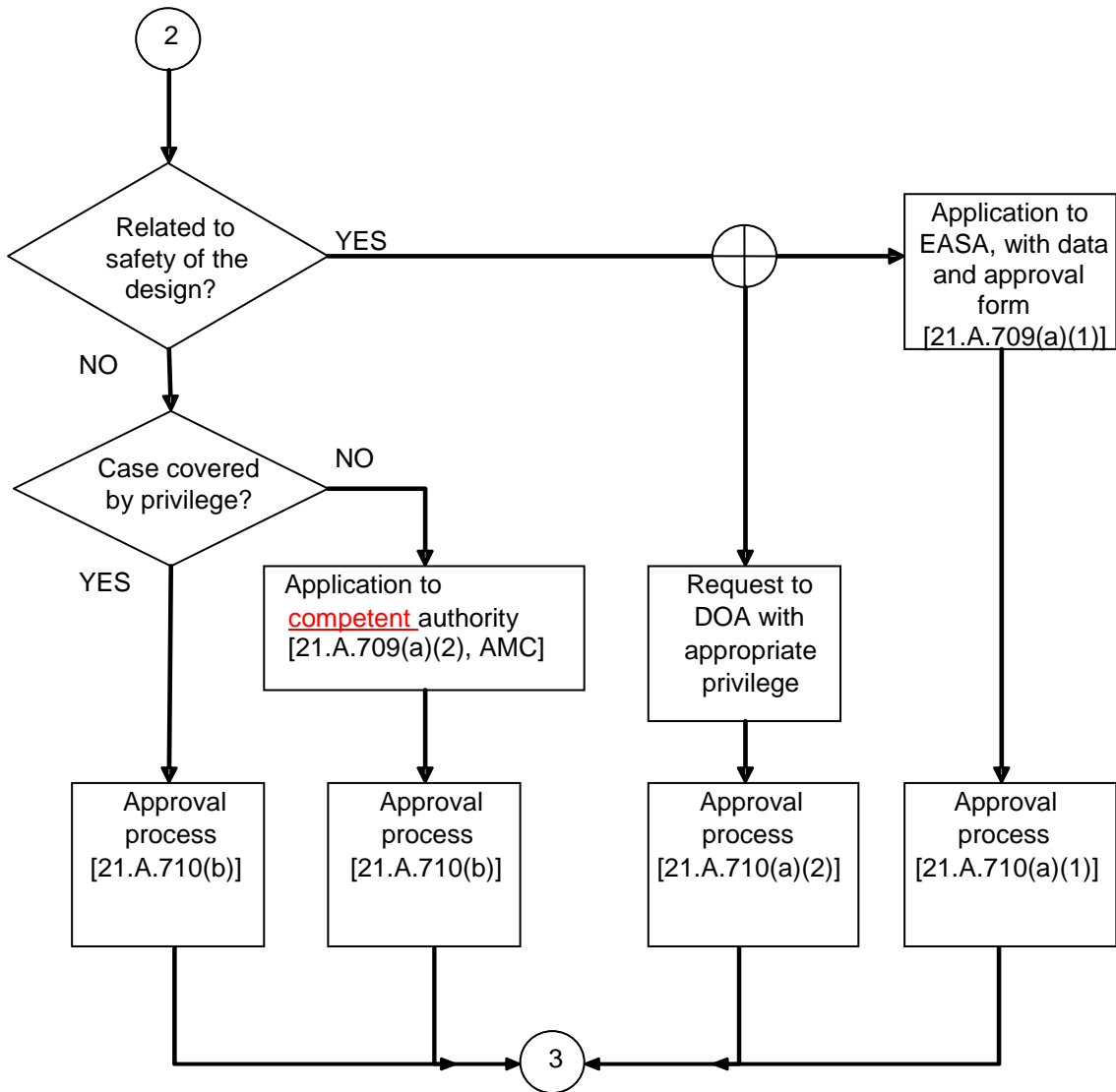
Subpart P — Permit to Fly**GM to Subpart P**

The process allowing a flight under a permit to fly can be described as follows:

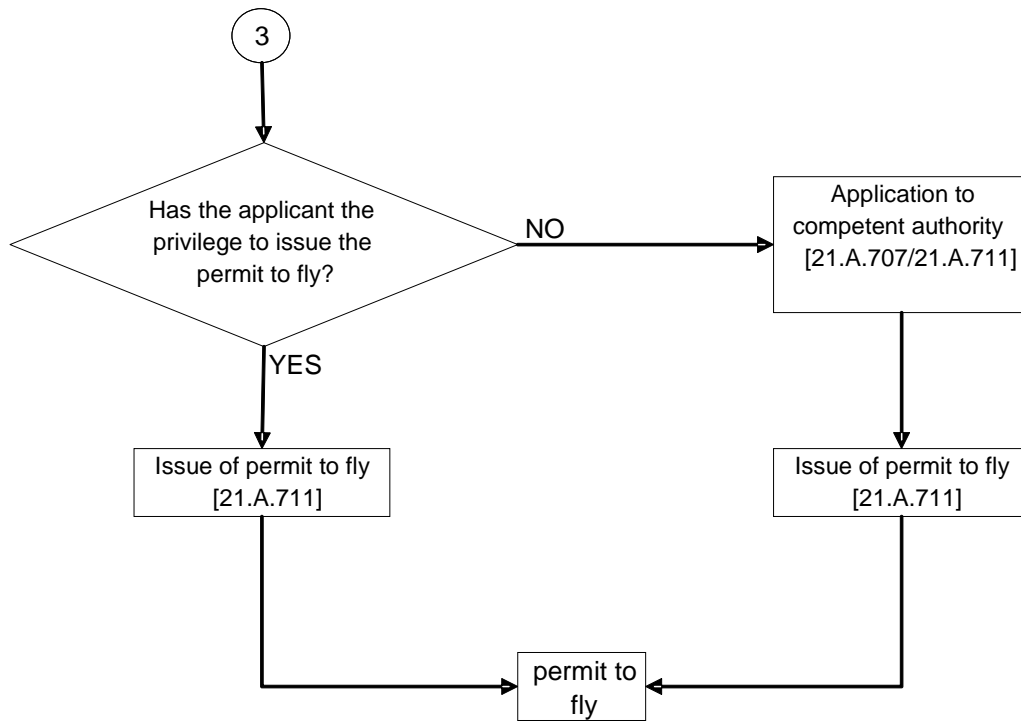
1. Flow-chart 1: overview
2. Flow-chart 2: approval of flight conditions
3. Flow-chart 3: issue of permit to fly
4. Flow-chart 4: changes after first issue of permit to fly

Flow-chart 1: overview

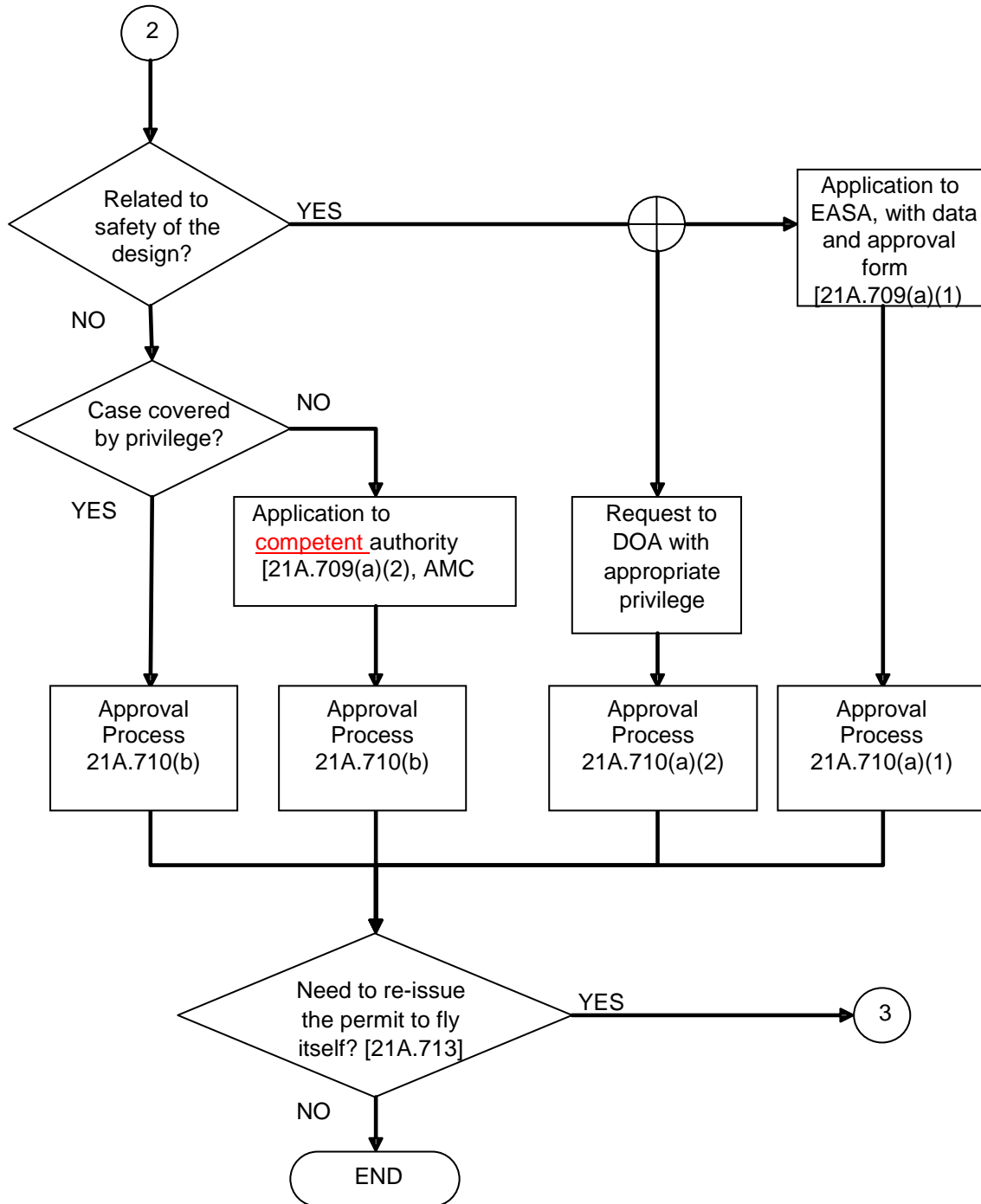
Flow-chart 2: approval of flight conditions



Flow-chart 3: issue of permit to fly



Flow-chart 4: changes after first issue of permit to fly



[Decision 2007/006/R, 5.4.2007]
 [Decision 2010/001/R, 30.03.2010]

GM 21.A.701(a) Permit to fly when certificate of airworthiness or restricted certificate of airworthiness is not appropriate

A certificate of airworthiness or restricted category certificate of airworthiness may not be appropriate for an individual aircraft or aircraft type when it is not practicable to comply with the normal continued airworthiness requirements and the aircraft is to a design standard that is demonstrated to be capable of safe flight under defined conditions. [Paragraph-Point 21.A.701](#) identifies cases where the issuance

of a (restricted) certificate of airworthiness may not be possible or appropriate and this [paragraph GM](#) provides further information and typical examples for clarification where appropriate: -

Note: This list of examples is not exhaustive

- (1) Development:
 - testing of new aircraft or modifications
 - testing of new concepts of airframe, engine, propeller and equipment;
 - testing of new operating techniques;
- (2) [Showing Demonstration of](#) compliance with regulations or certification specifications:
 - certification flight testing for type certification, supplemental type certificates, changes to type certificates or ETSO authorisation;
- (3) Design organisations or production organisations crew training:
 - Flights for training of crew that will perform design or production flight testing before the design approval [and/or](#) Certificate of Airworthiness (C of A) can be issued.
- (4) Production flight testing of new production aircraft:
 - For establishing conformity with the approved design, typically this would be the same program for a number of similar aircraft;
- (5) Flying aircraft under production between production facilities:
 - green aircraft ferry for follow on final production.
- (6) Flying the aircraft for customer acceptance:
 - Before the aircraft is sold and/or registered.
- (7) Delivering or exporting the aircraft:
 - Before the aircraft is registered in the State where the C of A will be issued.
- (8) Flying the aircraft for Authority acceptance:
 - In the case of inspection flight test by the authority before the C of A is issued.
- (9) Market survey, including customer's crew training:
 - Flights for the purpose of conducting market survey, sales demonstrations and customer crew training with non type-certificated aircraft or aircraft for which conformity has not yet been established or for non-registered a/c and before the Certificate of Airworthiness is issued.
- (10) Exhibition and air show:
 - Flying the aircraft to an exhibition or show and participating to the exhibition or show before the design approval is issued or before conformity with the approved design has been shown.
- (11) Flying the aircraft to a location where maintenance or airworthiness review are to be performed, or to a place of storage:
 - Ferry flights in cases where maintenance is not performed in accordance with approved programmes, where an AD has not been complied with where certain equipment outside the Master Minimum Equipment List (MMEL) is unserviceable or when the aircraft has sustained damage beyond the applicable limits.
- (12) Flying an aircraft at a weight in excess of its maximum certificated take-off weight for flight beyond the normal range over water, or over land areas where adequate landing facilities or appropriate fuel is not available:
 - Oversees ferry flights with additional fuel capacity.
- (13) Record breaking, air racing or similar competition:
 - Training flight and positioning flight for this purpose are included

- (14) Flying aircraft meeting the applicable ~~airworthiness requirements~~certification specifications before conformity to the environmental requirements has been found:
- Flying an aircraft which has been ~~shown~~demonstrated to comply with all applicable ~~airworthiness requirements~~certification specifications but not with environmental requirements.
- (15) For non-commercial flying activity on individual non-complex aircraft or types for which a certificate of airworthiness or restricted certificate of airworthiness is not appropriate.
- For aircraft which cannot practically meet all applicable ~~airworthiness requirements~~certification specifications, such as certain aircraft without TC-holder ('generically termed orphan aircraft') or aircraft which have been under national systems of Permit to Fly and have not been ~~shown~~demonstrated to meet all applicable requirements. The option of a permit to fly for such an aircraft should only be used if a certificate of airworthiness or restricted certificate of airworthiness cannot be issued due to conditions which are outside the direct control of the aircraft owner, such as the absence of properly certified spare parts.

Note: The above listing is of cases when a permit to fly MAY be issued; it does not mean that in the described cases a permit to fly MUST be issued. If other legal means are available to allow the intended flight(s) they can also be used.

[Decision 2007/006/R, 5.4.2007]

[Decision 2010/001/R, 30.03.2010]

GM 21.A.701 Scope

An aircraft registered outside the Member States and used for flight testing by an organisation which has its principle place of business in a Member State, remains under the authority of its state of registry. The Agency or an appropriately approved design organisation can provide, on request, technical assistance to the state of registry for the issue of a permit to fly, or equivalent authorisation, under the state of registry applicable regulations.

[Decision 2007/006/R, 5.4.2007]

GM 21.A.703 Applicant for a permit to fly

1. The applicant for a permit to fly may be a person other than the registered owner of the aircraft. As the holder of this permit will be responsible for ensuring that all the conditions and limitations associated with the permit to fly are continuously satisfied, the applicant for the permit should be a person or organisation suitable for assuming these responsibilities. In particular, the organisations designing, modifying or maintaining the aircraft should normally be the holder of the associated permits to fly.
2. An appropriately approved design organisation can apply for the approval of the flight conditions when using its privilege in accordance with 21.A.263(b)(1).

[Decision 2007/006/R, 5.4.2007]

GM 21.A.705 Competent authority

An aircraft registered in a Member State is under the responsibility of this Member State for continuing airworthiness aspects. Consequently, any permit to fly under Part 21 should be issued by that Member State including cases where the aircraft will fly in another State. The permit to fly contains all the conditions and restrictions to ensure safe flight but other airspace and operational rules remain the competence of the authority of the State where the flight will take place. The applicant should therefore also ensure compliance with the relevant regulations of that State.

[Decision 2007/006/R, 5.4.2007]

GM 21.A.707(b) Application

EASA Form 21 (see AMC 21.B.520(b)) should be obtained from the competent authority.

[Decision 2007/006/R, 5.4.2007]

GM 21.A.708(b)(6) Continuing airworthiness

In most cases a simple reference to existing maintenance requirements will suffice for aircraft that have a temporarily invalid C of A.

For other aircraft it will have to be proposed by the applicant as part of the flight conditions. For approved organisations they can be included in their procedures.

[Decision 2007/006/R, 5.4.2007]

GM No. 1 to 21.A.708(c) Safe flight

Safe flight normally means continued safe flight and landing but in some limited cases (e.g. higher risk flight testing) it can mean that the aircraft is able to fly in a manner that will primarily ensure the safety of overflown third parties, the flight crew and, if applicable other occupants.

This definition of 'safe flight' should not be interpreted as allowing a test pilot, equipped with a parachute and operating over a sparsely populated area, to set out on a test flight in the full knowledge that there is a high probability of losing the aircraft. The applicant should take reasonable care to minimise safety risks and to be satisfied that there is a reasonable probability that the aircraft will carry out the flight without damage or injury to the aircraft and its occupants or to other property or persons whether in the air or on the ground.

[Decision 2007/006/R, 5.4.2007]

GM No. 2 to 21.A.708(c) Substantiations

The substantiations should include analysis, calculations, tests or other means used to determine under which conditions or restrictions the aircraft can perform safely a flight.

[Decision 2007/006/R, 5.4.2007]

GM No. 3 to 21.A.708(c) Operation of Overweight Aircraft

This GM provides information and guidance with respect to permit to fly for operating an aircraft in excess of its maximum certificated take-off weight, for flight beyond the normal range over water, or over land areas where adequate landing facilities or appropriate fuel is not available.

1. GENERAL.

The excess weight that may be authorized for overweight operations should be limited to additional fuel, fuel carrying facilities, and navigational equipment necessary for the flight.

It is recommended that the applicant discuss the proposed flight with the TC holder of the aircraft to determine the availability of technical data on the installation of additional fuel carrying facilities and/or navigational equipment.

2. CRITERIA USED TO DETERMINE THE SAFETY OF ADDITIONAL FACILITIES.

In evaluating the installation of additional facilities, the Agency or the design organisation must find that the changed aircraft is safe for operation. To assist in arriving at such a determination, the following questions are normally considered:

- a. Does the technical data include installation drawings, structural substantiating reports, weight, balance, new centre of gravity limits computations, and aircraft performance limitations in sufficient detail to allow a conformity inspection of the aircraft to be made?
- b. In what ways does the aircraft not comply with the applicable [airworthiness requirements](#)[certification specifications](#)?

- c. Are the fuel tanks vented to the outside? Are all areas in which tanks are located ventilated to reduce fire, explosion, and toxicity hazards?
- d. Are the tanks even when empty strong enough to withstand the differential pressure at maximum operating altitude for a pressurized aircraft?
- e. Have means been provided for determining the fuel quantity in each tank prior to flight?
- f. Are shutoff valves, accessible to the pilot, provided for each additional tank to disconnect these tanks from the main fuel system?
- g. Are the additional fuel tank filler connections designed to prevent spillage within the aircraft during servicing?
- h. Is the engine oil supply and cooling adequate for the extended weight and range?

3. LIMITATIONS.

The following types of limitations may be necessary for safe operation of the aircraft:

- a. Revised operational airspeeds for use in the overweight condition.
- b. Increased pilot skill requirements.
- c. A prescribed sequence for using fuel from various tanks as necessary to keep the aircraft within its centre of gravity range.
- d. Notification to the control tower of the overweight take-off condition to permit use of a runway to minimize flight over congested areas.
- e. Avoidance of severe turbulence. If encountered, the aircraft should be inspected for damage as soon as possible.

EXAMPLE of operating limitations which may be prescribed as part of the permit to fly:

Aircraft type: xxxxxx Model: yyyy

Limitations:

- 1. Maximum weight must not exceed 8 150 pounds.
- 2. Maximum quantity of fuel carried in auxiliary tanks must not exceed 106 gallons in fwd tank, 164 gallons in centre tank, and 45 gallons in aft tank.
- 3. Centre of gravity limits must not exceed (fwd) +116.8 and (aft) +124.6.
- 4. Aerobatics are prohibited.
- 5. Use of autopilot while in overweight condition is prohibited.
- 6. Weather conditions with moderate to severe turbulence should be avoided.
- 7. When an overweight landing is made or the aircraft has been flown through moderate or severe turbulence while in an overweight condition, the aircraft must be inspected for damage after landing. The inspections performed and the findings must be entered in the aircraft log. The pilot must determine, before the next take-off, that the aircraft is airworthy.
- 8. When operated in the overweight condition, the cruising speed (V_c) shall not exceed 185 m.p.h. and the maximum speed (V_{ne}) shall not exceed 205 m.p.h.
- 9. Operation in the overweight condition must be conducted to avoid areas having heavy air traffic, to avoid cities, towns, villages, and congested areas, or any other areas where such flights might create hazardous exposure to person or property on the ground.

[Decision 2007/006/R, 5.4.2007]

GM 21.A.708(d) Control of aircraft configuration

The applicant should establish a method for the control of any change or repair made to the aircraft, for changes and repairs that do not invalidate the conditions established for the permit to fly.

All other changes should be approved in accordance with 21.A.713 and when necessary a new permit to fly should be issued in accordance with 21.A.711.

[Decision 2007/006/R, 5.4.2007]

AMC 21.A.709(b) Submission of documentation supporting the establishment of flight conditions

Together with the application, the documentation required by 21.A.709(b) must be submitted with the approval form (EASA Form 18B) defined below, completed with all relevant information. If the complete set of data is not available at the time of application, the missing elements can be provided later. In such cases, the approval form must be provided only when all data are available, to allow the applicant to make the statement required in box 8-9 of the form.

FLIGHT CONDITIONS FOR A PERMIT TO FLY – APPROVAL FORM	
1. Applicant <i>[Name of organisation providing the flight conditions and associated substantiations]</i>	2. Approval form No: Issue: <i>[Number and issue, for traceability purpose]</i>
3. Aircraft manufacturer/type	4. Serial number(s)
5. Purpose <i>[Purpose in accordance with 21.A.701(a)]</i>	
6. Aircraft configuration The above aircraft for which a permit to fly is requested is defined in <i>[add reference to the document(s) identifying the configuration of the aircraft]</i> <i>[For change(s) affecting the initial approval form: description of change(s). This form must be re-issued]</i>	
7. Substantiations <i>[References to the document(s) justifying that the aircraft (as described in 56) can perform the intended flight(s) safely under the defined conditions or restrictions.]</i> <i>[For change(s) affecting the initial approval form: reference(s) to additional substantiation(s). This form must be re-issued]</i>	
8. Conditions/Restrictions The above aircraft must be used with the following conditions or restrictions: <i>[Details of these conditions/restrictions, or reference to relevant document, including specific maintenance instructions and conditions to perform these instructions]</i>	
9. Statement The flight conditions have been established and justified in accordance with 21.A.708. The aircraft as defined in block 6 above has no features and characteristics making it unsafe for the intended operation under the identified conditions and restrictions. <i>[when approved under a privilege of an approved organisation]</i>	
10. Approved under <i>[ORGANISATION APPROVAL NUMBER]</i>	
11. Date of issue	12. Name and signature <i>[Authorised signatory]</i>
<i>[when not approved under a privilege of an approved organisation]</i>	
13. Approval and date <i>[the appropriate approval: EASA, competent authority]</i>	

EASA Form 18B Issue [23](#)

When the flight conditions are approved under a privilege, this form should be used by the approved organisation to document the approval.

*[Decision 2007/006/R, 5.4.2007]
[Decision 2010/001/R, 30.03.2010]*

GM 21.A.710 Approval of flight conditions

1. The approval of flight conditions is related to the safety of the design, when:
 - a. the aircraft does not conform to an approved design; or
 - b. an Airworthiness Limitation, a Certification Maintenance Requirement or an Airworthiness Directive has not been complied with; or
 - c. the intended flight(s) are outside the approved envelope;
 - d. the permit to fly is issued for the purpose of 21.A.701(a)(15).
2. Examples when the approval of flight conditions is not related to the safety of the design are:
 - a. production flight testing for the purpose of conformity establishment;
 - b. delivery / export flight of a new aircraft the design of which is approved;
 - c. demonstrating continuing conformity with the standard previously accepted by the Agency for the aircraft or type of aircraft to qualify or re-qualify for a (restricted) certificate of airworthiness.

[Decision 2007/006/R, 5.4.2007]

GM 21.A.711(e) Additional conditions and restrictions

The conditions and restrictions prescribed by the competent authority may include airspace restrictions to make the conditions approved under 21.A.710 more concrete, or conditions outside the scope of the ones mentioned in 21.A.708(b) such as a radio station license.

[Decision 2007/006/R, 5.4.2007]

[Decision 2010/001/R, 30.03.2010]

GM 21.A.713 Changes

Changes to the conditions or associated substantiations that are approved but do not affect the text on the permit to fly do not require issuance of a new permit to fly.

In case a new application is necessary, the substantiation for approval of the flight conditions only needs to address the change.

[Decision 2007/006/R, 5.4.2007]

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.

[Decision 2007/006/R, 5.4.2007]

Subpart Q — Identification of products, parts and appliances

GM 21.A.804(a)(1) Identification of parts and appliances

It is not the intent of 21.A.804(a)(1) to introduce an obligation for a production organisation (manufacturer) to mark new parts or appliances with information which is not identified by the design approval holder. Therefore, the physical marking of parts and appliances is only required when established by the design approval (TC, STC, ETSO, repair, ~~minor~~ change) holder.

For designs (TC, STC, ETSO, repair, change) approved after 28 December 2009 (the date of entry into force of Commission Regulation (EC) No 1194/2009 ~~amending Regulation 1702/2003~~), the design approval holder is required to identify to the manufacturer how the marking in accordance with 21.A.804(a)(1) should be done. This can be limited to identifying a marking field, possible depth and/or means etc., without prescribing the actual text or symbols to be used.

[Decision 2010/001/R, 30.03.2010]

SECTION B**Subpart A — General provisions****GM 21.B.20 Responsibility for implementation**

Each certificate or approval in accordance with Part 21 Section A Subparts F, G, H, I and P will normally be issued and controlled by the competent authority of the Member State in whose country the applicant or holder is located. Therefore, to ensure consistency between the competent authorities of the Member States in issuing certificates and approvals, implementation of Part 21 should be based on the following three principles:

- a) The establishment and maintenance of an effective organisation and corresponding processes by all competent authorities.
- b) The operation of all competent authorities in accordance with Part 21 and its certification specifications (CS Acceptable Means of Compliance (AMC)) and guidance material (GM).
- c) A standardisation process established and operated by the Agency to assess the standard achieved, and to provide timely advice and guidance to the competent authorities of the Member States.

As a result the responsibility for implementation comprises of the two main objectives:

- a) To ensure that certificates and approvals are only granted to applicants that comply with the requirements of Part 21; and
- b) To ensure sufficient visibility of the processes to give the Agency and the other Member States the necessary confidence in the certificates or approvals granted.

GM 21.B.25(a) Organisation

The competent authority designated by each Member State should have an organisation in such a way that -

- a) there is specific and effective management authority in the conduct of all relevant activities,
- b) the functions and processes described in Part 21 and its CS AMC and GM may be properly implemented,
- c) the competent authority of the Member State policy, organisation and operating procedures for the implementation of Part 21 are properly documented and applied,
- d) all competent authority of the Member State personnel involved in the related activities are provided with training where necessary,
- e) specific and effective provision is made for the communication and interface as necessary with the Agency and the competent authorities of the Member States,
- f) all functions related to the implementation of Part 21 are adequately described and shown (Standardisation).

A general policy in respect of Part 21 activities should be developed, sponsored and implemented by the manager at the highest appropriate level, for example the top of the functional area of the competent authority of the Member State that is responsible for the related matters.

Appropriate steps should be taken to ensure that the policy is known and understood by all staff involved, and all necessary steps should be taken to implement and maintain the policy.

Whilst satisfying also additional national regulatory responsibilities, the general policy should in particular take into account:

- (a) the provisions of the Basic Regulation (EC) No 216/2008
- (b) the provisions of Part 21 and its CS AMC and GM
- (c) the needs of industry
- (d) the needs of the Agency and of the competent authorities of the Member States.

The policy should define specific objectives for key elements of the organisation and processes for implementation of related Part 21 activities, including the corresponding control procedures and the measurement of the achieved standard.

GM 21.B.25(b) Resources

The organisation for related Part 21 activities should be clearly defined within the general organisation of the competent authority of the Member State, with the hierarchical and functional links, and the names of the senior staff. Although final responsibility should be placed at the top of the functional area that is responsible for the related Part 21 activities as a whole, all subordinate levels of management should be suitably resourced and empowered to fulfil their delegated tasks.

The definition of an organisation for the implementation of related Part 21 activities should include the specification of

- a) a manager responsible for the specific Part 21 activity acting as internal and external focal point. The responsibility is best placed with the manager who is in control of the day-to-day functions concerning the specific Part 21 activity, although he may delegate specific tasks to other individuals;
- b) individual or group responsibilities, duties and associated reporting lines;
- c) the resources, human and material;
- d) the documented procedures to be operated in respect of the relevant Part 21 activities.

The various tasks and responsibilities of the personnel involved in the related Part 21 activities should be clearly identified. The authority attached to the responsibilities should be enough to ensure that the activities will be performed correctly.

These responsibilities include among others:

- a) the management of the organisation
- b) the management of investigation teams
- c) the team leadership/membership
- d) the investigation and surveillance activities
- e) the administrative management of certificates and approvals including record keeping
- f) the external and internal interface activities including feedback to the Agency
- g) the control and distribution of documentation

The definition of the organisation should include means to ensure continued effectivity of the organisation. The means should provide for a regular assessment of the organisation and its related activities as well as a feedback system for the follow up of necessary corrective actions (e.g., through the implementation of a quality system, internal audit system, etc.).

GM 21.B.25(c) Qualification and training

The competent authority of the Member State should ensure appropriate and adequate training of its personnel to meet the standard that is considered by the Agency necessary to perform the work. Arrangements should be made for initial and continuation training as required.

It is understood that the basic competence of the competent authority of the Member State staff is a matter of recruitment and normal management functions in selection of staff for particular duties. Moreover, it is understood that the competent authority of the Member State provides training in the basic skills as required for those duties.

However, to avoid differences in understanding and interpretation, it is considered important that all personnel involved in Part 21 activities should be provided with further training specifically related to the relevant Part 21 activity up to the common Agency standard.

The competent authority of the Member State should provide training through its own training organisation with qualified trainers or through another qualified training source (e.g., training provided by other competent authorities, the Agency or qualified entities).

AMC 21.B.30(a) Documented procedures

The various elements of the organisation for the related Part 21 activities must be documented in order to establish a reference source for the establishment and maintenance of this organisation. The documented procedures must be established in a way that it will facilitate its use. They must be clearly identified, kept up-to-date and made readily available to all the personnel involved in the relevant activities.

The documented procedures must cover, as a minimum, the following aspects:

- a) policy and objectives,
- b) organisation structure,
- c) responsibilities and attached authority,
- d) procedures and processes,
- e) internal and external interfaces,
- f) internal control procedures,
- g) training of personnel,
- h) cross-references to associated documents,
- i) assistance from other competent authorities or the Agency (where required).

Except for smaller competent authorities, it is likely that the information is held in more than one document or series of documents, and suitable cross-reference information must be provided. For example, organisational structure and job descriptions are not usually in the same documentation as the detailed working procedures. In such cases it is recommended that the documented procedures include an index of cross-references to all such other related information, and the related documentation must be readily available when required.

AMC 21.B.35(a) Changes

Standardisation is based on the assessment of the organisation and procedures of the competent authorities of the Member States and their implementation and suitability by the Agency. Consequently, a significant change in the competent authority of the Member State organisation and documented procedures validated by the Agency needs a reassessment to maintain the confidence in the standardisation process.

Examples of significant changes include changes in the organisation hierarchy, decision making levels, number and qualification of personnel, etc.

The competent authority of the Member State must notify any of these changes to the Agency and must be prepared to provide any further explanation/information requested by the Agency. The Agency may decide to review the documented organisation and procedures of the competent authority of the Member State and request any clarification or changes. This might also apply when a change in the regulations takes place and the Agency decides that a specific assessment/monitoring of the competent authorities related to that change is necessary.

GM 21.B.40 Principles for the resolution of disputes

It is essential for the efficient accomplishment of the competent authority of the Member State activities related to Part 21 that all decisions regarding the resolution of disputes are taken at as low a level as possible. In addition the documented procedures for the resolution of disputes should clearly identify the chain of escalation.

GM No. 1 to 21.B.45 Co-ordination with other related activities

The purpose of co-ordination with other related activities is to

- a) harmonise the effects of various approval and certification teams especially when dealing with one organisation / applicant to prevent conflicts of conclusions,
- b) ensure efficient flow of information between the various approval and certification teams to facilitate the execution of their duties

- c) optimise the use of the Agency and the competent authorities resources to minimise disruption and cost.

Therefore, for a given organisation / applicant the responsible person(s) of the Agency or competent authorities of the Member State should arrange for exchange of information with, and provide necessary assistance, as appropriate, to the relevant competent authority of the Member State or Agency teams or staff - e.g.:

- a) the appropriate certification teams;
- b) the design organisation approval team;
- c) the production organisation approval team;
- d) the maintenance organisation approval team; or
- e) other approval or certification teams as appropriate.

GM No. 2 to 21.B.45 Co-ordination

An exchange of information should especially take place in accordance with Article 40~~15~~ of the Basic Regulation (EC) No 216/2008:

- a) an immediate reaction of a competent authority of the Member State to a safety problem
- b) granting of exemptions by the competent authority of the Member State from the substantive requirements of the Basic-Regulation (EC) No 216/2008 and its implementing rules (for a period of more than two months or when the exemptions become repetitive)
- c) granting of approvals on an equivalent level of protection by the competent authority of the Member State by derogation from the Part 21 requirements

GM No. 3 to 21.B.45 Reporting - Information relevant to registers established by the Agency

When so requested by the Agency, the competent authority of the Member State should notify any certificate or approval issued, changed or revoked including details of the scope of that certificate or approval to the Agency for inclusion in a central register managed by the Agency.

GM21.B.55 Record keeping for design approvals transferred to the Agency

Record keeping related to design approvals, for which the responsibility is transferred to the Agency, will remain initially with the competent authority of the Member State that has granted the approvals, at the disposal of the Agency. This GM specifies the administrative documents to be kept for the various kinds of design approvals. It does not repeat the requirements put on holders of design approvals to keep records (ref. 21.A.55, 21.A.105, 21.A.118A(a)(1), 21.A.447, 21.A.605).

1. Type-certificate
 - a) Copy of the type-certificate
 - b) Copy of the type-certificate data sheet
 - c) Environmental protection approval data
 - d) Documents defining the type-certification basis including information to justify special conditions, equivalent safety findings and exemptions (Certification Review Items or equivalent)
 - e) List of approved modifications,
 - f) List of the competent authority's approved publications (Flight Manual, Repair Manual, Airworthiness Limitations, Certification Maintenance Requirements)
 - g) Airworthiness directives
 - h) Master Minimum Equipment List
 - i) Maintenance Review Board Report
2. Supplemental type certificate

SECTION B— Subpart A — General Provisions

- Copy of supplemental type certificate
 - Environmental protection approval data
 - Documents defining the certification basis including information to justify special conditions, equivalent safety findings and exemptions (Certification Review Items or equivalent)
 - List of the competent authority's approved documents
 - Airworthiness directives
3. JTSO Authorisation
- Copy of JTSO authorisation letter
 - Copy of Declaration of Design and Performance
 - Statement of compliance with applicable standards
 - Airworthiness directives
4. Other part or appliance approvals
- a) Copy of approval letter,
 - b) Copy of Declaration of Design and Performance or equivalent
 - c) Statement of compliance with applicable standards
 - d) Airworthiness Directives
5. Changes from non TC or STC holders
- a) Modification approval sheet, or equivalent document
 - b) Documents required by 21.A.105, or equivalent national requirement
- Note: Not applicable to minor design changes approved under a DOA privilege, for which record keeping is under the DOA holder responsibility.
6. Repair design approvals
- a) Repair approval sheet
 - b) Documents listed in 21.A.447, or equivalent national requirement
- Note: Not applicable to repair design approved under a DOA privilege, for which record keeping is under the DOA holder responsibility.

Subpart F — Production without Production Organisation Approval

AMC 21.B.120(a) Investigation team - Qualification criteria for the investigation team members

The competent authority must ensure that the team leader and team members have received appropriate training in the relevant Subpart of Part 21 and in the related competent authority documentation before performing investigations. They must also have knowledge and experience at the appropriate level in aviation production and inspection activities relative to the particular application for a letter of agreement.

AMC 21.B.120(c)(1) Evaluation of applications

1. General

When applying Part 21 Section A Subpart F and Section B Subpart F the competent authority must consider that these Subparts are only an alternative way for production to Part 21 Section A Subpart G and Section B Subpart G. To meet the ICAO airworthiness obligations and to issue a Certificate of Airworthiness for an individual aircraft in a practical and efficient way, the competent authority must use a system of approval of production organisations (POA) under Part 21 Section A Subpart G and Section B Subpart G, providing to the competent authority the necessary confidence in technical standards. The consistent standards of these approvals will also support the standardisation efforts by the Agency. Nevertheless it is recognised that it is not always practical, economical and/or advisable to use the POA.

Considering ICAO airworthiness obligations as well, Part 21 Section A Subpart F and Section B Subpart F is provided for such a case on the basis of the following principles:

- a) Subpart F must be considered as an alternative option for particular cases
- b) Its adoption must be done on an individual basis, as consequence of an assessment by the competent authority (see 21.A.121, 21.A.133(a) and their associated CS and GM).

2. Application

The competent authority must receive an application for a letter of agreement on an EASA Form 60 (see below) completed by the applicant. The eligibility of the application should be verified in relation to the competent authority procedures, based on 21.A.121 and its associated CS and GM. The applicant should be advised accordingly about the acceptance or rejection of the application.

3. Location of the applicant

The location of the applicant seeking acceptance for production under Part 21 Section A Subpart F determines which competent authority is responsible for issuing the letter of agreement.

EASA Form 60 Application for agreement of production under Part 21 Subpart F	
<i>Competent authority</i> of a <i>an EU</i> Member State <i>of the European Union</i> or EASA	
1. Registered name and address of the applicant:	
2. Trade name (if different):	
3. Location(s) of manufacturing activities:	
4. Description of the manufacturing activities under application	
a) Identification (TC, P/N , ... as appropriate):	
b) Termination (No. of units, Termination date, ...):	
5. Evidence supporting the application, as per 21.A.124(b):	
6. Links/arrangements with design approval holder(s)/design organisation(s) where different from Block 1. :	
7. Human resources:	
8. Name of the person signing the application:	
_____ Date	_____ Signature

EASA Form 60 Issue 3

- Block 1: The name of the applicant must be entered. For legal entities the name must be as stated in the register of the National Companies Registration Office. In this case a copy of the entry in the register of the National Companies Registration Office must be provided to the competent authority.
- Block 2: State the trade name by which the applicant is known to the public if different from the information given in Block 1. The use of a logo may be indicated in this Block.
- Block 3: State all locations of manufacturing activities that are covered by the application. Only those locations must be stated that are directly under the control of the applicant stated in Block 1.
- Block 4: This Block must include further details of the manufacturing activities under the approval for the addresses indicated in Block 3. The Block 'Identification' must indicate the products, parts or appliances intended to be produced, while the Block 'Termination' must address any information on the limitation of the activity, e.g., by stating the intended number of units to be manufactured or the expected date of completion of the manufacturing activities.
- Block 5: This Block must state evidence supporting the determination of applicability as stated in 21.A.121. In addition an outline of the manual required by 21.A.125(b) must be provided with the application.
- Block 6: The information entered here is essential for the evaluation of eligibility of the application. Therefore special attention must be given concerning the completion of this Block either directly or by reference to supporting documentation in relation to the requirements of 21.A.122 and AMC 21.A.122.
- Block 7: The information to be entered here must reflect the number of staff, or in case of an initial approval the intended number of staff, for the manufacturing activities under this application and therefore must include also any associated administrative staff.
- Block 8: State the name of the person authorised to sign the application.

[Decision 2007/012/R, 29.11.2007]

GM 21.B.120(c)(3) Investigation preparation and planning

Following acceptance of an application and before commencing an investigation the competent authority should:

- identify the site locations needing investigation
- liaise with the competent authority of another Member State where there is seen to be a need to visit a production facility in that State for one of the following reasons:
 - a) where a manufacturer has contracted part of the production to another organisation holding a production organisation approval and a need arises to ensure the contract has the same meaning for all parties to the contract, and the local competent authority of the Member State agrees
 - b) to inspect a product (or part or appliance) under production where the sub-contractor is not holding a POA
- co-ordinate with the competent authority of a third country and/or the Agency where there is seen to be a need to visit a production facility in that country for one of the following reasons:
 - a) where a manufacturer has contracted part of the production to another organisation holding a production organisation approval issued by the Agency or accepted through an recognition agreement in accordance with Article 912 of the Basic Regulation and a need arises to ensure the contract has the same meaning for all parties to the contract, and the Agency and/or the competent authority agrees
 - b) to inspect a product (or part or appliance) under production where the sub-contractor is not holding a POA.

GM 21.B.120(c)(5) and (6) Auditing and investigation findings

During its investigation process, the competent authority may make findings which should then be recorded. These may be non-conformities to the requirements, the manual as supplied by the

manufacturer describing its inspection procedures or non-conformities related to the items under inspection. The manner in which the findings will be handled by the competent authority before and during the validity of the letter of agreement, should be detailed in its procedures.

GM 21.B.143(a)125(a) Objective evidence

Objective evidence is a fact which is, or can be documented, based on observations, measurements or tests that can be verified. Objective evidence generally comes from the following:

- a) documents or manuals
- b) examination of equipment/products
- c) information from interview questions and observations of production activities

AMC 21.B.130 Issue of the letter of agreement

Unless otherwise agreed by the competent authority no production before the issue of the letter of agreement may be accepted under Part 21 Section A Subpart F.

GM 21.B.130(b) Issue of the letter of agreement

The agreement should include or reference a pre-defined plan of inspection points established as part of the production inspection system and agreed with the competent authority to be used as a basis for the inspections described in 21.A.129 and 21.B.120(c)(5) and its associated CS and GM. The plan should clearly identify inspection point, places, inspection subjects (materials, process, tooling documentation, human resources, etc.), as well as the focal points and the method of communication between the manufacturer and the competent authority.

The competent authority should detail a method how it will assure itself that the manufacturer is working in accordance with the manual and the agreed inspection procedures during the validity period of the agreement. For renewal of this validity period the procedure as defined in 21.B.140 should be used.

Any conditions under which the agreement will expire (such as termination date and/or number of units to produce), should be clearly stated in the letter of agreement.

AMC 21.B.140 Amendment of a letter of agreement

The competent authority must be satisfied that any change affecting a letter of agreement comply with the requirements of Section A Subpart F before implementation can start. A plan for the change should be agreed with the applicant in accordance with AMC 21.B.130. If the change affects the content of the letter of agreement, a new application should be filed and an amended/revised letter of agreement should be obtained subsequently.

GM 21.B.150(d) Record keeping - Traceability of release certificates

The recordkeeping for those EASA Forms 52 and [One1](#) that have been validated by the competent authority should allow verification of such validation by concerned parties including the recipients of the release certificates.

Subpart G— Production Organisation Approval

GM 21.B.220(a) Investigation team

1. Type of Team

Where the applicant is located in [ana](#) Member State, the competent authority should appoint a production organisation approval team (POAT) leader and members appropriate to the nature and scope of the applicant's organisation.

Where the facilities of the applicant are located in more than one Member State, the competent authority of the country of manufacture should liaise with the other involved competent authorities to agree and appoint a POAT leader and members appropriate to the nature and scope of the applicant's organisation.

2. Team leader selection

The team leader should satisfy all of the criteria for a team member and will be selected by considering the following additional criteria:

- j) the capability to lead and manage a team
- k) the capability to prepare reports and be diplomatic
- l) experience in approval team investigations (not necessarily only Part [21A21 Section A](#) Subpart G)
- m) a knowledge of production and quality systems for aircraft and related products and parts

3. Team member selection

The team leader should agree with the competent authority on the size of the POA team and the specialisations to be covered taking into account the scope of work and the characteristics of the applicant. Team members should be selected by considering the following criteria:

- training, which is mandatory, for Part 21 Section A, Subpart G and Section B, Subpart G
- education and experience, to cover appropriate aviation knowledge, audit practices and approval procedures
- the ability to verify that an applicant's organisation conforms to its own POA procedures, and that its key personnel are competent.

AMC 21.B. 220(c) Procedures for investigation - Evaluation of applications

The competent authority must receive an application for POA on an EASA Form 50 (see below) completed by the applicant. The eligibility and appropriateness of the application must be evaluated in accordance with 21.A.133 at that time and the applicant must be advised about acceptance or rejection of its application in writing accordingly.

EASA Form 50 Application for Part 21 production organisation approval	
<i>Competent authority</i> of a <u>an EU</u> Member State of the European Union or EASA	
1. Registered name and address of the organisation:	
2. Trade name (if different):	
3. Locations for which the approval is applied for:	
4. Brief summary of proposed activities at the item 3 addresses	
a) General:	
b) Scope of approval:	
c) Nature of privileges:	
5. Description of organisation:	
6. Links/arrangements with design approval holder(s)/design organisation(s) where different from 1. :	
7. Approximate number of staff engaged or intended to be engaged in the activities:	
8. Position and name of the accountable manager:	
<hr style="width: 20%; margin: auto;"/> Date	<hr style="width: 20%; margin: auto;"/> Signature of the accountable manager

Block 1: The name of the organisation must be entered as stated in the register of the National Companies Registration Office. For the initial application a copy of the entry in the register of the National Companies Registration Office must be provided to the competent authority.

Block 2: State the trade name by which the organisation is known to the public if different from the information given in Block 1. The use of a logo may be indicated in this Block.

Block 3: State all locations for which the approval is applied for. Only those locations must be stated that are directly under the control of the legal entity stated in Block 1.

Block 4: This Block must include further details of the activities under the approval for the addresses indicated in Block 4. The Block 'General' must include overall information, while the Block 'Scope of approval' must address the scope of work and products/categories following the principles laid down in the GM 21.A.151. The Block 'nature of privileges' must indicate the requested privileges as defined in 21.A.163(b)-(de). For an application for renewal state 'not applicable'.

Block 5: This Block must state a summary of the organisation with reference to the outline of the production organisation exposition, including the organisational structure, functions and responsibilities. The nomination of the responsible managers in accordance with 21.A.145(c)(2) must be included as far as possible, accompanied by the corresponding EASA Forms 4.

For an application for renewal state 'not applicable'.

Block 6: The information entered here is essential for the evaluation of eligibility of the application. Therefore special attention must be given concerning the completion of this Block either directly or by reference to supporting documentation in relation to the requirements of 21.A.133(b) and (c) and the AMC to 21.A.133(b) and (c).

Block 7: The information to be entered here must reflect the number of staff, or in case of an initial approval the intended number of staff, for the complete activities to be covered by the approval and therefore must include also any associated administrative staff.

Block 8: State the position and name of the accountable manager.

GM No. 1 to 21.B.220(c) Procedures for investigation - Investigation preparation and planning

Following the acceptance of the application and before commencing an investigation, the competent authority should, for the preparation and planning of the investigation:

- identify the site locations needing investigation taking into account the scope of any other POA issued by a Member State, which are valid in the circumstances
- liaise with the Agency for the appointment of any necessary observer(s) for standardisation purposes
- establish any necessary liaison arrangement with other competent authorities
- agree the size and composition of the POAT and any specialist tasks likely to be covered and to select suitable team members from all involved competent authorities
- seek any necessary advice and guidance from the Agency
- liaise with the competent authority of the other Member State where there is seen to be a need to visit a production approval holder facility in that Member State for one of the following reasons:
 - 1) where a manufacturer has subcontracted production to another organisation and therefore a need arises to ensure that contract has the same meaning for all parties to the contract, and the competent authority of the Member State agrees
 - 2) to inspect a product, part, appliance, or material under production for its own, Member States or non-EU register.

GM No. 2 to 21.B.220(c) Procedures for investigation – General

1. Purpose of the Procedures

The purpose is to investigate the applicant production organisation for compliance with Part 21 Subpart G in relation to the requested terms of approval. When appropriate, this procedure should also be used to investigate significant changes or applications for variation of scope of approval.

The following procedure assumes that the application has been accepted and that an investigation team has been selected.

2. Initiation

The POA Team Leader initiates the procedure by:

- 2.1 arranging a meeting with the POAT members to review the information provided in accordance with 21.A.134 and to take account of any knowledge that the POAT members have regarding the production standards of the applicant
- 2.2. obtaining information from other teams of a competent authority of the Member State or the Agency on the functioning applicant organisation (see GM No. 1 to 21.B.45)
- 2.3 arranging a meeting with the applicant in order to:
 - enable the applicant to make a general presentation of its organisation and products, parts or appliances
 - enable the POAT to describe the proposed investigation process
 - enable the POAT to confirm to the applicant the identity of those managers nominated in accordance with Part 21 Subpart G who need to complete an EASA Form 4 (~~see format in EASA administrative procedures~~). See EASA Form 4 for Production Organisations on EASA website: <http://easa.europa.eu/certification/application-forms.php>. The applicant should provide a completed copy of EASA Form 4 for each of the key management staff identified by Part 21 Subpart G. The EASA Form 4 is a confidential document and will be treated as such.

3. Preparation

The POAT:

- 3.1 studies the information gathered in the initiation phase
- 3.2 establishes an investigation plan which:
 - takes account of the location of the POA applicants facility as identified per GM ~~24B~~No. 3 to 21.B.220(c)~~(3)~~
 - defines areas of coverage and work-sharing between POAT members taking account of their individual expertise
 - defines areas where more detailed investigation is considered necessary
 - establishes the need for external advice to POAT members where expertise may be lacking within the team
 - includes completion of a comprehensive plan for the investigation in order to present it to the applicant
 - recognises the need to:
 - review the documentation and procedures
 - verify compliance and implementation
 - audit a sample of products, parts, and appliances

- 3.3 co-ordinates with the appropriate Part 21 Section A Subpart J design organisation approval Teams sufficiently for both parties to have confidence in the applicants co-ordination links with the holder of the approval of the design (as required by 21.A.133)
 - 3.4 establishes liaison with the applicant to plan mutually suitable dates and times for visits at each location needing investigation, and also to agree the investigation plan and approximate time scales with the applicant
4. Investigation
- The POAT:
- 4.1 makes a check of the POE for compliance with Part 21 Subpart G
 - 4.2 audits the organisation, its organisational structure, and its procedures for compliance with Part 21 Subpart G, using EASA Form 56 as a guide during the investigation, and as a checklist at the end of it
 - 4.3. generates compliance checklists for investigations of working processes and procedures on site as required
 - 4.4 accepts or rejects each EASA Form 4 completed by the key nominated personnel in accordance with 21.A.145(c)(2)
 - 4.5 checks that the production organisation exposition (POE) standard reflects the organisation, its procedures, practices and 21.A.143. Having checked and agreed a POE issue or subsequent amendment, the competent authority should have a clear procedure to indicate its acceptance or rejection
 - 4.6 makes sample audits at working level to verify that:-
 - (i) work is performed in accordance with the system described in the POE
 - (ii) products, parts, appliances or material produced by the organisation are in conformity with the applicable design data (see GM 21.B.235(b)(4)).
 - (iii) facilities, working conditions, equipment and tools are in accordance with the POE and appropriate for the work being performed
 - (iv) competence and numbers of personnel is appropriate for the work being performed
 - (v) co-ordination between production and design is satisfactory
 - 4.7 at an advanced stage of the investigation, conducts an interim team review of audit results and matters arising, in order to determine any additional areas requiring investigation.

Each investigation team should be accompanied during the process by company representatives who are knowledgeable of the applicants organisation and procedures. This will ensure that the organisation is aware of audit progress and problems as they arise. Access to information will also be facilitated.

The POATL should co-ordinate the work of POAT members for an efficient investigation process, which will provide a consistent and effective investigation and reporting standards.

5. Conclusions
- 5.1 The POATL holds a team meeting to review findings and observations so as to produce a final agreed report of findings.
 - 5.2 The POATL, on completion of the investigation, holds a meeting to verbally presents the report to the applicant.

The POATL should be the chairman of this meeting, but individual team members may present their own findings and observations.
 - 5.3 The meeting should agree the findings, corrective action time scales, and preliminary arrangements for any follow up that may be necessary.
 - 5.4 Some items may as a result of this meeting be withdrawn by the POATL but if the investigation has been correctly performed, at this stage there should be no disagreement over the facts presented.

- 5.5 Inevitably there will be occasions when the POAT member carrying out the audit may find situations in the applicant or POA holder where it is unsure about compliance. In this case, the organisation is informed about possible non-compliance at the time and advised that the situation will be reviewed within the competent authority before a decision is made. The organisation should be informed of the decision without undue delay. Only if the decision results in a confirmation of non-compliance this is recorded in Part 4 of EASA Form 56.
- 5.6 The POATL will transmit the final signed report on EASA Form 56 together with notes of the final meeting with the applicant to the competent authority where the applicant is located. The report will include recommendations and significant findings, together with appropriate conclusions and corrective actions. In particular, it should indicate if the POE is acceptable, or changes are required.
- 5.7 Completion of EASA Form 56 includes the need to record in Part 4 comments, criticisms, etc., and this must reflect any problems found during the visit and must be the same as the comments, criticisms made to the organisation during the debrief. Under no circumstances should additional comments, criticisms, etc., be included in Part 4 of the report unless the applicant or POA holder has previously been made aware of such comments.

Many applicants may need to take corrective action and amend the proposed exposition before the competent authority is able to conclude its investigation. Such corrective actions should be summarised in Part 4 of the EASA Form 56 and a copy always given to the applicant, so that there is a common understanding of the actions necessary before approval can be granted.

The intention of the EASA Form 56 Part 4 is to provide a summary report of findings and outstanding items during initial investigation and major changes. The competent authority will need to operate a supporting audit system to manage corrective action monitoring, closure etc. While the EASA Form 56 Part 4 format may be used for monitoring purposes, it is not adequate on its own to manage such system.

- 5.8 If the findings made during the investigation mean that approval recommendation will not or cannot be issued, then it is essential that such findings are confirmed in writing to the organisations within two weeks of the visit. The reason for confirmation in writing is that many organisations take a considerable time to establish compliance. As a result, it is too easy to establish a position of confusion where the organisation claims it was not aware of the findings that prevented issue of an approval.

6. Management Involvement

The accountable manager will be seen at least once during the investigation process and preferably twice, because he or she is ultimately responsible for ensuring compliance with the requirements for initial grant and subsequent maintenance of the production organisation approval. Twice is the preferred number of visits to the accountable manager, with one being conducted at the beginning of the audit to explain the investigation process and the second, at the end, to debrief on the results of the investigation.

Competent authority

of

a member an EU Member State of the

EUROPEAN UNION or

EASA

**RECOMMENDATION REPORT IN SUPPORT OF Part 21 SUBPART G APPROVAL
ISSUE / CONTINUATION / VARIATION / SIGNIFICANT CHANGE**

PART ONE OF FIVE PARTS: **BASIC DETAILS OF THE ASSESSMENT**

Name of the organisation:

Approval reference: _____

Address(es) of the facilities surveyed:

Main Part 21 Subpart G activities at facilities surveyed:

Date(s) of survey:

Names and positions of the organisation's senior management attended during survey:

Names of the competent authority staff:

Office:

EASA Form 56 completion date:

Note: If it is determined that recommendation for issue/continuation/variation/significant change of approval cannot be made because of non-compliance with Part 21 Subpart G, the reasons for non-compliance need to be identified in PART 4 of the report. A copy of PART 1 and PART 4, or at least the information included in these parts, must be given to the organisation to ensure that the organisation, in failing to obtain Part 21 Subpart G approval, even if only temporarily, has the same information as is on the files of the competent authority.

Competent authority

of

a *an EU* Member State of the

EUROPEAN UNION *or*

EASA

**RECOMMENDATION REPORT IN SUPPORT OF Part 21 SUBPART G ISSUE /
CONTINUATION / VARIATION / SIGNIFICANT CHANGE**

PART TWO OF FIVE PARTS: **Part 21 SUBPART G COMPLIANCE**

Name of organisation:

Approval of organisation:

Approval reference: _____

Survey reference:

Note A: This form has been compiled according those paragraphspoints of Part 21 Subpart G which are relevant to an organisation trying to demonstrate compliance.

Note B: The right hand part of each box must be completed with one of three indicators:

1. a tick (✓) which means compliance;
 2. NR which means the requirement is Not Relevant to the activity at the address surveyed; (the reason for NR should be stated in Part 4 of the report, unless the reason is obvious)
 3. a number relating to a comment which must be recorded in Part 4 of the report.
- The left hand part of each box is optional for use by the competent authority.

21.A.133 Eligibility

Any natural or legal person ('organisation') shall be eligible as an applicant for an approval under this Subpart. The applicant shall:

- (a) justify that, for a defined scope of work, an approval under this Subpart is appropriate for the purpose of showing conformity with a specific design; and
- (b) hold or have applied for an approval of that specific design; or
- (c) have ensured, through an appropriate arrangement with the applicant for, or holder of, an approval of that specific design, satisfactory co-ordination between production and design.

21.A.134 Application

Each application for a production organisation approval shall be made to the competent authority in a form and manner established by that authority, and shall include an outline of the information required by [21.A.143](#) and the terms of approval requested to be issued under [21.A.151](#).

PART TWO OF FIVE (CONTINUED):**SURVEY REFERENCE:****21.A.139 Quality System**

- (a) The production organisation shall demonstrate that it has established and is able to maintain a quality system. The quality system shall be documented. This quality system shall be such as to enable the organisation to ensure that each product, part or appliance produced by the organisation or by its partners, or supplied from or subcontracted to outside parties, conforms to the applicable design data and is in condition for safe operation, and thus exercise the privileges set forth in [21Apoint 21.A.163](#).

- (b) The quality system shall contain:

(1) as applicable within the scope of approval, control procedures for:

- (i) document issue, approval, or change;
- (ii) vendor and sub-contractor assessment audit and control;
- (iii) verification that incoming products, parts, materials, and equipment, including items supplied new or used by buyers of products, are as specified in the applicable design data;
- (iv) identification and traceability;
- (v) manufacturing processes;
- (vi) inspection and testing, including production flight tests;
- (vii) calibration of tools, jigs, and test equipment;
- (viii) non-conforming item control;
- (ix) airworthiness co-ordination with the applicant for, or holder of, a design approval;
- (x) records completion and retention;
- (xi) personnel competence and qualification;
- (xii) issue of airworthiness release documents;
- (xiii) handling, storage and packing;
- (xiv) internal quality audits and resulting corrective actions;
- (xv) work within the terms of approval performed at any location other than the approved facilities;
- (xvi) work carried out after completion of production but prior to delivery, to maintain the aircraft in a condition for safe operation;
- (xvii) issue of permit to fly and approval of associated flight conditions.
- The control procedures need to include specific provisions for any critical parts.

- (b) The quality system shall contain (cont'd) –

(2) An independent quality assurance function to monitor compliance with, and adequacy of, the documented procedures of the quality system. This monitoring shall include a feedback system to the person or group of persons referred to in [21Apoint 21.A.145\(c\)\(2\)](#) and ultimately to the manager referred to in [21Apoint 21.A.145 \(c\)\(1\)](#) to ensure, as necessary, corrective action.

PART TWO OF FIVE (CONTINUED):**SURVEY REFERENCE:****21.A.143 Exposition**

- (a) The organisation shall submit to the competent authority a production organisation exposition providing the following information:
(see Part 3 of this Form)
- (b) The production organisation exposition shall be amended as necessary to remain an up-to-date description of the organisation, and copies of any amendments shall be supplied to the competent authority.

21.A.145 Approval requirements

The production organisation shall demonstrate, on the basis of the information submitted in accordance with [21Apoint 21.A.143](#) that:

- (a) with regard to general approval requirements, facilities, working conditions, equipment and tools, processes and associated materials, number and competence of staff, and general organisation are adequate to discharge obligations under 21.A.165;
- (b) with regard to all necessary airworthiness, noise, fuel venting and exhaust emissions data:
(1) the production organisation is in receipt of such data from the Agency, and from the holder of, or applicant for, the type-certificate, restricted type-certificate or design approval to determine conformity with the applicable design data;

(2) the production organisation has established a procedure to ensure that airworthiness, noise, fuel venting and exhaust emissions data are correctly incorporated in its production data;

(3) such data are kept up to date and made available to all personnel who need access to such data to perform their duties;
- (c) with regard to management and staff:
(1) A manager has been nominated by the production organisation, and is accountable to the competent authority. His or her responsibility within the organisation shall consist of ensuring that all production is performed to the required standards and that the production organisation is continuously in compliance with the data and procedures identified in the exposition referred to in [21Apoint 21.A.143](#).

(2) a person or a group of persons have been nominated by the production organisation to ensure that the organisation is in compliance with the requirements of this [Annex I \(Part, 21\)](#), and are identified, together with the extent of their authority. Such person(s) shall act under the direct authority of the accountable manager referred to in [subparagraph point \(1\)](#). The knowledge, background and experience of the persons nominated shall be appropriate to discharge their responsibilities;

(3) staff at all levels have been given appropriate authority to be able to discharge their allocated responsibilities and that there is full and effective co-ordination within the production organisation in respect of airworthiness, noise, fuel venting and exhaust emission data matters;
- (d) with regard to certifying staff, authorised by the production organisation to sign the documents issued under [point 21.A.163](#) under the scope or terms of approval:
(1) the knowledge, background (including other functions in the organisation), and experience of the certifying staff are appropriate to discharge their allocated responsibilities;

(2) the production organisation maintains a record of all certifying staff which shall include details of the scope of their authorisation;

(3) certifying staff are provided with evidence of the scope of their authorisation.

PART TWO OF FIVE (CONTINUED):**SURVEY REFERENCE:****21.A.147 Changes to the approved production organisation**

- (a) After the issue of a production organisation approval, each change to the approved production organisation that is significant to the showing of conformity or to the airworthiness and characteristics of noise, fuel venting and exhaust emissions of the product, part or appliance, particularly changes to the quality system, shall be approved by the competent authority. An application for approval shall be submitted in writing to the competent authority and the organisation shall demonstrate to the competent authority before implementation of the change, that it will continue to comply with this Subpart.

- (b) The competent authority shall establish the conditions under which a production organisation approved under this Subpart may operate during such changes unless the competent authority determines that the approval should be suspended.

21.A.148 Changes of location

A change of the location of the manufacturing facilities of the approved production organisation shall be deemed of significance and therefore shall comply with [21A point 21.A.147](#).

21.A.149 Transferability

Except as a result of a change in ownership, which is deemed significant for the purposes of [21A point 21.A.147](#), a production organisation approval is not transferable.

21.A.151 Terms of approval

The terms of approval shall identify the scope of work, the products or the categories of parts and appliances, or both, for which the holder is entitled to exercise the privileges under [21A point 21.A.163](#).

Those terms shall be issued as part of a production organisation approval.

21.A.153 Changes to the terms of approval

Each change to the terms of approval shall be approved by the competent authority. An application for a change to the terms of approval shall be made in a form and manner established by the competent authority. The applicant shall comply with the applicable requirements of this Subpart.

21.A.157 Investigations

A production organisation shall make arrangements that allow the competent authority to make any investigations, including investigations of partners and sub-contractors, necessary to determine compliance and continued compliance with the applicable requirements of this Subpart.

21.A.163 Privileges

Pursuant to the terms of approval issued under point 21.A.135, the holder of a production organisation approval may:

- (a) perform production activities under this [Annex I \(Part 21\)](#).
- (b) in the case of complete aircraft and upon presentation of a statement of conformity (EASA Form 52) under [point 21.A.174](#), obtain an aircraft certificate of airworthiness and a noise certificate without further showing;
- (c) in the case of other products, parts or appliances, issue authorised release certificates (EASA Form 1) under 21.A.307 without further showing;
- (d) maintain a new aircraft that it has produced and issue a certificate of release to service (EASA Form 53) in respect of that maintenance;
- (e) under procedures agreed with its competent authority for production, for an aircraft it has produced, and when the production organisation itself is controlling under its POA the configuration of the aircraft and is attesting conformity with the design conditions approved for the flight, to issue a permit to fly in accordance with [point 21.A.711\(c\)](#) including approval of the flight conditions in accordance with [point 21.A.710\(b\)](#).

PART TWO OF FIVE (CONTINUED):**SURVEY REFERENCE:****21.A.165 Obligations of the holder**

The holder of a production organisation approval shall:

- (a) ensure that the production organisation exposition furnished in accordance with [24Apoint 21.A.143](#) and the documents to which it refers, are used as basic working documents within the organisation;
- (b) maintain the production organisation in conformity with the data and procedures approved for the production organisation approval;
- (c) (1) determine that each completed aircraft conforms to the type design and is in condition for safe operation prior to submitting statements of conformity to the competent authority; or
- (2) determine that other products, parts or appliances are complete and conform to the approved design data and are in a condition for safe operation before issuing [an EASA Form 1](#) to certify conformity to approved design data and in a condition for safe operation, and additionally in case of engines, determine according to data provided by the engine type-certificate holder that each completed engine is in compliance with the applicable emissions requirements as defined in [24Apoint 21.A.18\(b\)](#), current at the date of manufacture of the engine, to certify emissions compliance; or
- (3) determine that other products, parts or appliances conform to the applicable data before issuing EASA Form 1 as a conformity certificate;
- (d) record all details of work carried out;
- (e) establish and maintain an internal occurrence reporting system in the interest of safety, to enable the collection and assessment of occurrence reports in order to identify adverse trends or to address deficiencies, and to extract reportable occurrences. This system shall include evaluation of relevant information relating to occurrences and the promulgation of related information;
- (f) (1) report to the holder of the type-certificate or design approval, all cases where products, parts or appliances have been released by the production organisation and subsequently identified to have possible deviations from the applicable design data, and investigate with the holder of the type-certificate or design approval in order to identify those deviations which could lead to an unsafe condition;
- (2) report to the Agency and the competent authority of the Member State, or both, the deviations which could lead to an unsafe condition identified according to [subparagraph point \(1\)](#). Such reports shall be made in a form and manner established by the Agency under [point 21.A.3A\(b\)\(2\)](#) or accepted by the competent authority of the Member State;
- (3) where the holder of the production organisation approval is acting as a supplier to another production organisation, report also to that other organisation all cases where it has released products, parts or appliances to that organisation and subsequently identified them to have possible deviations from the applicable design data;
- (g) provide assistance to the holder of the type-certificate or design approval in dealing with any continuing airworthiness actions that are related to the products parts or appliances that have been produced;
- (h) establish an archiving system incorporating requirements imposed on its partners, suppliers and sub-contractors, ensuring conservation of the data used to justify conformity of the products, parts or appliances. Such data shall be held at the disposal of the competent authority and be retained in order to provide the information necessary to ensure the continuing airworthiness of the products, parts or appliances;
- (i) where, under its terms of approval, the holder issues a certificate of release to service, determine that each completed aircraft has been subjected to necessary maintenance and is in condition for safe operation, prior to issuing the certificate;
- (j) where applicable, under the privilege of [point 21.A.163\(e\)](#), determine the conditions under which a permit to fly can be issued;
- (k) where applicable, under the privilege of [point 21.A.163\(e\)](#), establish compliance with [point 21.A.711\(c\)](#) and (e) before issuing a permit to fly to an aircraft.

Competent authority of
of an EU Member State of the or
EUROPEAN UNION or EASA

**RECOMMENDATION REPORT IN SUPPORT OF Part 21 SUBPART G ISSUE /
CONTINUATION / VARIATION/ SIGNIFICANT CHANGE**

PART THREE OF FIVE PARTS: **Part 21 SUBPART G EXPOSITION COMPLIANCE**

Name of organisation:

Approval of organisation:

Approval reference: _____ **Survey reference:**

Note A: Each box must be completed with one of three indicators:

1. a tick (✓) which means compliance;
2. NR which means the requirement is NOT RELEVANT to the activity at the address surveyed; (The reason for NR should be stated in Part 4 of the report unless the reason is obvious.);
3. a number relating to a comment which must be recorded in Part 4 of the report.

Note B: The exposition may be compiled in any subject order as long as all applicable subjects are covered.

Note C: If the organisation holds another Part approval requiring an exposition or handbook it is acceptable to use this index as a supplement to the existing exposition or handbook and to cross-refer each subject to the position in the existing exposition or handbook.

Production organisation exposition

Revision Status:

(Content as required by 21.A.143(a))

- | | | |
|-----|----------------------|---|
| (1) | <input type="text"/> | A statement signed by the accountable manager confirming that the production organisation exposition and any associated manuals which define the approved organisation's compliance with this Subpart will be complied with at all times; |
| (2) | <input type="text"/> | the title(s) and names of the managers accepted by the competent authority in accordance with point 21.A.145(c)(2) ; |
| (3) | <input type="text"/> | the duties and responsibilities of the manager(s) as required by point 21.A.145(c)(2) including matters on which they may deal directly with the competent authority on behalf of the organisation. |
| (4) | <input type="text"/> | an organisational chart showing associated chains of responsibility of the managers as required by point 21.A.145(c)(1) and (c)(2); |
| (5) | <input type="text"/> | a list of certifying staff as referred to in point 21.A.145(d)
[Note : a separate document may be referenced] |
| (6) | <input type="text"/> | a general description of man-power resources; |

PART THREE OF FIVE (CONTINUED):		SURVEY REFERENCE:
(7)	<input type="text"/>	a general description of the facilities located at each address specified in the production organisation's certificate of approval.
(8)	<input type="text"/>	a general description of the production organisation's scope of work relevant to the terms of approval;
(9)	<input type="text"/>	the procedure for the notification of organisational changes to the competent authority;
(10)	<input type="text"/>	the amendment procedure for the production organisation exposition;
(11)	<input type="text"/>	a description of the quality system and the procedures as required by point 21.A.139(b)(1) ;
(12)	<input type="text"/>	a list of those outside parties referred to in point 21.A.139 (a) . [Note : a separate document may be referenced]

Competent authority

of ~~Sheet 1 of a~~ *an EU* Member State of the

EUROPEAN UNION *-or-*

EASA

**RECOMMENDATION REPORT IN SUPPORT OF Part 21 SUBPART G APPROVAL
ISSUE / CONTINUATION / VARIATION / SIGNIFICANT CHANGE**

PART FOUR OF FIVE PARTS: **FINDINGS ON Part 21 SUBPART G COMPLIANCE STATUS**

Name of organisation:

Approval reference: _____ **Survey reference:** _____

Note A: Each finding must be identified by number and the number must cross-refer to the same number in a box in Part 2 or 3 of the Part 21 Subpart G survey report.

Note B: As stated in Part 1 any comments recorded in this Part 4 should be copied to the organisation surveyed together with Part 1.

Note C: In case of a partial clearance of a finding with some outstanding action remaining, this action has to be identified.

NO:	FINDING	LEVEL	OUTSTANDING ACTION	CLEARANCE	
				DATE	REP.REF.

NAME & SIGNATURE OF SURVEYOR:

Date:

PART FOUR OF FIVE (CONTINUED):				Sheet ___ of ___	
SURVEY REFERENCE:					
NO:	FINDING	LEVEL	OUTSTANDING ACTION	CLEARANCE	
				DATE	REP.REF.
NAME & SIGNATURE OF SURVEYOR:				Date:	

Competent authority

of

a *an EU* Member State of the

~~EUROPEAN UNION~~ or

EASA

**RECOMMENDATION REPORT IN SUPPORT OF Part 21 SUBPART G APPROVAL
ISSUE / CONTINUATION / VARIATION/SIGNIFICANT CHANGE**

PART FIVE OF FIVE PARTS: **Part 21 SUBPART G APPROVAL RECOMMENDATION**

Name of organisation:

Approval reference: _____ **Survey reference:** _____

Recommendation for issue / variation of approval/significant change:

The following Part 21 Subpart G Terms of approval are recommended for the above organisation at the address(es) specified in Part 1 of this report:

or

Recommendation for continuation of existing approval:

It is recommended that the Part 21 Subpart G Terms of approval identified in EASA Form 55 referenced _____ be continued.

Reporting performed according to procedure for authority surveillance of suppliers of a POA holder located in other Member States, if applicable (Strict confidentiality to be observed)

Name of competent authority surveyor making recommendation:

Signature of the competent authority surveyor:

Competent authority office:

Date:

GM No. 3 to 21.B.220(c) Procedures for investigation - POA applications received from organisations with facilities/partners/suppliers/sub-contractors located in a third country

The obligations of the applicant are totally independent from the surveillance exercised by the competent authority. It is not acceptable that the applicant relies on surveillance activities of the competent authority to simplify its tasks.

Facilities located in a third country

When any part of the production facilities of an applicant for POA is located outside the Member States, then the location will be treated in all aspects as part of the applicant's POA organisation.

Therefore the investigating competent authority will:

- a) include the facilities outside the Member States fully in their investigation and surveillance activities for the applicant for, or holder of, the POA
- b) include the facilities outside the Member States in the terms of approval of the EASA Form 55 (see [Annex I](#) Part 21 Appendix X) when issuing the POA.

Partners/suppliers/sub-contractors located in a third country

The competent authority should define on the basis of Part 21, its associated CS and GM, a clear procedure on supplier control. This procedure should include the control of partners/suppliers/sub-contractors of the applicant for, or holder of, a POA that are located outside the Member States.

In respect of the applicant for, or holder, of the POA, the competent authority should:

- 1) investigate, for the initial approval and consequent continued surveillance, the production organisation, and its partners/suppliers/sub-contractors at the necessary level to ensure the organisation can comply with the requirements of Part 21,
- 2) in accordance with the competent authority procedure, assess and accept the documented procedure for supplier control as part of the POA holder's quality system, and changes to that procedure prior to implementation,
- 3) in accordance with competent authority procedure, assess the necessary level of surveillance to be exercised by the production organisation on partners / suppliers / sub-contractors and check the audit plan of the production organisation against this level.

The level of co-operation between the competent authority and the competent authority of the third country where a partner/supplier/sub-contractor of the production organisation is located may influence the authorities' activities concerning this partner/supplier/sub-contractor. Co-operation with the competent authority of the third country should be based on the capability and goodwill of that authority, and a complete interchange of necessary information.

The involvement of this competent authority of the third country in the surveillance of the partner/supplier/sub-contractor will be based on the following principles:

- When a recognition agreement under Article [912](#) of ~~the Basic~~ Regulation [\(EC\) No 216/2008](#) covering production subjects has been concluded:
 - a) The competent authority in accordance with GM No. 2 to 21.A.139(a) may decide that direct surveillance of the POA holder activities at the foreign location may not be necessary.
 - b) In any other case, provisions of the recognition agreement on the subject apply (technical assistance, ...).
- If a recognition agreement has not been concluded, or it does not cover production subjects, it may be necessary that the competent authority of the Member State, the Agency, and the competent authority of a third country enter into a specific working arrangement addressing the following matters:
 - a) acceptance by the competent authority of the third country of conducting manufacturing surveillance of the relevant production activities on behalf of the competent authority, under the respective quality standards defined by the competent authority.
 - b) tasks to be performed
 - c) practical methods

These arrangements are between authorities and do not relieve the applicant of its obligations.

- In all cases, even though surveillance tasks are delegated to the competent authority of the third country, the competent authority remains the responsible authority and may consequently exercise direct surveillance if necessary.
- In case that it is not possible to delegate surveillance tasks to the competent authority of the third country, the competent authority will have to establish a direct surveillance program in accordance with its procedure concerning supplier control as part of the overall surveillance of the POA holder.

GM No. 4 to 21.B.220(c) Procedures for investigation – Competent authority surveillance of suppliers of a POA holder located in other Member States

1. The aviation legislation identifies specific State obligations in relation to complete products:

State of manufacture, as used in ICAO Annex 8, normally identifies the country where the final assembly and the final determination of airworthiness is made. However, sub-assemblies and parts may be produced by POA holders in other countries and the EASA Form 1 - Authorised Release Certificate will identify those countries as the location for production.

Among Member States the obligations of the State of manufacture may be discharged through the use of the Part 21 POA system.

According to Part 21 Subpart G, each POA holder must have established and documented in its POE a system for its own control of suppliers/supplies. Surveillance of this system is part of the responsibility of the competent authority of the POA holder wherever the suppliers are located.

This surveillance may be exercised through the POA holder and/or at supplier level especially in the cases where the supplier would be eligible for its own POA.

The purpose of this procedure is to ensure the completeness of the responsibilities chain so that no separate technical agreement between these national authorities is necessary and when necessary to establish a means of communication between the involved competent authorities of the Member States.

2. Principle to organise competent authority supplier surveillance between Member States:

In order to avoid duplication and to take the best advantage of ~~the Basic~~ Regulation [\(EC\) No 216/2008](#) that establishes under Article [811](#) mutual recognition of certificates issued by production organisations approved in accordance with ~~IR-Part~~ [Part 21](#) Section A Subpart G by an Member State, the principle for the competent authority surveillance of the suppliers of a POA holder located in other Member States is for the responsible competent authority to delegate surveillance activity to the other competent authority of the supplier.

This applies between Member States and for suppliers holding a Part 21 POA.

Delegation of surveillance tasks does not imply a delegation of the overall responsibility, therefore the competent authority of the contractor always retains the right of direct supervision at the supplier location especially when serious quality problems are encountered. In such a case, co-ordination will be organised between both competent authorities.

This delegation of surveillance is to be considered automatic as soon as the supplier holds a Part 21 POA provided that the intended supply is included in the approved scope of work. Evidence of that approval will normally be found through the release of the supplied parts with an EASA Form 1. In addition, the competent authority of the supplier should immediately inform the competent authority of the contractor in case of a serious quality problem.

In the cases where the competent authority of the contractor considers that it is necessary to establish closer ties with the competent authority of the supplier (i.e., critical or significant parts) exchange of information between the competent authorities should be organised as follows:

- 2.1 Tasks of the competent authority of the POA contractor

The competent authority of the contractor should inform in writing the competent authority of the sub-contractor with the following:

- a. Identification (and location) of the contractor

- b. Identification (and location) of the sub-contractor
- c. Identification of the subcontracting (parts, contract N°, etc.)
- d. Reference to the quality requirements attached to the contract
- e. Name and address of the competent authority office/person in charge of the POA
- f. Whether Direct Delivery Authorisation (DDA) applies
- g. Any specific action item/requirement from the competent authority
- h. Request for a bi-annual reporting (both ways).

EASA Form 58A is provided for convenience of the competent authority for this purpose.

The competent authority of the contractor should require that the contract/order from the contractor to the sub-contractor should indicate that it is placed under the surveillance of its competent authority on behalf of the competent authority of the contractor and should address the subject to the payment of the possible surveillance fees.

2.2 Tasks of the competent authority of the supplier (sub-contractor)

On receipt of the information from the competent authority of the contractor, the competent authority of the sub-contractor should:

- Verify that the scope of work of the POA of the supplier covers the intended supply (or envisage to extend it in liaison with the supplier).
- Verify that the specific quality requirements for the parts have been introduced in the quality system of the supplier.
- Confirm to the competent authority of the contractor that the procurement is included in the POA of the supplier and that their surveillance will cover this activity.
- Indicate the name and address of the competent authorities office/person in charge of the POA.

If the supplier has no POA under Part 21, or does not want to extend it, and/or if its competent authority cannot conduct surveillance on behalf of the other competent authority, the competent authority of the supplier will inform the competent authority of the contractor in order for it to decide on appropriate actions.

2.3 Exchange of information between the competent authorities

This information should normally take two forms:

- Immediate exchange of information between both competent authorities in case of serious quality problems;
- A bi-annual exchange of information at a given date in order to guarantee proper on going control of the subcontract by both competent authorities.

This information should cover in a concise form:

a) For the competent authority of the contractor:

- A resume of the quality problems encountered by the contractor, on receipt inspection, on installation on aircraft or on in service aircraft;
- A status of the reference documents.

b) For the competent authority of the sub-contractor:

- A resume of at least the following subjects:
 - Changes in organisation and qualification of the sub-contractor.(in case of impact on the procurement),
 - Quality problems encountered during manufacture,
 - Corrective actions following problems encountered earlier on the procurement,

- Findings from national authorities surveillance that may have an impact on the procurement,
- Quality problems related to the contractor procurement (materials, documentation, procedures, processes).

Exchange of information between national authorities according to this procedure is strictly confidential and should not be disclosed to other parties.

It is recommended to plan at least every 5 years a meeting between Industry and the two national authorities to review each major subcontract to verify proper management by the various parties involved.

3. Miscellaneous

a) Release documentation

Release of parts by the POA sub-contractor to the contractor will be accompanied by an «Authorised Release Certificate EASA Form 1» issued for «Airworthiness» or for «Conformity» as appropriate.

b) Sub-subcontracting

If the sub-contractor wants itself to subcontract, it is up to the competent authority of the sub-contractor to verify that this is done in accordance with the conditions of the contract, to organise as necessary the related authority surveillance and to inform the competent authority of the contractor.

c) Language

Except if agreed otherwise it is recommended to use the English language for exchange of information between the competent authorities.

<p>Competent authority</p> <p>of</p> <p>a <u>an EU</u> Member State <u>of the European Union</u> or</p> <p><u>EASA</u></p> <p>REQUEST FOR REPORTING ON SUB-CONTRACTOR SURVEILLANCE</p>	
Document reference number:	<REQUEST REF. NO.>
As competent authority which issued a POA to:	<CONTRACTOR COMPANY>
With approval reference:	<CONTRACTOR POA REF. NO..>
The <COMPETENT AUTHORITY> has determined that there is a need for direct authority supplier surveillance of:	<SUB-CONTRACTOR COMPANY>
With approval reference:	<SUB-CONTRACTOR POA REF.NO.>
Which is situated in:	<COUNTRY OF SUB-CONTRACTOR COMPANY>
As part of the surveillance as required for the Part 21 Section A Subpart G approved production organisation, according to GM No. 4 to 21.220(c) the competent authority of the sub-contractor is requested to perform authority surveillance on the specific sub assemblies and parts as details and requirements are defined below.	
Identification of subcontracting (parts, contract No., ...):	
Reference to the quality requirements attached to the contract between contractor and sub-contractor:	
Name and address of the requesting competent authority office/person in charge of the POA:	
Direct Delivery Authorisation (DDA) applies:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Specific action item/requirement from the competent authority of the contractor:	
Request and details required for a bi-annual reporting (both ways) according to GM No. 4 to 21.B.220(c) (Strict confidentiality to be observed):	
Name and signature of competent authority person making the request:	
Competent authority office:	Date:

EASA Form 58A – Request for reporting on sub-contractor surveillance, Page x of x

<p><i>Competent authority</i></p> <p>of</p> <p>a <u>an EU</u> Member State of the European Union <u>or</u></p> <p><u>EASA</u></p> <p>REPORT ON SUB-CONTRACTOR SURVEILLANCE</p>	
Document reference number:	<REPORT REF. NO.>
Reporting request reference number:	< REQUEST REF. NO >
As responsible competent authority the <COMPETENT AUTHORITY> issued a POA to and is performing direct authority surveillance of:	<SUB-CONTRACTOR COMPANY>
With approval reference:	<SUB-CONTRACTOR POA REF. NO..>
Which is a subcontracted supplier of:	<CONTRACTOR COMPANY>
With approval reference :	<CONTRACTOR POA REF.NO.>
Which is situated in:	<COUNTRY OF CONTRACTOR COMPANY>
According to GM No. 4 to 21.220(c) and on request of the competent authority of the contractor company the <COMPETENT AUTHORITY> reports on the results of its authority surveillance on the specific parts and appliances defined below:	
Identification of subcontracting (parts, contract No., ...):	
Identification of attachments to this report (if needed):	
Date and identification of previous report:	
Resume of surveillance results:	
Changes in organisation and qualification of the sub-contractor. (in case of impact on the procurement):	
Quality problems encountered during manufacture:	
Corrective actions following problems encountered earlier on the procurement:	
Findings from competent authority surveillance that may have an impact on the procurement:	
Quality problems related with the contractor procurement (materials, documentation, procedures, processes):	
Note: Exchange of information between national authorities according to this procedure is strictly confidential and should not be disclosed to other parties.	
Name and signature of competent authority person reporting:	

Competent authority office:

Date:

EASA Form 58B – Report on sub-contractor surveillance, Page x of x

GM 21.B.225(a) Objective evidence

Objective evidence is a fact which is, or can be documented, based on observations, measurements or tests that can be verified. Objective evidence generally comes from the following:

- a) documents or manuals
- b) examination of equipment/products
- c) information from interview questions and observations of POA activities.

AMC 21.B.225(a) Notification of findings

In case of a level one finding confirmation must be obtained in a timely manner that the accountable manager received the letter containing details of the level one finding and the approval suspension details.

A level two finding requires timely and effective handling by the competent authority to ensure completion of the corrective action. This includes intermediate communication, including reminding letters as necessary, with the POA holder to verify that the corrective action plan is followed.

AMC No. 1 to 21.B.230 Issue of the certificate

The competent authority should base its decision to issue or amend a POA on the recommendation report (EASA Form 56, see GM No.2 to 21.B.220(c)) of the POAT submitted by the POA team leader. The EASA Form 56 includes a proposal by the POAT for the scope and terms of approval defining the products, parts and appliances for which the approval is to be granted, with appropriate limitations.

When the competent authority issues the approval a final controlled copy of an acceptable exposition for the organisation should have been supplied to the competent authority.

In some cases it may be accepted that some findings are not fully closed because corrective actions are still in progress. The competent authority may decide according to the following principles:

- 1) Findings should be equivalent to level two, which do not need to be rectified as a matter of urgency within less than three months, and should normally not exceed three in number.
- 2) Corrective action plan, including timescales, should have been accepted and should not require an additional and specific follow-up audit by the competent authority.

A record should be kept by the competent authority and should be brought to the attention of the Agency on request for standardisation purposes.

GM 21.B.235(a)(4) Guide to the conduct of monitoring production standards.

1. 21.B.235(a)(4) identifies a need for a sample investigation of products, parts or appliances, their associated conformity determinations and certifications made by a POA holder. For this to be performed effectively and efficiently, the competent authority should integrate a sampling plan as part of the planning of the investigation and continued surveillance activities appropriate to the scope and size of the relevant applicant.
2. The sampling plan could, for example, investigate:
 - a modification (or change)
 - the installation, testing, or operation of a major part or system
 - the accuracy and generation of the Flight Test report data
 - the accuracy and generation of the Weighing report data
 - an engine test bed run
 - records traceability
 - the accuracy and generation of the Statement of Conformity data and the associated safe operation determination
 - the accuracy and generation of EASA Form 1 data.

The sampling plan should be flexible so as to:

- accommodate changes in production rate
- make use of results from other samples

- make use of results from other POA Investigations
- provide the maximum national authorities confidence

To be effective this product sample requires that the individual investigator(s):

- have a good practical knowledge of the product, part or appliance
- have a good practical knowledge of the manufacturing processes
- have an up to date knowledge of the manufacturers production programme
- use an appropriate and up to date sample plan and compliance check lists
- have a suitable recording system for the results
- have a properly operating feedback system to their national authorities organisation for POA and the manufacturer
- maintain an effective working relationship with the manufacturer and his staff
- be able to communicate effectively.

GM 21.B.235(b) Maintenance of the POA - Work allocation within the competent authority

After issue of the approval the competent authority should appoint a suitable member of its technical staff as the POATL to be in charge of the approval for the purpose of continued surveillance.

Where the POA holder facilities are located in more than one Member State the competent authority of the State of manufacture will liaise with the competent authorities of the various partners/members to ensure appropriate continued surveillance.

GM 21.B.235(b) and (c) Continued surveillance

Continued surveillance consists of:

1. Planned continued surveillance, in which the total surveillance actions are split into several audits, which are carried out at planned intervals during the validity period of the production organisation approval. Within the continued surveillance one aspect may be audited once or several times depending upon its importance.
2. Unplanned POA reviews, which are specific additional investigation of a POA holder related to surveillance findings or external needs. The competent authority is responsible for deciding when a review is necessary taking into account changes in the scope of work, changes in personnel, reports on the organisation performance submitted by other EASA or national authorities teams, reports on the in service product.

AMC 21.B.235(c) Continuation of POA

At the end of the 24 months continued surveillance cycle the POATL responsible for the POA should complete an EASA Form 56 (see GM No.2 to 21.B.220(c)) as a summary report for the continued surveillance including the recommendation for continuation of the POA as applicable. The EASA Form 56 should be countersigned by the person responsible within the competent authority for his acceptance. At this stage there is no limitation to the number of level two findings that may be open, provided they are within the time limits of the respective corrective action plans.

[Decision 2010/001/R, 30.03.2010]

AMC No. 1 to 21.B.240 Application for significant changes or variation of scope and terms of the POA

The competent authority must receive an application for significant changes or variation of scope and terms of the POA on an EASA Form 51 (see below) completed by the applicant.

EASA Form 51	
Application for significant changes or variation of scope and terms of Part 21 POA	
<p><i>Competent authority</i></p> <p>of</p> <p>a <u>an EU Member State</u> of the European Union or</p> <p><u>EASA</u></p>	
1. Name and address of the POA holder:	
2. Approval reference number:	
3. Locations for which changes in the terms of approval are requested:	
4. Brief summary of proposed changes to the activities at the item 3 addresses:	
a) General:	
b) Scope of approval:	
c) Nature of privileges:	
5. Description of organisational changes:	
6. Position and name of the accountable manager or nominee:	
<hr style="width: 20%; margin: 0 auto;"/> Date	<hr style="width: 20%; margin: 0 auto;"/> Signature of the accountable manager (or nominee)

EASA Form 51

Block 1: The name must be entered as written on the current approval certificate. Where a change in the name is to be announced state the old name and address here, while using Block 5 for the information about the new name and address. The change of name and/or address must be supported by evidence, e.g. by a copy of the entry in the register of commerce.

Block 2: State the current approval reference number.

Block 3: State the locations for which changes in the terms of approval are requested or state 'not applicable' if no change is to be anticipated here.

Block 4: This Block should include further details for the variation of the scope of approval for the addresses indicated in Block 3. The Block 'General' must include overall information for the change (including changes e.g. in workforce, facilities etc.), while the Block 'Scope of approval' must address the change in the scope of work and products/categories following the principles laid down in the GM 21.A.151. The Block 'nature of privileges' must indicate a change in the privileges as defined in 21.A.163(b)-(d). State 'not applicable' if no change is anticipated here.

Block 5: This Block must state the changes to the organisation as defined in the current production organisation exposition, including changes the organisational structure, functions and responsibilities. This Block must therefore also be used to indicate a change in the accountable manager in accordance with 21.A.145(c)(1) or a change in the nomination of the responsible managers in accordance with 21.A.145(c)(2). A change in the nomination of responsible managers must be accompanied by the corresponding EASA Forms 4. State 'not applicable' if no change is anticipated here.

Block 6: State the position and name of the accountable manager here. Where there is a change in the nomination of the accountable manager, the information must refer to the nominee for this position. State 'not applicable' if no change is anticipated here.

In case of an application for a change of the accountable manager the EASA Form 51 must be signed by the new nominee for this position. In all other cases the EASA Form 51 must be signed by the accountable manager.

GM 21.B.245 Continued validity

1. GENERAL

Decisions on restriction, surrender, suspension or revocation of POA will always be actioned in such a way as to comply with any applicable national laws or regulations relating to appeal rights and the conduct of appeals, unless the decision has been taken by the Agency. In such case, the Agency appeal procedures will apply.

2. RESTRICTION is temporary withdrawal of some of the privileges of a POA under 21.A.163.

3. SURRENDER is a permanent cancellation of a production organisation approval by the competent authority upon formal written request by the accountable manager of the organisation concerned. The organisation effectively relinquishes its rights and privileges granted under the approval and, after cancellation, may not make certifications invoking the approval and must remove all references to the approval from its company documentation.

4. SUSPENSION is temporary withdrawal of all the privileges of a production organisation approval under 21.A.163. The approval remains valid but no certifications invoking the approval may be made while the suspension is in force. Approval privileges may be re-instated when the circumstances causing the suspension are corrected and the organisation once again can demonstrate full compliance with the Requirements.

5. REVOCATION is a permanent and enforced cancellation of the whole of an approval by the competent authority. All rights and privileges of the organisation under the approval are withdrawn and, after revocation, the organisation may not make any certifications or other statements invoking the approval and must remove all references to the approval from its company documentation.

AMC 21.B.245 Corrective action plan

It is expected that any established POA holder will move quickly to re-establish compliance with Part 21 and not risk the possibility of approval suspension. Therefore, the corrective action period granted by the competent authority must be appropriate to the nature of the finding but in any case initially must not be more than six months. In certain circumstances and subject to the nature of the finding the competent authority can vary the six months period subject to a satisfactory corrective action plan agreed by the competent authority.

Failure to comply within time scale agreed by the competent authority means that provisional suspension of the POA in whole or in part must proceed.

Subpart H — Airworthiness certificates and restricted certificates of airworthiness

GM 21.B.320(b)(6) Investigation

1. Determination of necessary conditions, restrictions and/or limitations on the airworthiness certificate issued by a Member State

The competent authority of the Member State of registry may issue under its own legislation a document to list and identify all necessary conditions, restrictions and limitations that result from the investigation by the Agency and/or from the legislation of the competent authority of the Member State of registry. This document could take the form of an addendum to the approved flight manual or operating instruction or comparable document and should be referenced in Block 5 (limitations/remarks) of the appropriate certificate of airworthiness.

GM 21.B.325(a) Airworthiness certificates

1. Completion of the certificate of airworthiness by a Member State

Block 5: Insert restrictions developed in accordance with Part 21, including any reference to limitations as indicated in GM 21.B.320(b)(6).

2. Completion of the restricted certificate of airworthiness by a Member State

Block 5: Insert restrictions developed in accordance with Part 21, including any reference to limitations as indicated in GM 21.B.320(b)(6).

[Decision 2010/001/R, 30.03.2010]

GM 21.B.325(b) Completion of the Airworthiness Review Certificate by a Member State

- 1 Purpose

In accordance with the applicable continuing airworthiness requirements a certificate of airworthiness is valid only if a valid airworthiness review certificate is attached to it. For new aircraft, the competent authority will issue the airworthiness review certificate when issuing the certificate of airworthiness.

Subpart I — Noise certificates

GM 21.B.425(a) Noise certificates

1. Completion of the noise certificate by a Member State
 - 1.1 Completion instructions
 - Block 1. State of registry

The name of the State issuing the noise certificate. This item should match the corresponding information on the certificate of registration and certificate of airworthiness.
 - Block 2. Noise certificate

The title of the EASA Form 45 is 'Noise Certificate'
 - Block 3. Document No

A unique number, issued by the State of registry that identifies this particular document in their administration. Such a number will facilitate any enquiries with respect to the document.
 - Block 4. Registration marks

The nationality or common mark and registration marks as issued by the State of registry in accordance with Annex 7 to the Chicago Convention¹. This item should match the corresponding information on the certificate of registration and certificate of airworthiness.
 - Block 5. Manufacturer and manufacturer's designation of aircraft

The type and model of the subject aircraft. This item should match the corresponding information on the certificate of registration and certificate of airworthiness.
 - Block 6. Aircraft serial No

The aircraft serial number as given by the manufacturer of the aircraft. This item should match the corresponding information on the certificate of registration and certificate of airworthiness.
 - Block 7. Engine

The designation of the installed engine(s) for identification and verification of the aircraft configuration. It should contain the type and model of the subject engine(s). The designation should be in accordance with the type certificate or supplemental type certificate for the subject engine(s).
 - Block 8. Propeller

The designation of the installed propeller(s) for identification and verification of the aircraft configuration. It should contain the type and model of the subject propeller(s). The designation should be in accordance with the type certificate or supplemental type certificate for the subject propeller(s). This item is included only in noise certification documentation for propeller driven aeroplanes.
 - Block 9. Maximum take-off mass (kg)

The maximum take-off mass associated with the certificated noise levels of the aircraft in kilograms. The unit (kg) should be specified explicitly in order to avoid misunderstanding. If the primary unit of mass for the State of manufacture of the aircraft is different from kilograms, the conversion factor used should be in accordance with Annex 5 to the Chicago Convention.
 - Block 10. Maximum landing mass (kg)

¹ The Convention on International Civil Aviation on 7 December 1944

The maximum landing mass associated with the certificated noise levels of the aircraft in kilograms. The unit (kg) should be specified explicitly in order to avoid misunderstanding. If the primary unit of mass for the State of manufacture of the aircraft is different from kilograms, the conversion factor used should be in accordance with Annex 5 to the Chicago Convention. This item will only be included in the noise certification documentation for noise certificates issued under Chapter 2, 3, 4, 5 and 12.

Block 11. Noise certification standard

The Chapter to which the subject aircraft is noise certificated. For chapters 2, 8, 10 and 11, the section specifying the noise limits should also be included.

Block 12. Additional modifications incorporated for the purpose of compliance with the applicable noise certification standards

This item should contain as a minimum all additional modifications to the basic aircraft as defined by Blocks 5, 7 and 8 that are essential in order to meet the requirements of this Annex to which the aircraft is certificated as given under Block 11. Other modifications that are not essential to meet the stated chapter but are needed to attain the certificated noise levels as given may also be included at the discretion of the certifying authority. The additional modifications should be given using unambiguous references, such as supplemental type certificate (STC) numbers, unique part numbers or type/model designators given by the manufacturer of the modification.

Block 13. Lateral/full-power noise level

The lateral/full-power noise level as defined in the relevant Chapter. It should specify the unit (e.g. EPNdB (unit of the effective perceived noise level)) of the noise level and the noise level should be stated to the nearest tenth of a decibel (dB). This item is included only in noise certification documentation for aircraft certificated to Chapters 2, 3, 4, 5 and 12.

Block 14. Approach noise level

The approach noise level as defined in the relevant chapter. It should specify the unit (e.g. EPNdB) of the noise level and the noise level should be stated to the nearest tenth of a dB. This item is included only in noise certification documentation for aircraft certificated to Chapters 2, 3, 4, 5, 8 and 12.

Block 15. Flyover noise level

The flyover noise level as defined in the relevant chapter. It should specify the unit (e.g. EPNdB) of the noise level and the noise level should be stated to the nearest tenth of a dB. This item is included only in noise certification documentation for aircraft certificated to Chapters 2, 3, 4, 5 and 12.

Block 16. Overflight noise level

The overflight noise level as defined in the relevant chapter. It should specify the unit (e.g. EPNdB or dB(A) (unit of the A-weighted noise level)) of the noise level and the noise level should be stated to the nearest tenth of a dB. This item is included only in noise certification documentation for aircraft certificated to Chapters 6, 8 and 11.

Block 17. The take-off noise level

The take-off noise level as defined in the relevant chapter. It should specify the unit (e.g. EPNdB or dB(A)) of the noise level and the noise level should be stated to the nearest tenth of a dB. This item is included only in noise certification documentation for aircraft certificated to Chapters 8 and 10.

Block 18. Statement of compliance, including reference to Annex 16 to the Chicago Convention, Volume I

SECTION B/Subpart I

AMC & GM for PART 21

The statement is provided in EASA Form 45.

Block 19. Date of issue

The date on which the document was issued.

Block 20. Signature

The signature of the officer issuing the noise certificate. Other items may be added such as seal, stamp etc.

Additional information:

1. Logo and name of the issuing authority

In order to facilitate recognition the logo or symbol and the name of the issuing authority may be added in the box 'For use by the State of registry'.

2. Language

States issuing their noise certification documentation in a language other than English should provide an English translation.

[Decision 2007/008/R, 3.4.2007]

Subpart P — Permit to fly**AMC 21.B.520(b) Application for a permit to fly**

The competent authority must receive an application for permit to fly ~~on an~~ **in a form and manner established by that authority, e.g. on** EASA Form 21 (see below) completed by the applicant.

Application for Part 21 Permit to Fly	
1. Applicant:	<i>[Name of applicant]</i>
2. Aircraft nationality and identification marks:	
3. Aircraft owner:	
4. Aircraft manufacturer/type	5. Serial number
6. Purpose of flight <i>[Use terminology of 21.A.701(a) and add any additional information for accurate description of the purpose, e.g. place, itinerary, duration...]</i> <i>[For an application due to a change of purpose (ref. 21.A.713): reference to initial request and description of new purpose]</i>	
7. Expected target date(s) for the flight(s) and duration	
8. Aircraft configuration as relevant for the permit to fly 8.1 The above aircraft for which a permit to fly is requested is defined in <i>[add reference to the document(s) identifying the configuration of the aircraft. Same as required in AMC 21.A.263(c)(6) or AMC 21.A.709(b) application approval form 18A or 18B, box 56]</i> 8.2 The aircraft is in the following situation related to its maintenance schedule: <i>[Describe status]</i>	
9. Approval of flight conditions <i>[if not available at the time of application, indicate reference of request for approval]</i> <i>[Reference to:</i> 1. EASA approval, if flight conditions are approved by EASA; or 2. DOA approval form (see AMC 21.A.263(c)(6)), if approved under DOA privilege; or 3. Competent authority approval.	
10. Date:	11. Name and signature: <i>[Authorised signatory]</i>

EASA Form 21

[Decision 2007/006/R, 5.4.2007]