EUROPEAN MILITARY AIRWORTHINESS REQUIREMENT

EMAR 21

AMC & GM

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MILITARY AIRWORTHINESS AUTHORITIES FORUM

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Note:

This EMAR AMC/GM relies on definitions laid down in EMAD 1.

TABLE OF CONTENTS

ACCEPTABLE MEANS OF COMPLIANCE/GUIDANCE MATERIAL

SECTION A -TECHNICAL REQUIREMENTS

SUBPART A – GENERAL

AMC 21A.2 Undertaking by another organisation than the applicant for, or holder of, a certificate

In order to undertake the actions and obligations of the holder of, or applicant for, the certificate, the organisation should have an agreement in place with an approved Design Organisation who has access to the Type Design data.

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

For occurrence reporting, additional guidance material can be found in civil regulations EASA AMC 20-8, in EASA AMC 20.

In particular:

a) The products and part and appliances design rules prescribe that occurrences defined as a failure, malfunction, defect or other occurrence which has resulted in or may result in an unsafe condition must be reported to the Authority;

b) According to the product and part and appliances production rules occurrences defined as a deviation which could lead to an unsafe condition must be reported to the Authority.

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

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 Authority 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 should 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.

AMC 21A.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, 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 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 Authority considers there is an unsafe condition. There may be other cases where overriding safety considerations may lead the Authority 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 21A.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,
- 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 EMAR 21A.3B(b) for definition of "unsafe condition" used in EMAR 21A.3(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: Military Type-Certificates (MTC) or Military Supplemental Type-Certificates (MSTC) for aircraft, engines or propellers, or European Military Technical Standard Orders (EMTSO).

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 are to be consistent with that required by the airworthiness requirements 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 has to 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 has to 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
- The handling qualities, although having been found to comply with the applicable airworthiness requirements 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, as guidance, in EASA Certification Specification for Large Aircraft (CS – 25) 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 are to 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);
- 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 is 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 Authority 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 applicable airworthiness requirements. Further guidance at the engine level for those failures considered as hazardous can be found in CS-E-510 under EASA Certification Specification – Engines (CS-E).
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

The consequences and probabilities of propeller failures have to be assessed at the aircraft level in accordance with paragraph 2.1, and applicable airworthiness requirements. Further guidance at the propeller level for those failures considered as hazardous can be found in CS-P-70 under EASA Certification Specification – Propellers (CS-P).

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 is to be used to assess whether the crew or maintenance error raises issues that require regulatory action (whether in design or other areas), or is to 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 is to 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 Authority may decide to make mandatory such corrective action if necessary.

GM 21A.3B(d)(4) Compliance time charts for military aircraft

If it is not possible to find mitigations and/or limitations that re-establish compliance with all the applicable safety requirements, an increased risk for an individual failure could be acceptable for a fixed period of time if it is demonstrated that during this period the cumulative probability of catastrophic event per flight hour is still compliant with the type-certification basis.

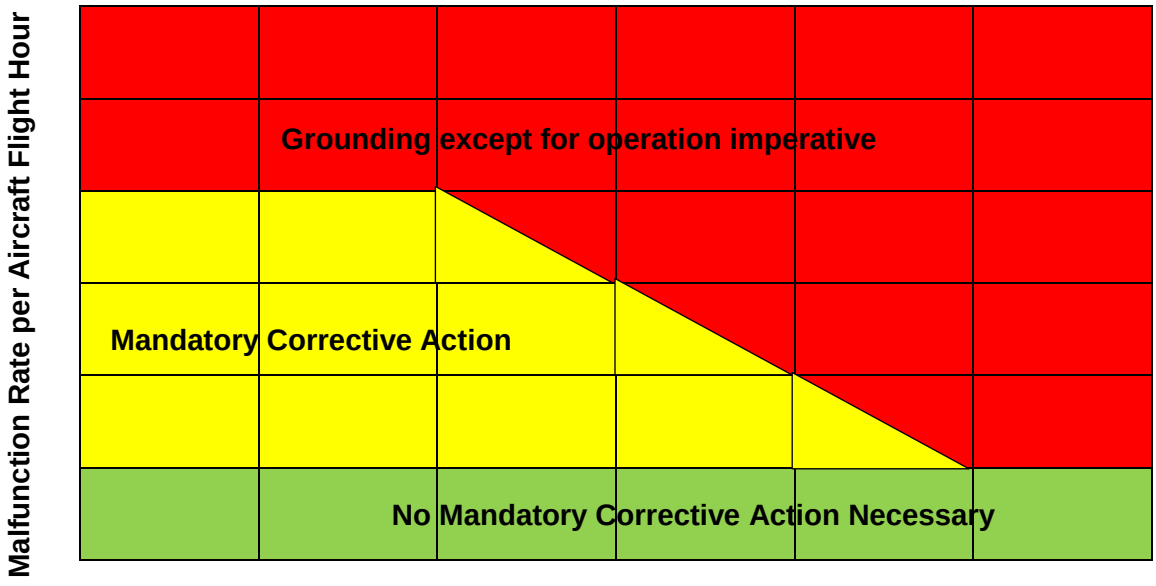
Exceptions are possible in accordance with National regulations.

The residual risk during the time allowed to fix the defect is to be identified and minimized. Risk assessment techniques could be used to establish the deadline period to fix defects as agreed by the National Authority.

The civil regulations EASA Part 21 (21.A3b) allow a time period that is directly related to the level risk ie higher the risk the shorter the time period. These regulations have hard limits for the maximum instantaneous risk, the maximum risk for an individual aircraft and maximum cumulative risk for the fleet. The basis of these regulations considers typical civil operation, of 10 major safety campaigns during an aircraft life, a hull life of 60,000 hours and that 75% of the risk is attributed to the design. Using the above assumptions they calculate an acceptable time period for restoration of risk levels to certification levels.

For military aircraft the above assumptions are not necessarily valid and the acceptable levels of risk likely to be different, however the principles of the civil system can be equally applied to the military regulations. The graphical representation below, on a logarithmic scale, is adapted from civil regulations AMC to EASA Part 21.A3b, without the numerical limits, and can be used to enable the Authority (where national regulations allow) to determine appropriate numerical limits, considering the role of the aircraft. There will be different limits for Catastrophic and Hazardous failures.

Risk and Reaction Times



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

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

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

Information to be provided:

Company Name: the name of the responsible design organisation (MTC, MSTC, approval of repair or minor change design, EMTSO authorisation holder) issuing the information.

Date: the date at which the information is released.

Eligibility: indicate the specific products or articles, in case of EMTSO 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 could be stated. Marking requirements of EMAR 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 EMTSO authorisation or EMPA 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 EMAR 21A.133(b) and (c))

b) Information regarding eligibility for installation (replacement parts, repair, modification, etc.)

c) Direct Delivery Authorisation (AMC No 1 to EMAR 21A.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 MSTC, 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 the EMAR Form 1.

Approval: provide reference information related to the approval of the data (Authority document or MDOA 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 Authority.

SUBPART B – MILITARY TYPE-CERTIFICATES

GM 21A.14(b) Eligibility for alternative procedures

Design organisations approved under EMAR 21 Section A Subpart J ("Subpart J MDOA") is to be the normal approach for military type-certification, military supplemental type-certification, approval of major changes to type design or approval of major repair design, except when agreed otherwise by the Authority in accordance with EMAR 21A.14, EMAR 21A.112B and EMAR 21A.432B.

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

AMC 21A.14(b) Alternative Procedures

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

1. Scope

1.1 As alternative to MDOA, a manual of procedures should set out specific design practices, resources and sequence of activities relevant for the specific projects, taking account of EMAR 21 requirements.

1.2 These procedures should be concise and limited to the information needed for quality and proper control of activities by the applicant/holder, and by the Authority.

2. Management of the (supplemental) type-certification process

2.1 For a particular project, at the beginning of the process, the applicant should propose to the Authority 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 should 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 Authority 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 Authority the means by which such compliance has been shown.

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

- 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 Authority decision is needed before further action;
- the flow of information to the Authority;
- 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 Authority;
- the establishment of the compliance documentation, including the time schedule and availability to the Authority;
- the control of the time schedule, for the accomplishment of the tasks in due time.

The applicant should submit all revisions of the certification programme to the Authority for acceptance.

2.2 The applicant should 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 should 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 should be defined in order to have an adequate link with the certification programme.

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

2.3 There are no privileges associated with alternative procedures, however the Authority will decide on the extent of its involvement in the verification of compliance documents. This involvement may vary according to the Authority knowledge of the applicant from previous and on-going activities and the resulting assessment of competence, and should 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 MTC or MSTC applicant should provide procedures acceptable to the Authority 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 should address the following points:

- identification of changes to type design;
- airworthiness classification;
- changes to type design initiated by subcontractors;
- documents to justify the classification;
- authorised signatories.

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

3.2.2 Identification of changes to type design

The procedure should indicate how the following are identified:

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

3.2.3 Airworthiness classification

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

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

3.2.4 Control of changes to type design initiated by subcontractors

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

3.2.5 Documents to justify the classification

All decisions of classification of changes to type design should be documented and approved by the Authority. 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 Authority for approval.

3.3 Approval of changes to type design

3.3.1 Content

The procedure should 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 compliance with the applicable airworthiness requirements is necessary, compliance documentation should be established following guidelines of paragraph 2.2.

3.3.3 Approval process

A For the approval of major changes to type design, a certification programme as defined in paragraph 2.1 should be established.

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

This document should include at least :

- identification and brief description of the change and its classification;
- applicable requirements;
- 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 should define a means:

- to identify the change;
- to present the change to the Authority for approval.

3.3.4 Authorised signatories

The procedure should identify the persons authorised to sign the change before release to the Authority 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 should 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 should be established in accordance with EMAR 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 MTC, MSTC, 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 S1000D Chapters, 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 Authority for approval should be identified in the procedure.

The procedure should include the information or instructions prepared by subcontractors or vendors, and declared applicable to its products by the MTC, MSTC, approval of changes to type design or approval of repair design holders.

4.3 Statement

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

5. Obligations addressed in EMAR 21A.44 (MTC holder), EMAR 21A.118A (MSTC holder) or EMAR 21A.451 (repair design approval holder)

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

6. Control of design subcontractors

The applicant should establish the necessary procedures to show to the Authority how it will control design subcontractors.

GM 21A.16A Airworthiness Codes

The European Military Airworthiness Certification Criteria (EMACC) handbook identifies the Airworthiness Codes (as defined in EMAD-1: Definitions and Acronyms Document) that can be used to show compliance of the product.

GM 21A.16B Special Conditions

EMAR 21A.16B introduces 3 categories of Special Conditions (as defined in EMAD-1):

a) Novel and unusual design features;

b) Unconventional use of product;

c) Service experience has shown that unsafe conditions may exist.

However, the need for a Special Condition, with an equivalent level of safety, based on in-service experience should be judged by using the following points as benchmarks:

a) The words “unsafe conditions” are used in GM EMAR 21A.3B(b) to justify the basis for an airworthiness directive;

b) The words “continued safe flight and landing” 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.

GM 21A.17A Type-certification Basis

The EMACC Guidebook offers guidance on how to tailor the criteria for the type-certification basis, based on the intended military use of the product.

GM 21A.33 Investigation and Tests

The requirements of EMAR 21A.33(a) will not preclude the applicant requesting the Authority 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 criteria. However in case of flight test the applicant is to have performed subject tests before the Authority tests and is to ensure that no features of the product preclude the safe conduct of the evaluation requested. The Authority 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 EMAR 21A.33(b) is also required for the above tests.

GM 21A.35 Flight Tests

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

GM 21A.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 will continue to do so in service.

2. Content of function and reliability testing

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

It may be possible to combine this testing with any required to show compliance with the applicable certification criteria. This will be agreed on a case-by-case basis with the Authority.

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

A substantial proportion of the flying is to be on a single aircraft. The flying is to 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 is to include a range of representative ambient operating conditions and airfields.

GM 21A.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 EMAR 21A.35(f)(1). At least 150 of the 300 flying hours is to 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 21A.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 EMAR 21A.35(f)(2).

GM 21A.42 Integration

The principles for the military type-certification (taking in account EMAR 21A.17A) are predicated on the hierarchy of the Military Type Certificate and subordinate certification:

- The use of the MTC is limited to Products, namely aircraft, engine or propeller.
- The certification of Parts is to be undertaken in accordance with Subpart K.

SUBPART C – Not applicable

SUBPART D – CHANGES TO MILITARY TYPE-CERTIFICATES

GM 21A.91 Classification of changes to a 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 EMAR 21 Section A Subpart D, i.e., either EMAR 21A.95 or EMAR 21A.97, or alternatively whether application and approval has to be made in accordance with EMAR 21 Section A Subpart E.

2. Introduction

2.1 EMAR 21A.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 phrase "appreciable effect affecting the airworthiness" of the product from EMAR 21A.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 EMAR 21A.91 and EMAR 21A.117 where classification is the first step of a procedure.

Note: For classification of Repairs see GM EMAR 21A.435(a).

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

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

For APU, this GM is to be used.

3. Assessment of a design change for classification

3.1 Changes to the type design

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

3.2 Classification Process (see attached diagram in Appendix A)

EMAR 21A.91 requires all changes to be classified as either major or minor, using the criteria of EMAR 21A.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 is to wait for availability of data before making a decision.

Wherever there is doubt as to the classification of a change, the Authority is to 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 the Authority 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 Authority in the continued airworthiness process.

Reasons for a classification decision are to 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 is to be classified major, in particular but not only, when one or more of the following conditions are met:

a) Where the change requires an adjustment of the type-certification basis (such as special condition, equivalent safety finding, elect to comply, exemption, reversion, later requirements);

b) Where the applicant proposes a new interpretation of the requirements used for the type type-certification basis that has not been published as AMC material or otherwise agreed with the Authority;

c) 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;

d) Where the extent of new substantiation data necessary to comply with the applicable airworthiness requirements and the degree to which the original substantiation data has to be re-assessed and re-evaluated is considerable;

e) The change alters the Airworthiness Limitations or the Operating Limitations;

f) The change is made mandatory by an airworthiness directive or the change is the terminating action of an airworthiness directive (ref. EMAR 21A.3B), see Note 1;

g) 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 Authority 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 EMAR 21A.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 EMAR 21A.91.

Appendix A to GM 21A.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 EMAR 21A.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 are to 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 EMAR 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 EMAR 21A.91. Strictly speaking the words “has appreciable effect” and “appreciably affect(s)” would have been used, but this has not been done to improve readability.

1. Structure

a) Changes such as a cargo door cut-out, fuselage plugs, change of dihedral, addition of floats;

b) Changes to materials, processes or methods of manufacture of primary structural elements, such as spars, frames and critical parts;

c) Changes that adversely affect fatigue or damage tolerance or life limit characteristics;

d) Changes that adversely affect aero-elastic characteristics;

e) Changes that affect primary structural element loads and their path.

2. Cabin Safety

a) 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.

b) Changes to the pressurisation control system which adversely affect previously approved limitations.

3. Flight

a) Changes which adversely affect the approved performance, such as high altitude operation, brake changes that affect braking performance, deck landing, operation with night vision devices, air to air refuelling, low level flight.

b) Changes which adversely affect the flight envelope.

c) 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 the applicable airworthiness requirements the classification process is based on the functional aspects of the change and its potential effects on safety.

a) Where failure effect is 'Catastrophic' or 'Hazardous', the change is to be classified as major.

b) Where failure effect is 'major', the change is to 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 wind-shear, HUD.

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

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

Where a change is made to software produced in accordance with the guidelines of EUROCAE ED12C/RTCA DO-178C "Software Considerations in Airborne Systems and Equipment Certification", the change is to be classified as major if either of the following apply, and the failure effect is Catastrophic, Hazardous or Major:

a) 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

b) the software is upgraded to or downgraded from Level A, Level B or Level C; or

c) the executable code, determined to be level C, is deeply changed, e.g., after a software reengineering process accompanying a change of processor.

For software developed to guidelines other than EUROCAE ED-12C/ RTCA DO-178C, the applicant is to assess changes in accordance with the foregoing principles.

For other codes the principles noted above may be used. However, due consideration is to be given to specific requirements/interpretations.

5. Propellers

Changes to:

a) diameter;

b) airfoil;

c) planform;

d) material;

e) blade retention system, etc.

6. Engines

Changes:

a) that adversely affect operating speeds, temperatures, and other limitations;

b) that affect or introduce parts (as identified by the applicable airworthiness requirements) where the failure effect has been shown to be hazardous;

c) that affect or introduce engine critical parts (as identified by the applicable airworthiness requirements) or their life limits;

d) to a structural part which requires a re-substantiation of the fatigue and static load determination used during certification;

e) to any part of the engine which adversely affects the existing containment capability of the structure;

f) that adversely affect the fuel, oil and air systems, which alter the method of operation, or require reinvestigation against the type-certification basis;

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

7. Rotors and drive systems

Changes that:

a) 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.

b) affect systems the failure of which may have hazardous or catastrophic effects. The design assessment will include:

- cooling system;
- lubrication system;
- rotor controls.

c) adversely affect the results of the rotor drive system endurance test, such as the rotor drive system required in EASA CS 27/29-917.

d) adversely affect the results of the shafting critical speed analysis such as required by EASA CS 27/29-931.

8. Environment (where applicable)

A change that introduces an increase in noise or emissions.

9. Power plant Installation

Changes which include:

a) control system changes which affect the engine/propeller/airframe interface;

b) new instrumentation displaying operating limits;

c) modifications to the fuel system and tanks (number, size and configuration);

d) change of engine/propeller type.

10. Operational capabilities

Integration or modification of mission equipment that could adversely affect safety of third parties include, but are not limited to:

a) installation of in-flight refuelling capabilities;

b) installation of new external tanks;

c) installation of new weapons and stores;

d) installation of new equipment that may affect Electromagnetic Environmental Effects (E3) integrity (eg new radar) installation of aerial delivery systems;

e) installation of flare and chaff system;

f) installation of systems integrating a high power laser;

g) modification to the release device of a jettisoning tank.

A classification process would be:

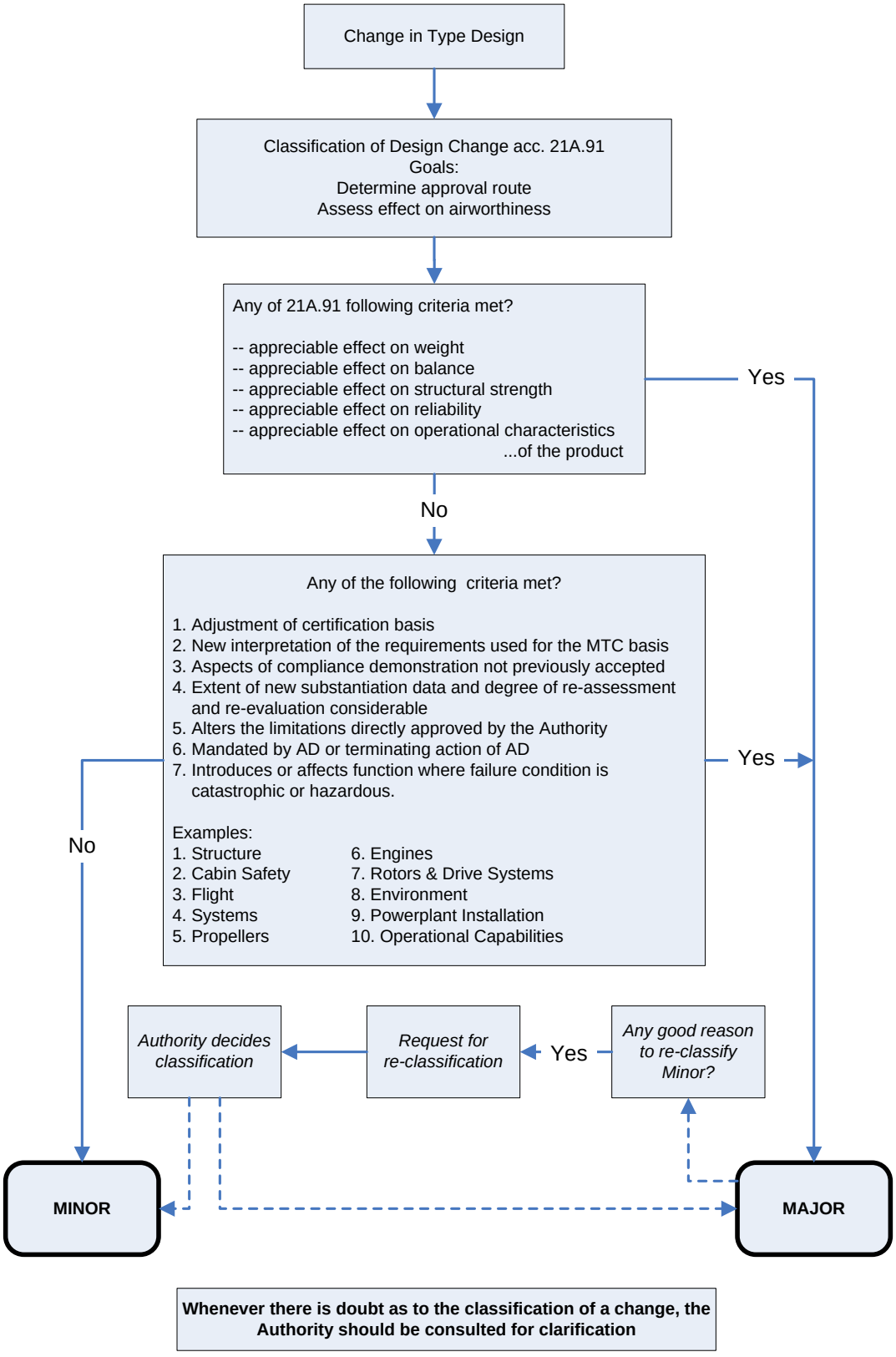


Figure 1 – Classification Process

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

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

GM 21A.101 Establishing the type-certification basis of Changed Aeronautical Products

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

Chapter 1. Introduction

1. Purpose

a) This GM provides guidance for establishing the military type-certification basis for changed aeronautical products in accordance with EMAR 21A.101 and to help identify if it will be necessary to apply for a new military type-certificate (MTC) under EMAR 21A.19. The guidance describes the process for establishing the type-certification basis for changes to military type certificates or military restricted type-certificates, military supplemental type certificates (MSTC) and amended MSTCs, detailing evaluations, classifications, and decisions made throughout the process.

b) The content of this GM is divided into four Chapters:

i. 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 the application of EMAR 21A.19 and EMAR 21A.101.

ii. Chapter 2 provides a general overview of EMAR 21A.19 and EMAR 21A.101, clarifies the principles and safety objectives and directs applicants to the applicable guidance contained in subsequent chapters of this GM.

ii. Chapter 3 contains guidance for implementation of EMAR 21A.101(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 EMAR 21A.19 considerations to identify conditions under which an applicant for a type design change is required to submit application for a new MTC and provides guidance at which stage of the process this assessment is to be performed.

iv. 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 EMAR 21A.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.

c) This GM describes an acceptable means, but not the only means to comply with EMAR 21A.19 and EMAR 21A101. However, if an applicant chooses to use the means described in this GM, they are to follow it entirely

2. Audience

This GM is for applicants applying for:

- major changes to type design of products under EMAR 21A.97 and to type design of Auxiliary Power Units (APUs) under EMAR 21A.604(b)),
- supplemental type-certificates (MSTCs) under EMAR 21A.113, or
- major changes to MSTCs under EMAR 21A.117(b).

3. Applicability

a) Reserved.

b) This GM applies to major type design changes under EMAR 21A.101 for aeronautical products type-certificated, restricted type-certificated, supplemental type-certificated or EMTSO approved (APU) under EMAR 21 (ref. 21A.21. 21A.23, 21A.115, 21A.604), with application for the type-certification basis of the applicable airworthiness code for the Certification Basis.

c) Minor type design changes are automatically considered not significant under EMAR 21A.101(b) and the existing type-certification basis is considered adequate for their approval under EMAR 21A.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 EMTSO 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 EMAR 21A.101 is considered adequate when the Authority determines that it provides adequate standards for the design change, i.e. when 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 EMTSO 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.

Certification requirements – Refers to each requirement of the type-certification basis based on recognised airworthiness codes and/or standards (e.g. EASA CS, FAA FAR, Mil Hdbk, JSSG, STANAG, Def-STAN, etc.).

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 airworthiness codes and/or standards – The applicable airworthiness codes and/or standards 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 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 airworthiness codes and/or standards – The applicable airworthiness codes and/or standards 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 airworthiness codes and/or standards 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 is to be considered in the context of all previous relevant design changes and all related revisions to the applicable airworthiness codes and/or standards. Not all product level changes are significant.

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 military type certificate, in accordance with EMAR 21A.19.

Chapter 2. Overview of EMAR 21A.19 and 21A.101

1. 21A.19

a) EMAR 21A.19 requires an applicant to obtain a new military type-certificate (MTC) for a changed product if the change in design, power, thrust, or weight is found by the Authority 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.

c) If the Authority has determined through EMAR 21A.19 that the proposed design change does not require a new MTC, see EMAR 21A.101 for the applicable implementing rules to establish the type-certification basis for the proposed design change. For guidance, see Chapter 3.

2. 21A.101

a) EMAR 21A.101(a) requires a change to a MTC to comply with the airworthiness codes that are applicable to the changed product and that are in effect at the date of the application, unless the change meets the criteria for the exceptions identified in EMAR 21A.101(b). The intent of EMAR 21A.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 an earlier amendment of the airworthiness code consistent with the requirements of EMAR 21A.101(b), when:

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

c) Note that earlier amendments may not precede the corresponding amendment of the airworthiness code incorporated by reference in the military type-certificate.

d) EMAR 21A.101(b) allows a changed product to comply with an earlier amendment of the applicable airworthiness code, provided one of the criteria in EMAR 21A.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 do not contain adequate or appropriate standards for the changed product, later amendments and/or special conditions will be applied.

e) EMAR 21A.101(b)(1)(i) and (ii) describe the automatic criteria establishing that a change is significant.

f) Reserved.

g) EMAR 21A.101(d) provides for the use of special conditions, under EMAR 21A.16B, when the proposed amendment of the applicable airworthiness code and any later amendment do not provide adequate standards to the proposed change.

h) Reserved.

Chapter 3. The Process for Establishing the Type-certification Basis for Changed Products EMAR 21A.101 (a) and (b)

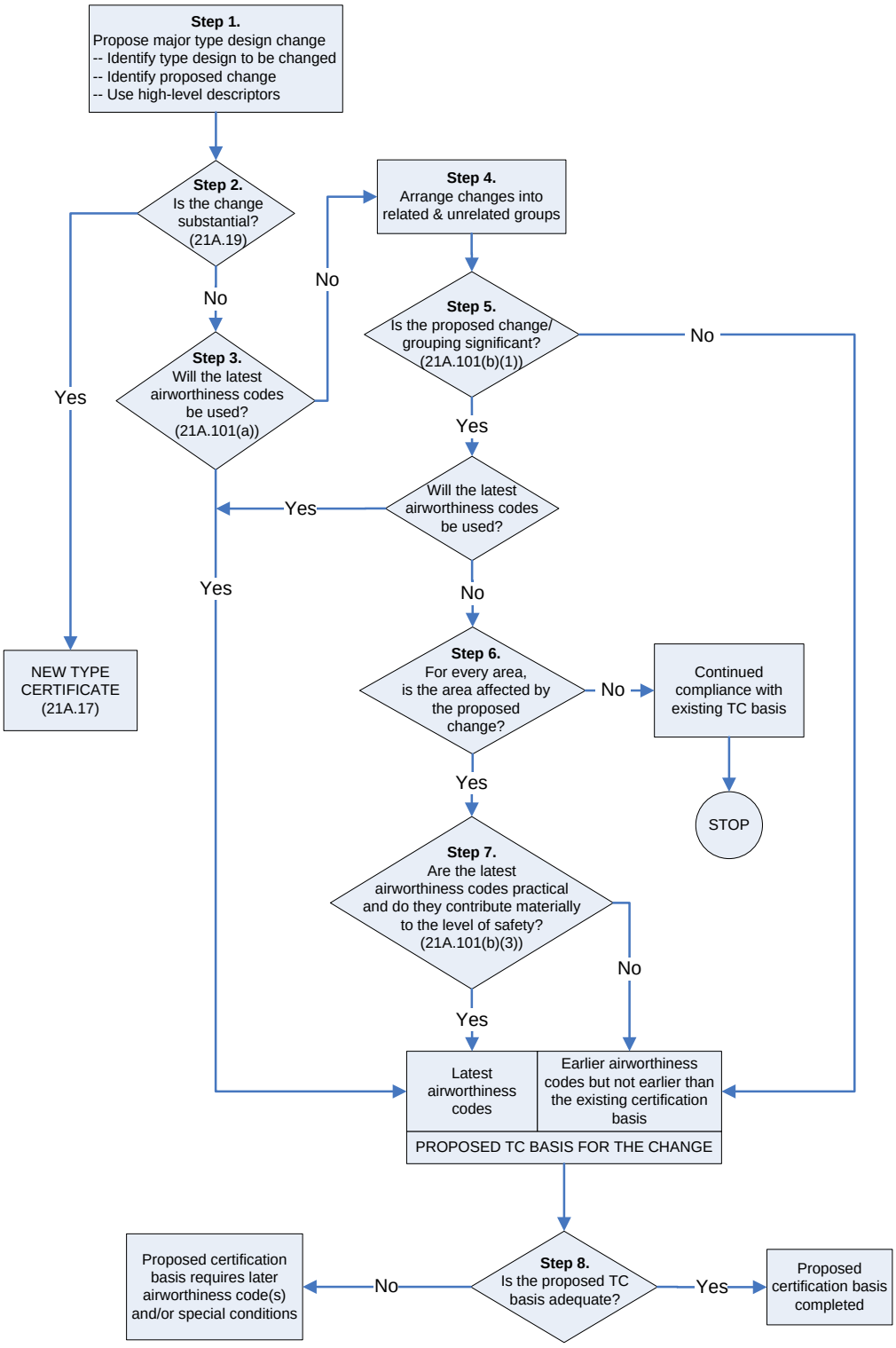
1. Overview

a) Both the applicant and the Authority have responsibility under EMAR 21A.101(a) and (b). The applicant is to show that the change complies with the latest applicable airworthiness code unless use of an exception per EMAR 21A.101(b) is justified. If an exception is proposed, the applicant is to make a preliminary classification whether the change is significant or not significant, and propose an appropriate type-certification basis. The Authority 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 will not be dependent on whether the MTC holder or applicant for a MSTC 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 Authority.

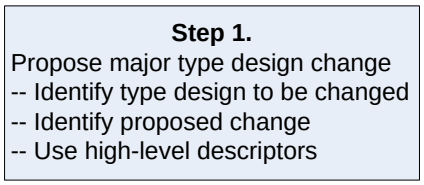
b) Reserved.

c) The following steps in conjunction with Figure 2 can be used to establish the appropriate type-certification basis for the type design change.

Fig. 2. Establishing the type-certification basis for a changed product



2. Step 1 of Figure 2. 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 is to identify which model or series within that model is the specific configuration that will be modified.

Note: An MSTC is not a product; it is a change to a product.

When changing or amending an MSTC the starting point is the existing modified product (MTC with existing MSTC installed). For example, if an applicant were amending an MSTC for an external cargo locker and the applicant proposed changing the configuration of the locker, then the starting point would be the existing MTC with the existing MSTC installed.

The applicant would then compare that configuration (MTC with existing MSTC installed) to the changed product (MTC with proposed amended MSTC 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 is to 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 is to be now considered in relation to the proposed type design change and is to 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 is to be taken into account in the next design change proposal.

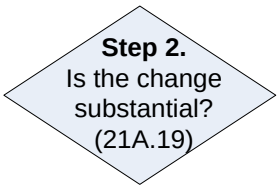
(1) Example 1: A 5% weight increase is currently being proposed, but a previous 10% and another 15% weight increase has been incorporated into this aircraft without upgrading the existing type-certification basis. In the current proposal for a 5% weight increase, the cumulative effects of the two previous 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 airworthiness code in the type-certification basis were upgraded.

(2) Example 2: The MTC 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 airworthiness code affected by the proposed change, it was identified that one requirement (e.g., damage tolerance), remained at the same amendment level as the X-100 original type-certification basis (derogation from EMAR 21A101(a) was allowed). Since the amendment level for this particular requirement 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 are to 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 reclassification 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 2. Is the change substantial?



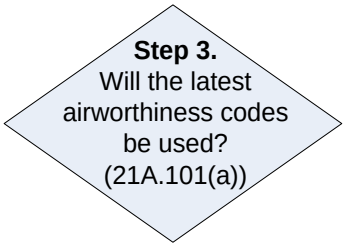
a) EMAR 21A.19 requires an applicant to apply for a new MTC for a changed product if the proposed change in design, power, thrust, or weight is so extensive that a substantially complete investigation of compliance with the applicable regulations is required. A new MTC could be required for either an 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 airworthiness code requirements applicable to a particular category of product. The number of airworthiness code requirements to which compliance is to 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 is to 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) A substantial change requires application for a new MTC under EMAR 21A.17 and EMAR 21A.19. If the change is not substantial, then follow the EMAR 21A.101 process.

4. Step 3 of Figure 2. Will the Latest Airworthiness Codes be Used?



a) The applicant can use the latest airworthiness codes for their proposed type design change. If the latest airworthiness codes are used, the applicant will meet the intent of

EMAR 21A.101 and no further classification (significant or not significant) and justification is needed. However, the decision to voluntarily comply with the latest certification standards 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, another applicant could apply EMAR 21A.101 for a similar design change proposal, and use the exceptions in accordance with EMAR 21A.101(b). If the latest airworthiness codes are not used, then proceed as follows:

5. Step 4 of Figure 2. Relation of Changes

Step 4.
Arrange changes into related & unrelated groups

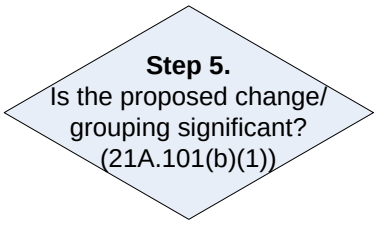
a) Once the proposed changes are identified using high-level descriptions, the next step is to determine if any of these changes are related to each other. Related changes are those that cannot exist without one another, are co-dependent, or a pre-requisite of one another. For example, a need to carry 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 2. The grouping of related and unrelated changes is particularly relevant to the significant Yes/No decision, (EMAR 21A.101(b)(1)), described in Step 5 of Figure 2. 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 is to identify areas, systems, parts or appliances of the product that are affected by the design change and the corresponding airworthiness code requirements associated with these areas. For each group, the applicant is to 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 will be updated or rewritten.

6. Step 5 of Figure 2. Is the Proposed Change Significant? (EMAR 21A.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 are to be considered. EMAR 21A.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.

(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 compliance.

(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.

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 is to focus on the design change itself. Consideration of only the regulatory importance or safety benefit of the latest

airworthiness codes and/or standards is not a justification by itself to cause a design change to be classified or re-classified as a significant change.

c) One or more of the automatic criteria in EMAR 21A.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.

d) Design changes can trigger one or more of the automatic criteria listed in EMAR 21A.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. 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 requirements 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 airworthiness codes and/or standards because it is considered “not contributing materially to the level of safety”, and therefore eligible for an exception under EMAR 21A.101(b)(1)(3). Determining whether a change meets the description for secondary change, and thus is eligible for an exception, will 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 EMAR 21A.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 Authority.

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 is to 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 the latest amendment of the applicable airworthiness codes and/or standards for certification of the changed product, unless the applicant can justify use of one of the exceptions provided in EMAR 21A.101(b)(2) and/or (3) to show compliance with earlier amendment(s). The final type-certification basis may consist of a combination of the applicable airworthiness codes and/or standards 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 is to comply with the applicable airworthiness codes and/or standards 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 EMAR 21A.101(b)(2) (see Section 9 for guidance on whether or not an area is affected by the proposed change).

c) Reserved.

d) EMAR 21A.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 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 is to provide acceptable justification for the application of earlier amendments for areas affected bya significant change. The justification will need to show that compliance with later amendment in these areas would not contribute materially to the level of safety or would be impractical. Such justification is to address all the aspects of the area, system, part or appliance affected by the significant change.

g) The final type-certification basis may combine airworthiness codes and/or standards at the latest amendment level, earlier (intermediate) amendment levels, and the amendment level of the existing type-certification basis, but cannot contain airworthiness codes and/or standards preceding the existing type-certification basis.

h) Note that if an applicant decides to use the latest airworthiness codes and/or standards 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

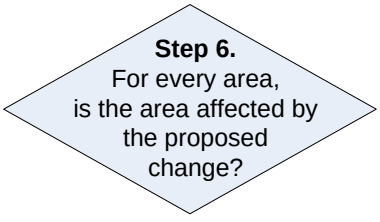
a) When a change is classified not significant, the rule (EMAR 21A.101(b)(1)) allows the use of the earlier airworthiness codes and standards, but not dated prior to the existing type-certification basis. Within this limit, the applicant is allowed to propose an amendment level for each airworthiness code and/or standard for the affected area. However, the applicant is to be aware that their proposal for the type-certification basis will be reviewed by the Authority 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 specific airworthiness codes and/or standards at later amendments. In such a case, the applicant is to consult with the Authority to ensure the type-certification basis includes other certification requirements that are directly related. Some later airworthiness codes and/or standards 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 Authority which other certification requirements 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 1.d of Chapter 1), the Authority will designate the applicable airworthiness codes and/or standards 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 airworthiness codes and/or standards, the Authority will designate special conditions.

9. Step 6 of Figure 2. Is the Area Affected By the Proposed Change? (21A.101(b)(2))



a) A ‘not affected’ 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:

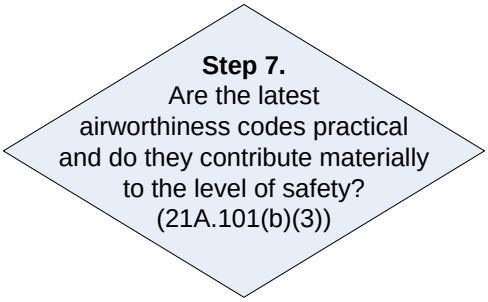
(1) Physical aspects. The physical aspects include direct changes to structures, systems, parts, and appliances (physical aspects may include software/airborne electronic hardware changes and the resulting effect on systems functions).

(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 is to be considered part of the entire proposed type design change and is to be approved as part of your proposed design change.

c) All areas affected by the proposed design change are to comply with the latest airworthiness codes and/or standards, unless the applicant can show that demonstrating compliance with the latest amendment of an airworthiness code and/or standard would not contribute to the level of safety or would be impractical. Step 7 provides further explanation.

10. Step 7 of Figure 2. Are the Latest Airworthiness Codes and/or Standards Practical and Do They Contribute Materially to the Level of Safety? (21A.101(b)(3))



a) Compliance with the latest airworthiness codes and/or standards 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 airworthiness codes and/or standards. The applicant is to provide sufficient justification to allow the Authority to make this determination. This exception could be applicable in the situations described in the paragraphs below:

Note: Compliance with later airworthiness codes and/or standards 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 requirement.

(1) Design features that exceed the existing type-certification basis, but do not meet the latest airworthiness codes and/or standards, 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, are to be incorporated in the amended type design configuration and recorded in the MTC data sheet or MSTC, where necessary, as an integral part of the type-certification basis. For example , an applicant proposes to install winglets on a large aeroplane. Part of the design involves adding a small number of new wing fuel tank fasteners. The latest certification requirements requires structural lightning protection. The applicant proposes an exception from these latest structural lightning protection requirements because the design change uses new wing fuel tank fasteners with cap seals installed. The cap seal is a design feature that exceeds the requirement at a previous amendment level, but does not meet the latest amendment. If the applicant can successfully substantiate that compliance with the previous amendment 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 is to be considered when applying the latest airworthiness codes and/or standards. 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 airworthiness codes and/or standards.

- 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 airworthiness codes and/or standards, comparable with what will be required for a new aeroplane. In these circumstances the proposed type-certification basis will need to encompass the airworthiness codes and/or standards in effect on the date of application for the change.

(3) Service experience: Relevant service experience, such as fleet performance or 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 airworthiness codes and/or standards could be appropriate.

- 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 airworthiness codes and/or standards, 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 Authority.

b) Impractical. Compliance with the latest airworthiness codes and/or standards 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 is to be supported with a substantiating data and analyses. While evaluating the applicant's position and their substantiating data regarding impracticality, the Authority 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 airworthiness codes and/or standards 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.

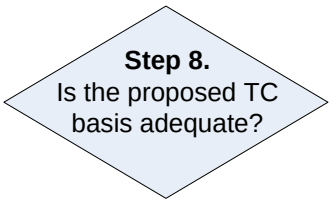
(3) There are cases where it is necessary to determine procedures for evaluating impracticality of applying latest airworthiness codes and/or standards to a changed product rule.

(a) The exception of impracticality is a qualitative and/or quantitative cost/safety benefit assessment for which itis 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 detailedcost/safety benefit analysis (although cost analysis could always be used to support an appropriate amendment level).

Note: The impractical exception is not to be based on the size of the applicant’s company or their financial resources. Costs to comply with a later amendment are to 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 airworthiness code and/or standard, and that redesign may make the changed product uncommon withrespect 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 airworthiness code and/or standard addresses.

11. Step 8 of Figure 2. 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 is to 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 a large aeroplane whose existing type-certification basis did not have lightning protection requirements. In this case, compliance with the certification requirement for lightning protection will be required, even though this is not a significant change.

b) In cases where inadequate or no airworthiness standards 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 EMAR 21A.16B(a), the Authority will prescribe special conditions containing necessary safety standard per EMAR 21A.16B(b). 21A.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 tothe 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 applicable airworthiness codes and/or standards 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 EMAR 21A.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. Reserved

3. Special Conditions. EMAR 21A.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 and/or standard 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 requirement 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 airworthiness codes and/or standards allowed through exceptions, or not significant, the level of safety intended by the special conditions are to be consistent with the agreed type-certification basis. Note that special conditions may also be applied under EMAR 21A.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. Reserved.

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. EMAR 21A.101 is equally applicable to those special purpose aircraft, except that the applicable certification requirements, the proposed change is to comply with, can exclude the paragraphs of the applicable airworthiness code that the Authority finds inappropriate for the special purpose for which the aircraft is to be used and may include possible alternative requirements to address that special purpose. Nevertheless, the “top-down” approach under EMAR 21A.101(a) and (b) (and the guidance in Chapter 3 of this GM) generally applies also to special purpose aircraft. All the exception routes under EMAR 21A.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 are to be reflected on the amended MTC or MSTC. The resulting type-certification basis is to be retained as it forms part of the compliance record required by the applicable Authority’s internal working procedures.

SUBPART E – MILITARY SUPPLEMENTAL TYPE-CERTIFICATES

GM 21A.112B Demonstration of capability for supplemental type-certificate cases

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

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

Product	**Discipline**	**Kind of MSTC**	**Group**
Small aircraft (products where Subpart J MDOA is required for MTC)			
Notes : * MSTC which leads to reassess the loads on large parts of primary structure will be in group 1. * 2/1 means that an assessment of consequences in terms of handling qualities, performance or complexity of showing 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		

Product	Discipline	Kind of MSTC	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		
		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
Large aircraft			
	Cabin Safety		

Product	Discipline	Kind of MSTC	Group
Note : Basically all changes related to cabin configuration will 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		
Note : MSTC which leads to reassess the loads on large parts of primary structure will be in Group 1.		Cargo door	1
		Change from Passenger to Freighter configuration	1
	Avionics		
Notes : For large aircraft products, the existence of EMTSO 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
		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
Helicopters	**All disciplines**		
Note : 2/1 means that an assessment of consequences in terms of handling qualities and performance may lead to classification in Group 1.		Main rotor or tail rotor blades replacement	1
		Autopilot	1
		Engine type change	1
		GPS installation	2
		Jettisonable overhead raft installation	2
		Utility basket installation	2/1

Product	Discipline	Kind of MSTC	Group
		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

SUBPART F – PRODUCTION WITHOUT PRODUCTION ORGANISATION APPROVAL

GM No. 1 to 21A.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.

GM No. 2 to 21A.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, MTC, MSTC, approval of repair or minor change design, or EMTSO authorisation (or equivalent when EMAR 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 EMAR 21), and released in a controlled manner to the manufacturer producing under EMAR 21 Section A Subpart F. This will be sufficient for the development of production data to enable manufacture in conformity with the design data.

Prior to issue of the MTC, MSTC, approval of repair or minor change design or EMTSO authorisation, or equivalent, design data is defined as ‘not approved’, but parts and appliances may be released with an EMAR Form 1 as a certificate of conformity.

After issue of the MTC, MSTC, approval of repair or minor change or EMTSO authorisation, or equivalent, this design data is defined as ‘approved’ and items manufactured in conformity are eligible for release on an EMAR Form 1 for airworthiness purposes.

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

An “arrangement” is considered suitable if it is documented and satisfies the Authority that co-ordination is satisfactory.

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

a) 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.);

b) The responsibilities and procedures of the manufacturer for receiving, managing and using the applicable design data provided by the design organisation;

c) The responsibilities and procedures of the manufacturer for developing, where applicable, its own manufacturing data in compliance with the applicable design data package;

d) 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.);

e) The scope of the arrangements covering EMAR 21 Section A Subpart F requirements, in particular: EMAR 21A.126(a)(4) and EMAR 21A.129(d) and (f) and any associated GM or AMC;

f) The responsibilities of the manufacturer, in case of products prior to type-certification to assist a design organisation in showing compliance with Certification Basis (access and suitability of production and test facilities for manufacturing and testing of prototype models and test specimen);

g) The procedures to deal adequately with production deviations and non-conforming parts;

h) 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;

i) The identification of responsible persons/offices who controls the above;

j) The acknowledgment by the holder of the MTC/MSTC/repair or change approval/EMTSO 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 EMAR 21 Section A 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 EMAR 21A.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 EMAR 21A.4).

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

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

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

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

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

Arrangement Sample Form

ARRANGEMENT i.a.w. EMAR 21A.122	
The undersigned agree on the following commitments:	relevant interface procedures
The design organisation [NAME] takes responsibility to - 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 EMAR 21 Section A Subpart F [NAME] - provide visible statement(s) of approved design data	
The person producing under EMAR 21 Section A Subpart F [NAME] takes responsibility to - 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 compliance with airworthiness requirements - develop, where applicable, its own manufacturing data in compliance with the airworthiness data package	
The design organisation [Name] and the person producing under EMAR 21 Section A Subpart F [Name] take joint responsibility to - deal adequately with production deviations and non conforming parts in accordance with the applicable procedures of the design organisation and the manufacturer producing under EMAR 21 Section A Subpart F. - achieve adequate configuration control of manufactured parts, to enable the manufacturer producing under EMAR 21 Section A Subpart F to make the final determination and identification for conformity or airworthiness release and eligibility status.	
The scope of production covered by this arrangement is detailed in ... [DOCUMENT REFERENCE/ ATTACHED LIST]	
[When the design organisation is not the same legal entity as the manufacturer producing under EMAR 21 Section A Subpart F] Transfer of approved design data The MTC/MSTC/EMTSO authorisation holder [NAME] acknowledges that the approved design data provided, controlled and modified in accordance with the arrangement are recognised as approved. Authority.	
[When the design organisation is not the same legal entity as the manufacturer producing under EMAR 21 Section A Subpart F] 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/MDOA holder] date signature xx.xx.xxxx ([NAME in block letters])	for the [NAME of the person producing under EMAR 21 Section A Subpart F] date signature xx.xx.xxxx ([NAME in block letters])

Instructions for completion:

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

Commitment: The document should include the basic commitments between the design organisation and the manufacturer producing under EMAR 21 Section A Subpart F as addressed in AMC EMAR 21A.4 and AMC No. 1 to EMAR 21A.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 should 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 EMAR 21A.122 and AMC No. 1 to EMAR 21A.122 from the design organisation to the person producing under EMAR 21 Section A Subpart F. The means by which the design organisation advises the person producing under EMAR 21 Section A Subpart F whether such data is approved or not approved should also be identified (ref. EMAR 21A.4 / AMC EMAR 21A.4).

Direct Delivery Authorisation: Where the design organisation and the person producing under EMAR 21 Section A Subpart F are separate legal entities the arrangement should 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 EMAR 21 Section A Subpart F, evidence should be available that this intermediate organisation has received authority from the design organisation to grant Direct Delivery Authorisation.

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

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

EMAR Form 60 is to be completed by the applicant.

An application may be accepted from:

a) An individual applying on his or her own behalf, or

b) In the case of an organisation, an individual with the authority to make agreements on behalf of the organisation.

The completed form is to be forwarded to the Authority.

GM to 21A.124(b)(1) Re-Use of Evidence

Organizations recognized by competent civil aviation authorities or certified as per AS/EN 9100 or the equivalent AQAP, may re-use part or all of the same process evidences in the demonstration of compliance with EMAR 21 Section A Subpart F, as agreed by the Authority.

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

The issue of a letter of agreement of production under EMAR 21 Section A Subpart F may be agreed by the Authority when:

a) 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

b) The Authority determines that EMAR 21 Section A Subpart G would be inappropriate, and consequently EMAR 21 Section A Subpart F applies. The main difference between EMAR 21 Section A Subparts G and F is that Subpart G requires the existence of a Quality System which provides the 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 Authority may take into account one or a combination of parameters such as the following:

   i. no flow production (infrequent or low volume of production);

   ii. simple technology (enabling effective inspection phases during the manufacturing process);

   iii. very small organisation.

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

In cases where EMAR 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 Authority may agree to use EMAR 21 Section A Subpart F for a limited period (transient phase).

In cases where EMAR 21 Section A Subpart G is applicable, such as to produce EMTSO articles, a letter of agreement to produce under EMAR 21 Section A Subpart F will 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 EMAR 21 Section A Subpart F will not be permitted.

GM 21A.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 are to be covered:

a) Table of Contents of the Manual (including list of existing inspection system documents or procedures);

b) Description of items to be manufactured (including intended quantities /deliveries);

c) List of possible suppliers;

d) General description of facilities;

e) General description of production means;

f) Human resources.

GM No. 1 to 21A.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 is to be specifically referenced, either directly or through a referenced capability list, in the letter of agreement from the Authority. The letter may also specify any limitation in the production rate.

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

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

a) Declaration by the applicant of undertaking in respect of:
   i. the requirements defined in EMAR 21 Section A Subpart F;
   ii. the procedures contained in the manual and in the documentation mentioned herein;
   iii. every legal provision laid down for the carrying on of the business activities (statutory declaration).

b) Declaration by the applicant certifying the conformity of the manual to the requirements defined in EMAR 21 Section A Subpart F;

c) Jobs, power and responsibilities of the accountable personnel;

d) Organisation chart, if required by the Authority;

e) Description of the resources, including human resources, with an indication of the personnel qualification criteria;

f) Description of location and equipment;

g) Description of the scope of work, the production processes and techniques, and reference to the “capability list”;

h) Communications with the Authority, and specifically those required by EMAR 21A.125A(c);

i) Assistance and communication with the design approval holder, and the means of compliance with EMAR 21A.125A(c);

j) Amendments to the Manual;

k) Description of the Inspection System (including test, see GM No. 2 to EMAR 21A.125A(b), and EMAR 21A.127 and EMAR 21A.128), and the procedures to meet EMAR 21A.126 and associated GM;

l) List of suppliers;

m) Issuing of the Statement of Conformity and Authority inspection for validation.

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

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

All items produced are to 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:

a) appliances - will require full functional testing to the specifications;

b) 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;

c) material - will require verification of its stated properties.

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

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

GM No. 1 to 21A.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 21A.125B(a) Examples for level one findings

Examples for level 1 findings are non-compliances with any of the following paragraphs, that could affect the safety of the aircraft:

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

It is to be anticipated that a non-compliance with these paragraphs 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 21A.126 Production Inspection System

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

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

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

a) The person producing under EMAR 21 Section A 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 Government Furnished Equipment (GFE) items.

b) Control may be based upon use of the following techniques, as appropriate:

   i. first article inspection, including destruction if necessary, to verify that the article conforms to the applicable data for new production line or new supplier,

   ii. incoming inspections and tests of supplied parts or appliances that can be satisfactorily inspected on receipt,

   iii. identification of incoming documentation and data relevant to the showing of conformity to be included in the certification documents,

   iv. 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.

c) The person producing under EMAR 21 Section A Subpart F may rely upon an EMAR Form 1 issued in accordance with EMAR 21 if provided as evidence of conformity with applicable design data.

d) For suppliers not holding a MPOA the inspection system of the person producing under EMAR 21 Section A Subpart F is to 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 EMAR 21 Section A Subpart F at the supplier's facility, if the item cannot or will not be completely inspected upon receipt.

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

All parts and materials coming from external parties are to 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 is to be certified by an inspection statement.

A suitable recording system is to 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 are to be physically segregated from other departments.

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

It is the responsibility of:

a) The designer, to define all necessary processes, techniques and methods to be followed during manufacture (EMAR 21A.31) and this information will be provided as part of the applicable design data.

b) 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 21A.126(a)(3) Production Inspection System - Means of checking of the production processes

The Production Inspection System is to be provided with appropriate means of checking that production processes, whether performed by the person producing under EMAR 21 Section A Subpart F or by subcontractors under its control, are carried out in accordance with applicable data, including:

a) 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;

b) Availability of personnel with suitable qualification, experience, and training for each required production, inspection, and test task. Special attention is to be paid to tasks requiring specialised knowledge and skill, e.g., NDT/NDI, welding...;

c) 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;

d) 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 are to show compliance with, and be traceable to, recognised national or international standards.

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

a) When a person producing under EMAR 21 Section A Subpart F is developing its own manufacturing data from the design data package delivered by a Design holder, procedures are to demonstrate the correct transcription of the original design data.

b) Procedures are to 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 is to 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.

c) During execution, all works are to 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 21A.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 is to 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 is to also identify any particular skills or qualification required of person(s) carrying out the inspections (e.g., NDT personnel). A copy of the plan is to be included in, or referenced by, the manual required by EMAR 21A.125A(b).

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

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

a) Storage areas are to be protected from dust, dirt, or debris, and adequate blanking and packaging of stored items is to be practised.

b) All parts are to be protected from extremes of temperatures and humidity and, where needed, temperature-controlled or full air-conditioned facilities are to be provided.

c) Racking and handling equipment is to be provided such as to allow storage, handling and movement of parts without damage.

d) Lighting is to be such as to allow safe and effective access and handling, but is to also cater for items which are sensitive to light e.g., rubber items.

e) Care is to 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.

f) Procedures are to be in place to maintain and record stored parts identities and batch information.

g) Access to storage areas is to be restricted to authorised personnel who are fully trained to understand and maintain the storage control arrangements and procedures.

h) Provisions are to be made for segregated storage of non-conforming items pending their disposition (see GM EMAR 21A.126(b)(4)).

GM 21A.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 are to be used to ensure that the documentation in use is always accurate and current.

GM 21A.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 are to be suitably identified by clearly marking or labelling, to indicate their non-conforming status.

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

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

a) The procedure is to permit to record the deviation, to present it to the Design holder under the provisions of EMAR 21A.122, and to record the results of the review and actions taken consequently as regards the part/product.

b) Any unintentional deviation from the manufacturing/inspection data is to be recorded and handled in accordance with EMAR 21 Section A Subpart D or E as changes to the approved design.

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

a) Records within a production environment satisfy two purposes. Firstly, they are to, during the production process, 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 EMAR 21 Section A Subpart F is to 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 is to be subject to appropriate documented procedures in the Manual required by EMAR 21A.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.

b) The related procedures are to:

   i. Identify records to be kept.

   ii. 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).

   iii. Control access and provide effective protection from deterioration or accidental damage.

   iv. Ensure continued readability of the records.

   v. Demonstrate to the Authority proper functioning of the records system.

   vi. Clearly identify the persons involved in conformity determination.

   vii. Define an archiving period for each type of data taking into account importance in relation to conformity determination subject to the following:

      1. Data which supports conformity of a product, part, or appliance is to be kept for not less than three years from the issue date of the related Statement of Conformity or Authorised Release Certificate.

2. Data considered essential for continuing airworthiness is to be kept throughout the operational life of the product, part or appliance.

viii. Data related to supplied parts may be retained by the supplier if the supplier has a system agreed under EMAR 21 Section A Subpart F by the Authority. The manufacturer is to, in each case, define the archiving period and satisfy himself or herself and the Authority that the recording media are acceptable.

GM 21A.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 21A.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:

a) 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 takeoff power or thrust;

b) A period of operation at rated maximum continuous power or thrust. For engines having a rated takeoff power or - thrust, part of that period is to be at rated takeoff power or - thrust.

The test equipment used for the test run is to 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 21A.128 Acceptable functional test –Variable pitch propellers

The functional tests required for a new propeller will be specified by the propeller design organisation and is to 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, will normally be required.

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

After functional test, each engine or propeller is to 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 is to 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 21A.129(a) Availability for inspection by the Authority

Each product, part or appliance is to be made available for inspection at any time at the request of the Authority.

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

The manufacturer is to provide such documentation, tools, personnel, access equipment etc. as necessary to enable the Authority to perform the inspections.

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

EMAR 21A.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 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 EMAR Form 1 validated by the Authority may be used as a conformity document as part of the assistance to the design approval applicant.

AMC No. 2 to 21A.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 Authority.

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

Before issue of the Statement of Conformity to the 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 Authority.

a) Equipment or modifications which do not meet the requirements of the state of manufacture but have been accepted by the Authority of the importing country.

b) Identification of products, parts or appliances which:

   i. Are not new;

   ii. Are furnished by the buyer or future operator (including those identified in EMAR 21A.801 and EMAR 21A.805).

c) Technical records which identify the location and serial numbers of components that have traceability requirements for continued airworthiness purposes including those identified in EMAR 21A.801 and EMAR 21A.805.

d) Log book and a modification record book for the aircraft as required by the Authority.

e) Log books for products identified in EMAR 21A.801 installed as part of the type design as required by the Authority.

f) A weight and balance report for the completed aircraft.

g) A record of missing items or defects which do not affect airworthiness these for example could be furnishing or GFE (Items may be recorded in a technical log or other suitable arrangement such that the operator and Authority are formally aware).

h) Product support information required by Certification Basis, 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.

i) 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.

j) 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.

k) Details of the approved interior configuration if different from that approved as part of the type design.

l) An approved Flight Manual which conforms to the build standard and modification state of the particular aircraft should be available.

m) Show that inspections for foreign objects at all appropriate stages of manufacture have been satisfactorily performed.

n) The registration has been marked on the exterior of the aircraft as required by national legislation.

o) Where applicable, there should be a certificate for noise and, for the aircraft radio station.

p) Where applicable, the installed compass and or compass systems have been adjusted and compensated and a deviation card displayed in the aircraft.

q) Software criticality list.

r) A record of rigging and control surface movement measurements.

s) Details of installations which will be removed before starting commercial air transport operations (e.g., ferry kits for fuel, radio or navigation).

t) List of all applicable Service Bulletins and airworthiness directives that have been implemented.

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

Purpose and scope

The description for this AMC is contained in EMAR Form 52 and refers only to the use of the aircraft Statement of Conformity issued under EMAR 21 Section A Subpart F. Statement of Conformity under EMAR 21 Section A Subpart F for products other than complete aircraft, and for parts and appliances is described in AMC No. 2 to EMAR 21A.130(b).

Additionally, for production under EMAR 21 Section A Subpart F, this Block should include validation by the 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 Authority validating the certificate, the name and the position/identification of such representative of the Authority, and the date of such validation by the Authority.

VALIDATION STATEMENT:

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

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

1 Introduction

This AMC relates only to the use of the EMAR Form 1 for manufacturing purposes. Attention is drawn to EMAR 21 and Appendix I to Part 145 which covers the use of the EMAR Form 1 for maintenance purposes.

2 Purpose and scope

Under EMAR 21 Section A Subpart F, the primary purpose of the certificate is to release products (other than complete aircraft), parts, appliances (hereafter referred to as 'item(s)') and/or material as identified in Blocks 7 through 10 as applicable after manufacture, or to release maintenance work carried out on items under the approval of the Authority.

The EMAR Form 1 is prepared and signed by the manufacturer. For production under EMAR 21 Section A Subpart F it is presented for validation by the Authority.

The Certificate referenced EMAR Form 1 is called the Authorised Release Certificate.

The Certificate is to be used for import purposes, as well as for domestic and intra-Community purposes, and serves as an official certificate for the delivery of items from the manufacturer to users. The Certificate is not a delivery or shipping note.

Under EMAR 21 Section A Subpart F the Certificate may only be issued by the Authority.

Aircraft are not to be released using the Certificate.

A mixture of 'New' and 'Used' items is not permitted on the same Certificate.

A mixture of items certified in conformity with 'approved data' and to 'non-approved data' is not permitted on the same Certificate, and consequently only one box in Block 13a can be ticked.

A mixture of items released under EMAR 21 Section A Subpart G and under EMAR Section A Subpart F is not permitted on the same Certificate.

3 General

By reference to EMAR 21, the Certificate should 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 Certificate unrecognisable. The overall size of the Certificate may be significantly increased or decreased so long as the Certificate remains recognisable and legible. If in doubt consult the Authority.

Please note that the User responsibility statements are normally placed on the reverse of this Certificate, but they may be added to the front of the Certificate by reducing the depth of the Form.

All printing should be clear and legible to permit easy reading.

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

English and, where required, one or more of the official languages of the issuing Member State are acceptable.

The details to be entered on the Certificate may be either machine/computer printed or hand-written using block letters, and should permit easy reading. Abbreviations should be restricted to a minimum. The space remaining on the reverse side of the Certificate may be used by the originator for any additional information but is not to include any certification statement.

The original Certificate should accompany the items and correlation should be established between the Certificate and the item(s). A copy of the Certificate should be retained by the manufacturer of the item and the Authority. Where the Certificate format and the data is entirely computer generated, subject to acceptance by the Authority, it is permissible to retain the Certificate format and data on a secure database.

There is no restriction in the number of copies of the Certificate sent to the customer or retained by the originator.

The Certificate that accompanies the item may be attached to the item by being placed in an envelope for durability.

4 Completion of the release certificate by the originator

By reference to EMAR 21, except as otherwise stated, there should be an entry in all Blocks to make the document a valid certificate.

AMC 21A.130(c) Validation of the Statement of Conformity

It is the responsibility of the applicant to ensure that each and every product, part and appliance conforms to the applicable design data and is in condition for safe operation before issuing and signing the relevant Statement of Conformity. During manufacture, the applicant is expected to use such facilities, systems, processes and procedures as described in the Manual and have been previously agreed with the Authority.

The Authority should then make such inspection and investigation of records and product, part or appliance as are necessary to determine that the agreed facilities, systems, processes and procedures have been used, and that the Statement of Conformity may be regarded as a valid document.

To enable timely inspection and investigation by the Authority, the Statement of Conformity should be prepared and submitted to the Authority immediately upon satisfactory completion of final production inspection and text.

AMC 21A.130(c)(1) Initial transfer of ownership

Upon transfer of ownership:

a) For a complete aircraft, whether or not an application for a Certificate of Airworthiness is to be made, an EMAR Form 52 should be completed and submitted to the Authority for validation.

b) For anything other than a complete aircraft an EMAR Form 52 is inappropriate, and an EMAR Form 1 should be completed and submitted to the Authority for validation.

NOTE: If there is significant delay between the last production task and presentation of EMAR Form 52 or EMAR Form 1 to the Authority, then additional evidence relating to the storage, preservation and maintenance of the item since its production should be presented to the Authority.

SUBPART G – MILITARY PRODUCTION ORGANISATION APPROVAL

GM 21A.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, MTC, MSTC, approval of repair or minor change design, or EMTSO authorisation (or equivalent when EMAR 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 EMAR 21) and released in a controlled manner to a production organisation approval holder. This is to 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 MTC, MSTC, approval of repair or minor change design or EMTSO authorisation, or equivalent, design data is defined as 'not approved' but parts and appliances may be released with an EMAR Form 1 as a certificate of conformity.

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

GM to 21 A.133 Issue of Military Production Organisation Approval

a) Where a production organisation has an extant EASA Part 21 production organisation approval, and when the military production activity is within the scope of the EASA term of approval, the organisation may be accepted by the Authority to satisfy the EMAR 21 requirements for that scope of work with any further investigation limited only to the delta between the two approvals. The Authority is to be kept informed by the production organisation of significant changes to the organisation and of any EASA findings that may impact the military production activity.

b) Where a production organisation has an extant EASA Part 21 production organisation approval, and when the scope of the EASA term of approval does not entirely cover the military production activity, those parts of the organisation's EASA Part 21 exposition that are equally applicable to satisfy the EMAR 21 may be accepted by the Authority as equivalent in respect of the EMAR 21 requirements. It is permissible that only those parts of the organisation that are specific to the military activity or requirements are addressed in the EMAR 21 exposition. Those requirements covered by read-across of the sections of the EASA exposition document are to be identified and the EASA document clause reference quoted.

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

'Appropriate' is to be understood as follows:

a) 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).

b) The applicant will be required to show a need for an approval, normally based on one or more of the following criteria:

i. Production of aircraft, engines or propellers (except if the Authority considers a MPOA inappropriate);

ii. Production of EMTSO articles and parts marked EMPA;

iii. Direct delivery to users such as owners or operators maintenance organisations with the need for exercising the privileges of issuing Authorised Release Certificates – EMAR Form 1;

iv. Participation in an international co-operation program where working under an approval is considered necessary by the Authority;

v. Criticality and technology involved in the part or appliance being manufactured. Approval in this case may be found by the Authority as the best tool to exercise its duty in relation to airworthiness control;

vi. Where an approval is otherwise determined by the Authority.

c) It is not the intent of the 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.

d) Where standard parts, materials, processes or services are included in the applicable design data (see guidance on applicable design data in GM EMAR 21A.131) their standards are to be controlled by the MPOA 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:

i. consumable materials;

ii. raw materials;

iii. standard parts;

iv. parts identified in the product support documentation as ‘industry supply’ or ‘no hazard’;

v. non-destructive testing or inspection;

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

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

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

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

a) 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.);

b) The responsibilities and procedures of a MPOA holder/applicant for developing, where applicable, its own manufacturing data in compliance with the airworthiness data package;

c) The responsibilities of a MPOA 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.);

d) The scope of the arrangements should cover EMAR 21 Section A Subpart G requirements and associated AMC and GM, in particular: EMAR 21A.145(b), EMAR 21A.165(c), (f) and (g);

e) The responsibilities of a MPOA holder/applicant, in case of products prior to type-certification to assist a design organisation in showing compliance with airworthiness requirements (access and suitability of production and test facilities for manufacturing and testing of prototype models and test specimen);

f) The procedures to deal adequately with production deviations and non-conforming parts;

g) 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;

h) The identification of the responsible persons/offices who control the above;

i) The acknowledgment by the holder of the MTC/MSTC/repair or change approval/EMTSO 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 EMAR 21A.133.

When the design and production organisations 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 (refer to AMC EMAR 21A.4).

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

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

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

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

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

Arrangement Sample Form

ARRANGEMENT i.a.w. EMAR 21A.133(b) and (c)	
The undersigned agree on the following commitments:	relevant interface procedures
The design organisation [NAME] takes responsibility to - 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	
The production organisation approval holder [NAME] takes responsibility to - 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 compliance with airworthiness requirements - develop, where applicable, its own manufacturing data in compliance with the airworthiness data package	
The design organisation [Name] and the MPOA holder [Name] take joint responsibility to - 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 MPOA holder to make the final determination and identification for conformity.	
The scope of production covered by this arrangement is detailed in ... [DOCUMENT REFERENCE/ ATTACHED LIST]	
[When the design organisation is not the same legal entity as the production organisation approval holder] Transfer of approved design data The MTC/MSTC/EMTSO holder [NAME] acknowledges that the approved design data provided, controlled and modified in accordance with the arrangement are recognised as approved by the 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.	
[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/MDOA holder] date signature xx.xx.xxxx ([NAME in block letters])	for the [NAME of the MPOA holder] date signature xx.xx.xxxx ([NAME in block letters])

Instructions for completion:

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

Commitment: The document should include the basic commitments between the design organisation and the MPOA holder as addressed in AMC EMAR 21A.4 and AMC No. 1 to EMAR 21A.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 should 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 EMAR 21A.131 and AMC EMAR 21A.131 from the design organisation to the MPOA holder. The means by which the design organisation advises the MPOA holder whether such data is approved or not approved is also to be identified (ref. EMAR 21A.4/AMC EMAR 21A.4).

Direct Delivery Authorisation: Where the design organisation and the MPOA holder are separate legal entities the arrangement should 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 MPOA holder evidence should be available that this intermediate organisation has received authority from the design organisation to grant Direct Delivery Authorisation.

Signature: AMC No. 1 to EMAR 21A.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 should be signed mutually by the authorised representatives of the design organisation and the MPOA holder in this regard.

GM 21A.134 Application – Application form and manner

EMAR Form 50 is to be obtained from the 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 Authority.

Organizations recognized by competent civil aviation authorities or certified as per AS/EN 9100 or the equivalent AQAP, may re-use part or all of the same process evidences in the demonstration of compliance with EMAR 21 Section A Subpart G, as agreed by the Authority.

GM No. 1 to 21A.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 is to 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:

a) procedures, instructions, data to cover the issues of EMAR 21A.139(b)(1) are available in a written form,

b) distribution of relevant procedures to offices/persons is made in a controlled manner,

c) procedures which identify persons responsible for the prescribed actions are established,

d) the updating process is clearly described.

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

The 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 21A.139(a) Quality System – Conformity of supplied parts or appliances

The MPOA 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 GFE.

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 EMAR 21A.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):

a) qualification and auditing of supplier's quality system,

b) evaluation of supplier capability in performing all manufacturing activities, inspections and tests necessary to establish conformity of parts or appliances to type design,

c) first article inspection, including destruction if necessary, to verify that the article conforms to the applicable data for new production line or new supplier,

d) incoming inspections and tests of supplied parts or appliances that can be satisfactorily inspected on receipt,

e) identification of incoming documentation and data relevant to the showing of conformity to be included in the certification documents,

f) a vendor rating system which gives confidence in the performance and reliability of this supplier,

g) 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 MPOA holder may rely on inspection/tests performed by supplier if it can establish that:

a) personnel responsible in charge of these tasks satisfy the competency standards of the MPOA quality system,

b) quality measurements are clearly identified,

c) the records or reports showing evidence of conformity are available for review and audit.

The control of suppliers holding a MPOA 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 MPOA holder can rely upon documentation for parts or appliances released under a supplier's EMAR 21A.163 privileges.

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

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

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

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

b) An organisation having a Quality system designed to meet a recognised Standard such as AS/EN 9100 (relevant to the scope of approval being requested) is to expand it to include at least the following additional topics, as appropriate, in order to show compliance with the requirements of EMAR 21 Section A Subpart G:

   i. Mandatory Occurrence Reporting and continued airworthiness as required by EMAR 21A.165(e);

   ii. Control of work occasionally performed (outside the MPOA facility by MPOA personnel);

   iii. Co-ordination with the applicant for, or holder of, an approved design as required by EMAR 21A.133(b) and (c) and EMAR 21A.165(g);

   iv. Issue of certifications within the scope of approval for the privileges of EMAR 21A.163;

   v. Incorporation of airworthiness data in production and inspection data as required in EMAR 21A.133(b) and (c) and EMAR 21A.145(b);

   vi. 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;

   vii. 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;

   viii. Personnel training and qualification procedures especially for certifying staff as required in EMAR 21A.145(d).

c) 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 EMAR Section A Subpart G. In all cases, the Authority will still need to be satisfied that compliance with EMAR 21 Section A Subpart G is established.

GM No. 1 to 21A.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 21A.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 EMAR 21A.139(a).

The quality assurance function to ensure the above is to 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 is to include all elements of the quality system in order to show compliance with EMAR 21 Section A Subpart G.

AMC No. 1 to 21A.139(b)(1)(ii) Vendor and sub-contractor assessment, audit and control – Military Production Organisation Approval (MPOA) 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 MPOA and audit and control is hereafter referred to as "surveillance".

The production organisation is required by EMAR 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 MPOA holder from its obligations under EMAR 21A.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 MPOA 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 MPOA holder has a documented arrangement with OP for the purpose of assessing and/or surveying a MPOA's supplier.

2 Approval by the 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 EMAR 21A.147.

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

(a) The MPOA holder should include the use of OP for supplier assessment and surveillance in the MPOA holders' quality system to demonstrate compliance with the applicable requirements of EMAR 21.

(b) Procedures required for using OP for supplier assessment and surveillance should be consistent with other procedures of the MPOA holders' quality system.

(c) Procedures of the MPOA 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 MPOA holder and made available to the Authority upon request.

(3) The method used by the MPOA 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 MPOA 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 MPOA holder uses an OP accredited and working in accordance with an aviation standard (e.g. AS/EN 9104 series of requirements) that describes requirements for the other party assessment and surveillance, the items (ii) and (iv) above should be deemed to be complied with.

(4) A definition to what scope the OP will conduct suppliers surveillance on behalf of the MPOA holder. If the OP replaces surveillance in part, the MPOA holder should identify the functions that will continue to be surveyed by the MPOA holder.

(5) The procedures used by the OP to notify the MPOA holder of nonconformities discovered at the suppliers facility, corrective action and follow-up.

(d) The MPOA should make arrangements that allow the Authority to make investigation in accordance with EMAR 21A.157 to include OP activities.

AMC No. 2 to 21A.139(b)(1)(ii) Vendor and sub-contractor assessment, audit and control - Military Production Organisation Approval (MPOA) 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 MPOA 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 EMAR 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 EMAR 21A.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 MPOA holder from its obligations under EMAR 21A.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 MPOA 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 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 EMAR 21A.147.

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

(a) The MPOA holder should include the use of supplier certification for the supplier assessment and surveillance in the MPOA holder's quality system to demonstrate compliance with the applicable requirements of EMAR 21.

(b) Procedures required for use of supplier certification for the supplier assessment and surveillance should be consistent with other procedures of the MPOA holders' quality system.

(c) Procedures of the MPOA 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 MPOA holder and made available to the Authority upon request.

(2) A listing of the certified suppliers under surveillance by the OP and used by the MPOA holder. This listing should be maintained by the MPOA holder and made available to the Authority upon request.

(3) The method used by the MPOA 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 MPOA 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 MPOA 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 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 and working in accordance with an aviation standard (e.g. AS/EN 9104 series of requirements) that describes requirements for the OP certification, the items (ii), (iv) and (v) above should be deemed to be complied with.

(4) A definition to what scope the OP will conduct suppliers surveillance on behalf of the MPOA holder. If the OP replaces surveillance in part, the MPOA holder should identify the functions that will continue to be surveyed by the MPOA holder.

(5) Procedures that ensure that the MPOA is aware of the loss of an existing certification.

(6) Procedures that ensure that the MPOA holder is aware of nonconformities and has access to detailed information of these nonconformities.

(7) Procedures to evaluate the consequences of nonconformities and take appropriate actions.

(d) The MPOA should make arrangements that allow the Authority to make investigation in accordance with EMAR 21A.157 to include OP activities

GM 21A.143 Exposition – Production Organisation Exposition

The purpose of the MPOE 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 EMAR 21A.143(a). Where this information is documented and integrated in manuals, procedures and instruction, the MPOE is to provide a summary of the information and an appropriate cross reference.

The Authority requires the MPOE 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 MPOE is required to be kept up to date per a procedure, laid down in the MPOE. Significant changes to the organisation (as defined in GM EMAR 21A.147(a)) is to be approved by the Authority prior to update of the MPOE.

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 EMAR 21 Section A Subpart G except that the supplement is to have an index identifying where those parts missing from the supplement are covered. Those items then formally become part of the MPOE. In any combined documents the MPOE is to be easily identifiable.

GM 21A.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 are to 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 are to show 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 is to 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 is to include, where appropriate, verification that specific qualification standards have been implemented, for example NDT, welding, etc. Training is to be organised to establish and maintain the personal competence levels determined by the organisation to be necessary.

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

a) When a MPOA 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.

b) Procedures are required to define the manner in which airworthiness, and where applicable 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 is to 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 EMAR Form 1.

GM 21A.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 EMAR 21 Section A Subpart G.

The manager needs to have sufficient knowledge and authority to enable him or her to respond to the 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 21A.145(c)(2) Approval Requirements – Responsible managers

The person or persons nominated is to represent the management structure of the organisation and be responsible for all functions as specified in EMAR 21 Section A Subpart G. It therefore follows that, depending on the size of the EMAR 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 Authority requires the nominated managers to be identified and their credentials submitted on an EMAR Form 4 to the Authority 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 EMAR 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 are to be defined in such a way that all responsibilities are covered.

Where a EMAR 21 Section A Subpart G organisation chooses to appoint managers for all or any combination of the identified EMAR 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 is to 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 EMAR 21 Section A Subpart G and requesting remedial action as necessary by the other managers or the Accountable Manager as appropriate. He or she is to have a direct access to the Accountable Manager.

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

a) 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.

b) 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.

c) Training should be given to develop a satisfactory level of knowledge of organisation procedures, aviation legislation, and associated implementing rules, airworthiness requirements and GM, relevant to the particular role.

d) For that purpose, in addition to general training policy, the organisation should define its own standards for training, including pre-qualification standards, for personnel to be identified as certifying staff.

e) Training policy is part of the Quality System and its appropriateness forms part of investigation by the Authority within the organisation approval process and subsequent surveillance of persons proposed by managers.

f) The training should be updated in response to experience gained and changes in technology.

g) A feedback system to ascertain that the required standards are being maintained should be put in place to ensure the continuing compliance of personnel to authorisation requirements.

h) For release of products, parts or appliances, the responsibilities to issue statements of conformity/release certificates (EMAR Form 1) or military permit to fly including approval of flight conditions are allocated to the certifying staff identified in EMAR 21A.145(d)(2).

i) The 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.

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

a) The following is the minimum information to be recorded in respect of each certifying person:

   i. Name;

   ii. Date of Birth;

   iii. Basic Training and standard attained;

   iv. Specific Training and standard attained;

   v. If appropriate – Continuation Training;

   vi. Experience;

   vii. Scope of the authorisation;

   viii. Date of first issue of the authorisation;

ix. If appropriate – expiry date of the authorisation;

x. Identification Number of the authorisation.

b) The record may be kept in any format and should be controlled by an internal procedure of the organisation. This procedure forms part of the quality system.

c) Persons authorised to access the system should 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.

d) The certifying person should be given reasonable access on request to his or her own records.

e) Under the provision of EMAR 21A.157 the Authority has a right of access to the data held in such a system.

f) The organisation should 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 21A.145(d)(3) Approval requirements – Evidence of authorisation

a) The authorisation document should 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.

b) 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 Authority.

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

a) Changes to be approved by the Authority include:

i. Significant changes to production capacity or methods;

ii. Changes in the organisation structure especially those parts of the organisation in charge of quality;

iii. A change of the Accountable Manager or of any other person nominated under EMAR 21A.145(c)(2);

iv. Changes in the production or quality systems that may have an important impact on the conformity/airworthiness of each product, part or appliance;

v. Changes in the placement or control of significant sub-contracted work or supplied parts.

b) To ensure that changes do not result in non-compliance with EMAR 21 Section A Subpart G it is in the interest of both the 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 is to also permit agreement on the need for variation of the terms of approval (ref. EMAR 21A.143(a)(9)).

c) Where a change of name or ownership results in the issue of a new approval the investigation will normally take account of the Authority's knowledge and information from the preceding approval.

d) Changes of location are addressed in EMAR 21A.148 and changes of ownership in EMAR 21A.149, change of scope of approval in EMAR 21A.153.

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

a) 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 Authority as prescribed in EMAR 21A.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 Authority, in advance of the relocation, which can allow continuation of the approval.

b) 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 Authority has indicated its satisfaction with the arrangements.

c) 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 should, at least, identify the following:

   i. 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 Authority;

   ii. The basis of the co-ordination plan, e.g., whether by product or area;

   iii. Planned timing of each phase of relocation;

   iv. Arrangements for maintaining the standards of the approval up to the point where the production area is closed down;

   v. Arrangements for verifying continued production quality upon resumption of work at the new location;

   vi. Arrangements for check and/or re-calibration of inspection aids or production tools and jigs before resuming production;

   vii. Procedures which ensure that goods are not released from the new location until their associated production and quality systems have been verified;

   viii. Arrangements for keeping the Authority informed of progress with the relocation.

d) From the co-ordination plan, the Authority can determine the points at which it wishes to conduct investigation.

e) If an agreed co-ordination plan is in operation, the 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 21A.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 EMAR 21A.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 MPOE. 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 Authority could suspend or revoke the approval under EMAR 21B.245.

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

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

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

The codes shown against each scope of work item are intended for use by the 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 MPOA holder is entitled to exercise the privileges defined in EMAR 21A.163 will be described by the Authority as follows:

FOR PRODUCTS:

a) General area, similar to the titles of the corresponding certification codes;

b) Type of Product, in accordance with the type-certificate.

FOR PARTS AND APPLIANCES:

a) General area, showing the expertise, e.g., mechanical, metallic structure;

b) 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 A11 Very Light Aeroplanes A12 Other M1 Aircraft for military transport of troops, reconnaissance, patrols, tankers, electronic warfare missions, etc. M2 Combat fixed wing aircraft and advanced trainers M3 Combat helicopter U1 Fixed wing UAV <150kg U2 Fixed wing UAV >150kg U4 Rotary wing UAV <150kg U5 Rotary wing UAV >150kg	Insert 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

C3 Weapons C4 Other military equipment	Defensive Aids
D1 Maintenance D2 Issue of military permit to fly	Insert aircraft types State aircraft types

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

EMAR Form 51 should be completed in accordance with the procedures of the MPOE.

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

The completed form and an outline of the changed production organisation exposition, and details of the proposed change to MPOA terms of approval should be forwarded to the Authority.

GM 21A.157 Investigations – Arrangements

The arrangements made by the applicant for, or holder of an approval under EMAR 21 Section A Subpart G are to allow the 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 MPOA.

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

The arrangements are to enable the organisation to give positive assistance to the Authority and co-operate in performing the investigation during both initial assessment and for the subsequent surveillance to maintain the MPOA.

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

Assistance to the Authority includes all appropriate means associated with the facilities of the production organisation to allow the 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 Authority seeks to have an open relationship with the organisation and suitable liaison personnel are to be nominated to facilitate this, including suitable representative(s) to accompany Authority staff during visits not only at the organisations own facilities but also at sub-contractors, partners or suppliers.

GM No. 1 to 21A.158(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 21A.158(a) Examples of level one findings

Examples of level one findings are non-compliances with any of the following EMAR 21 paragraphs, that could affect the safety of the aircraft:

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

It is to be anticipated that a non-compliance with these paragraphs 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 EMAR 21A.157, in particular to obtain access to facilities, after denial of one written request are to be classified as a level one finding.

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

A positive finding by the Authority of:

a) an uncontrolled non-compliance with type design data affecting the airworthiness of product part or appliance;

b) an incident/accident identified as caused by MPOA holder;

c) non-compliance with the MPOE and its associated procedures which could affect conformity of manufactured items to design data;

d) insufficient competence of certifying staff;

e) insufficient resources in respect of facilities, tools and equipment;

f) insufficient means to ensure good production work standards;

g) a lack of effective and timely response to prevent a recurrence of any of paragraph a) to f).

AMC 21A.163(c) Computer generated signature and electronic exchange of the EMAR Form 1

1 Submission to the Authority

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

2 Characteristics of the electronic system generating the EMAR Form 1

2.1 The electronic system should :

a) guarantee secure access for each certifying staff;

b) 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 EMAR Form 1 (recording and record keeping) with suitable security, safeguards and backups;

c) be active only at the location where the part is being released with an EMAR Form 1;

d) not permit to sign a blank form;

e) 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);

f) provide for a "personal" electronic signature identifying the signatory. The signature should be generated only in the presence of the signatory.

2.2 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:

a) it is uniquely linked to the signatory;

b) it is capable of identifying the signatory;

c) it is created using means that the signatory can maintain under their sole control.

2.3 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.

2.4 MPOA holders/applicants are reminded that additional national and/or European requirements may need to be satisfied when operating electronic systems.

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

a) administrators, signatories;

b) scope of authorisation, rights;

c) password and secure access, authentication, protections, confidentiality;

d) track changes;

e) minimum blocks to be completed, completeness of information;

f) archives;

g) etc.

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

a) manufacturer code;

b) customer identification code;

c) workshop report;

d) inspection results;

e) etc.

3 Characteristics of the EMAR Form 1 generated from the electronic system

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

3.2 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.

3.3 When printing the electronic form, it should meet the general format of EMAR Form 1. A watermark-type 'PRINTED FROM ELECTRONIC FILE' should be printed on the document.

3.4 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 EMAR Form 1.

3.5 Additional information not required by the EMAR Form 1 completion instructions may be added to the printed copies of EMAR Form 1 as long as the additional data do not prevent.

4 Electronic exchange of the electronic EMAR Form 1

4.1 The electronic exchange of the electronic EMAR Form 1 should be accomplished on a voluntary basis. Both parties (issuer and receiver) should agree on electronic transfer of the EMAR Form 1.

4.2 For that purpose, the exchange needs to include:

a) all data of the EMAR Form 1, including data referenced from the EMAR Form 1;

b) all data required for authentication of the EMAR Form 1.

4.3 In addition, the exchange may include:

a) data necessary for the electronic format;

b) additional data not required by the EMAR Form 1 completion instructions, such as manufacturer code, customer identification code.

4.4 The system used for the exchange of the electronic EMAR Form 1 should provide:

a) a high level of digital security; the data should be protected, unaltered or uncorrupted;

b) traceability of data back to its source should be possible.

4.5 Trading partners wishing to exchange EMAR 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.

4.6 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 EMAR Form 1.

4.7 The receiver should be capable of regenerating the EMAR Form 1 from the received data without alteration; if not the system should revert back to the paper system.

4.8 When the receiver needs to print the electronic form, refer to the subparagraph 3 above.

AMC 21A.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 Authority is satisfied that the procedures required by EMAR 21A.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:

a) Preservation, periodic inspection visits, etc.;

b) Embodiment of a Service Bulletin;

c) Application of airworthiness directives;

d) Repairs;

e) Maintenance tasks resulting from special flights;

f) Maintenance tasks to maintain airworthiness during flight training, demo flights and other non-revenue flights.

Any maintenance activities should be recorded in the Aircraft Log Book. It should 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 should use EMAR Form 53 which should subsequently become part of the aircraft maintenance records.

Maintenance of components outside the MPOA capability

Such maintenance activity outside the capability of the Aircraft MPOA 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 EMAR 21A.163(c) (EMAR 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 should 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 EMAR 145, classified and released as ‘used’.

AMC 21A.163(e) Procedure for the issue of a military 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 military permit to fly including approval of the flight conditions.

Each MPOA applicant or holder should develop its own internal procedure following this AMC, in order to obtain the privilege of EMAR 21A.163(e) to issue permits to fly for an aircraft under procedures agreed with its Authority for production, when the production organisation itself is controlling under its MPOA the configuration of the aircraft and is attesting conformity with the design conditions approved for the flight.

2 Procedure for the issue of a military permit to fly

2.1 Content

The procedure should address the following points:

a) as relevant, in accordance with EMAR 21A.710(b), the approval of flight conditions;

b) conformity with approved conditions;

c) issue of the military permit to fly under the MPOA privilege ;

d) authorised signatories;

e) interface with the local Authority for the flight.

2.2 Approval of the flight conditions (when relevant)

The procedure should include the process to establish and justify the flight conditions, in accordance with EMAR 21A.708 and how compliance with EMAR 21A.710(c) is established, and include the EMAR Form 18b as defined in AMC EMAR 21A.709(b) for the approval under the MPOA privilege.

2.3 Conformity with approved conditions

The procedure should indicate how conformity with approved conditions is made, documented and attested by an authorised person.

2.4 Issue of the military permit to fly under the MPOA privilege

The procedure should describe the process to prepare the EMAR Form 20b (or MFTP equivalent) and how compliance with EMAR 21A.711(c) and (e) is established before signature of the military permit to fly.

2.5 Authorised signatories

The person(s) authorised to sign the military permit to fly under the privilege of EMAR 21A.163(e) should 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 should include provisions describing the communication with the local Authority for compliance with the local requirements which are outside the scope of the conditions of EMAR 21A.708(b) (see EMAR 21A.711(e)).

GM 21A.165(a) Obligations of the holder – Basic working document

Compliance with the MPOE is a prerequisite for obtaining and retaining a production organisation approval.

The organisation is to make the MPOE available to its personnel where necessary for the performance of their duties. A distribution list is to therefore be established. Where the MPOE mainly refers to separate manuals or procedures, the distribution of the MPOE could be limited.

The organisation is to ensure that personnel have access to and are familiar with that part of the content of the MPOE or the referenced documents, which covers their activities.

Monitoring of compliance with the MPOE is normally the responsibility of the quality assurance function.

GM No. 1 to 21A.165(c) Obligations of the holder – Conformity of prototype models and test specimens

EMAR 21A.33 requires determination of conformity of prototype models and test specimens to the applicable design data. The EMAR Form 1 may be used as a conformity certificate as part of the assistance a MPOA holder/applicant provides to a design approval holder/applicant.

GM No. 2 to 21A.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 divergences (concessions or non-conformances) during the manufacturing process. All these changes are to have been approved by the design approval holder, or when necessary by the Authority.

GM No. 3 to 21A.165(c) Obligations of the holder – Condition for safe operation

Before issue of the Statement of Conformity to the Authority of the Member State of registry, the holder of a production organisation approval is to make an investigation so as to be satisfied in respect of each of the items listed below. The documented results of this investigation are to be kept on file by the MPOA 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 Authority of the Member State of registry):

a) Equipment or modifications which do not meet the requirements of the State of manufacture but have been accepted by the Authority of the importing country;

b) Identification of products, parts or appliances which:

   i. Are not new;

   ii. Are furnished by the buyer or future operator (including those identified in EMAR 21A.801 and EMAR 21A.805).

c) Technical records which identify the location and serial numbers of significant components that have special traceability requirements for continued airworthiness purposes including those identified in EMAR 21A.801 and EMAR 21A.805;

d) Log book and a modification record book for the aircraft as required by the Authority;

e) Log books for products identified in EMAR 21A.801 installed as part of the type design as required by the Authority;

f) A weight and balance report for the completed aircraft;

g) A record of missing items or defects which do not affect airworthiness these for example could be furnishing or GFE (Items may be recorded in a technical log or other suitable arrangement such that the operator and Authority are formally aware);

h) Product support information required by other implementing rules and associated airworthiness requirements 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;

i) Records which demonstrate completion of maintenance tasks appropriate to the test flight flying hours recorded by the aircraft. These records are to show the relationship of the maintenance status of the particular aircraft to the manufacturers recommended maintenance task list and the MRB document/report;

j) 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;

k) Details of the approved interior configuration if different from that approved as part of the type design;

l) An approved Flight Manual which conforms to the build standard and modification state of the particular aircraft is to be available;

m) Show that inspections for foreign objects at all appropriate stages of manufacture have been satisfactorily performed;

n) 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;

o) Where applicable there is to be a certificate for noise and for the aircraft radio station;

p) The installed compass and or compass systems have been adjusted and compensated and a deviation card displayed in the aircraft;

q) Software criticality list;

r) A record of rigging and control surface movement measurements;

s) Details of installations which will be removed before starting commercial air transport operations (e.g., ferry kits for fuel, radio or navigation);

t) Where maintenance work has been performed under the privilege of EMAR 21A.163(d) issue a release to service that includes a statement that the aircraft is in a condition for safe operation;

u) List of all applicable Service Bulletins and airworthiness directives that have been implemented.

GM No. 4 to 21.165(c) Airworthiness Release or Conformity Certificate

The EMAR Form 1, when used as a release certificate as addressed in EMAR 21A.165(c)(2) and (3), may be issued in two ways:

a) As an airworthiness release, only when by virtue of the arrangement described in EMAR 21A.133(b) and (c), it can be determined that the part conforms to the approved design data and is in condition for safe operation.

b) As a conformity Certificate, only when by virtue of the arrangement described in EMAR 21A.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 EMAR Form 1 as a conformity Certificate are not eligible for installation in a type-certificated aircraft.

The EMAR Form 1 is to only be used for Conformity release purposes when it is possible to indicate the reason that prevents its issue as for airworthiness release purposes.

GM 21A.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 is to 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 is to be subject to appropriate procedures in the Quality System required by EMAR 21A.139.

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

The related organisation procedures are to:

a) Identify records to be kept;

b) 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);

c) Control access and provide effective protection from deterioration or accidental damage;

d) Ensure continued readability of the records;

e) Demonstrate to the Authority proper functioning of the records system;

f) Clearly identify the persons involved in conformity determination;

g) Define an archiving period for each type of data taking into account importance in relation to conformity determination subject to the following:

   i. Data which supports conformity of a product, part, or appliance are to be kept for not less than three years from the issue date of the related Statement of Conformity or Authorised Release Certificate;

   ii. Data considered essential for continuing airworthiness are to be kept throughout the operational life of the product, part or appliance.

h) 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 are to define in each case who is to retain the record data (organisation or partner, supplier or sub-contractor). They are to also define method for surveillance of the recording/record keeping system of the partners, suppliers or sub-contractors.

SUBPART H – MILITARY CERTIFICATES OF AIRWORTHINESS AND MILITARY RESTRICTED CERTIFICATES OF AIRWORTHINESS

There are no AMC or GM items associated with this Subpart**.**

SUBPART I – NOISE CERTIFICATES (To be added later if required)

SUBPART J – MILITARY DESIGN ORGANISATION APPROVAL

GM to 21 A.235 Issue of Military Design Organisation Approval

c) Where a design organisation has an extant EASA Part 21 design organisation approval, and when the military design activity are in the scope of the EASA term of approval, the organisation may be accepted by the Authority to satisfy the EMAR 21 requirements for that scope of work with any further investigation limited only to the delta between the two approvals. The Authority is to be kept informed by the design organisation of significant changes to the organisation and of any EASA findings that may impact the military design activity.

d) Where a design organisation has an extant EASA Part 21 design organisation approval, and when the scope of the EASA term of approval does not entirely cover the military design activity, those parts of the organisation's EASA Part 21 exposition that are equally applicable to satisfy the EMAR 21 may be accepted by the Authority as equivalent in respect of the EMAR 21 requirements. It is permissible that only those parts of the organisation that are specific to the military activity or requirements are addressed in the EMAR 21 exposition. Those requirements covered by read-across of the sections of the EASA exposition document are to be identified and the EASA document clause reference quoted.

GM No. 1 to 21A.239(a) Design assurance system

1 Purpose

This GM outlines some basic principles and objectives of EMAR 21A.239(a).

2 Definitions

a) The design assurance system is the organisational structure, responsibilities, procedures and resources to ensure the proper functioning of the design organisation.

b) The design assurance means all those planned and systematic actions necessary to provide adequate confidence that the organisation has the capability:

i. to design products, or parts in accordance with the applicable airworthiness requirements and environmental protection requirements (where applicable);

ii. to show and verify the compliance with these requirements; and

iii. to demonstrate this compliance.

c) 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 and verify and to maintain compliance with the applicable airworthiness requirements and environmental protection requirements (where applicable).

3 Design Assurance

The complete process, starting with the airworthiness and environmental protection (where applicable) requirements and product specifications and culminating with the issuing of a type-certificate, is shown in the diagram on Figure 3. 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 airworthiness and environmental protection (where applicable) requirements and will continue to comply after any change.

Two main aspects should therefore be considered:

a) How the planned and systematic actions are defined and implemented, from the very beginning of design activities up to and including the continued airworthiness activities;

b) How these actions are regularly evaluated and corrective actions implemented as necessary.

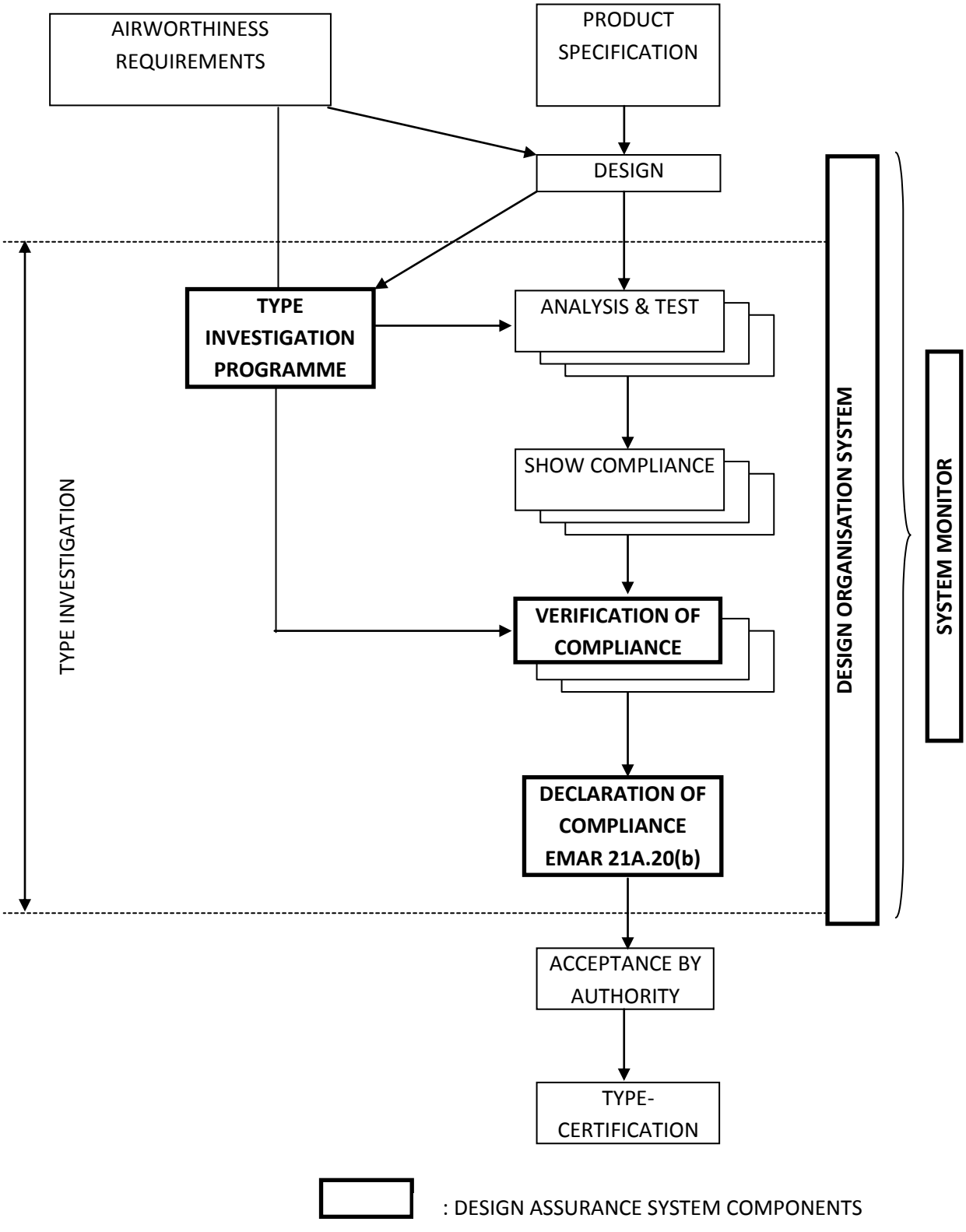


Figure 3 - Relationships between design, design assurance and type investigation

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 Military Design Organisation Exposition (MDOE) in accordance with EMAR 21A.243, in particular to indicate the initiation of design activities on a product.

b) To assure that all instructions of the MDOE 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 EMAR 21A.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 Authority that prototype models and test specimens adequately conform to the type design (see EMAR 21A.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 EMAR 21A.20(b) and EMAR 21A.97(a)(3)) with the applicable airworthiness and environmental protection (where applicable) requirements after verification of satisfactory completion of the Type Investigation. In accordance with EMAR 21A.20(c) and EMAR 21A.97(a)(4), his or her signature on the declaration of compliance confirms that the procedures as specified in the MDOE have been followed (see also GM EMAR 21A.265(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 airworthiness and environmental protection (where applicable) requirements as defined in Type Investigation programme.

b) Approval of the technical content (completeness, technical accuracy...), including any subsequent revisions, of the manuals approved by the Authority (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 Authority with respect to all aspects of Type Investigation.

b) Ensuring that a MDOE is prepared and updated as required in EMAR 21A.243.

c) Co-operation with the Authority in developing procedures to be used for the type-certification process.

d) Issuing of guidelines for documenting compliance.

e) Co-operation in issuing guidelines to ensure compliance with the regulations for the preparation of the manuals, Service Bulletins, drawings, specifications, and standards.

f) Ensuring distribution of applicable airworthiness and environmental protection (where applicable) requirements and other specifications.

g) Co-operating with the Authority in proposing the type-certification basis

h) Interpretation of airworthiness and environmental protection (where applicable) requirements and requesting decisions of the Authority in case of doubt.

i) Advising of all departments of the design organisation in all questions regarding airworthiness, environmental protection (where applicable) approvals and certification.

j) Preparation of the Type Investigation programme and co-ordination of all tasks related to Type Investigation in concurrence with the Authority.

k) Regular reporting to the Authority about Type Investigation progress and announcement of scheduled tests in due time.

l) Ensuring co-operation in preparing 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 compliance with all airworthiness and environmental protection (where applicable) requirements, as well as for completeness, and signing for release of the documents.

o) Checking the required type design definition documents described in EMAR 21A.31 and ensuring that they are provided to the Authority 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 EMAR 21A.91 and granting the approval for minor changes in accordance with EMAR 21A.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 (where applicable) and granting the approval on behalf of the Authority.

u) Ensuring the initiation of activities as a response to failure (accident/incident/in-service experience) evaluation and complaints from the operation and providing of information to the Authority in case of airworthiness impairment (continuing airworthiness).

v) Advising the Authority with regard to the issue of airworthiness directives in general based on Service Bulletins.

w) Ensuring that the manuals approved by the Authority, including any subsequent revisions (the Aircraft Flight Manual, MMEL, the Airworthiness Limitations section of the Instructions for Continued Airworthiness and the CMR document, where applicable) are checked to determine that they meet the respective requirements, and that they are provided to the Authority 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 airworthiness requirements. For that purpose, the applicant should:

i. establish the list of all documents it is producing to comply with the applicable airworthiness requirements;

ii. define procedures and organisation to produce and issue these documents, using where applicable and so elected EMAR 21A.263(c)(3) privilege.

b) In accordance with EMAR 21A.57, EMAR 21A.61, EMAR 21A.107, EMAR 21A.119, EMAR 21A.120 and EMAR 21A.449, ensuring that these documents are provided to all affected operators and authorities within the pMS.

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 21A.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 EMAR 21A.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:

a) an organisational structure to:

i. control the design;

ii. show compliance with applicable airworthiness and environmental protection (where applicable) requirements;

iii. independently check showings of compliance;

iv. liaise with the Authority;

v. continuously evaluate the design organisation;

vi. control sub-contractors.

b) Procedures and responsibilities associated with the functions listed above, taking due account of EMAR 21 requirements applicable to design and approval of minor changes to type design or minor repairs to products.

AMC 21A.239(a)(3) Design assurance system - Independent system monitoring

The system monitoring function required by EMAR 21A.239(a)(3) may be undertaken by the existing quality assurance organisation when the design organisation is part of a larger organisation.

AMC 21A.239(b) Design assurance system - Independent checking function of the showing of compliance

a) The independent checking function of the showing 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.

b) The verification should be shown by signing compliance documents, including test programmes and data.

c) 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.

d) For MSTC cases, when compliance statement and associated documentation are produced by the MTC holder, and when these data are approved under the system of the authority of MTC holder, then the MSTC applicant MDOEs not need to provide, within its own MDOA, the independent checking function required in EMAR 21A.239(b) for these data.

GM 21A.239(c) Design assurance system

In meeting the requirements of EMAR 21A.239(c) the applicant for a design organisation approval under EMAR 21 Section A Subpart J may adopt the following policy:

a) 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.

b) In the event that a Partner/Sub-contractor holds a military design organisation approval (MDOA), then in accordance with EMAR 21A.239(c), the applicant may take this into account in demonstrating the effectiveness of this integrated system.

c) When any Partner/Sub-contractor MDOEs not hold a MDOA then the applicant will need to establish to its own satisfaction and the satisfaction of the Authority, the adequacy of that partner's/sub-contractor's design assurance system in accordance with EMAR 21A.243(b).

AMC No. 1 to 21A.243(a) Design Organisation Exposition requirements

The MDOE should provide the following information for each product covered by the design organisation approval.

a) A description of the tasks which can be performed under the approval, according to the following classification:

   i. General areas, like turbojet and turbo-propeller aircraft, small aircraft, UAVs and rotorcraft;

   ii. Technologies handled by the organisation (composite, wood or metallic construction, electronic systems, etc.);

   iii. 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;

   iv. 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.

b) 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.

c) 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.

d) A general description of the way in which the organisation performs all the design functions in relation to airworthiness and environmental protection (where applicable) approvals including:

   i. 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 airworthiness and environmental protection (where applicable) requirements, including specific requirements for import by importing authorities;

   ii. The procedures for classifying design changes as "major" or "minor" and for the approval of minor changes;

   iii. The procedures for classifying and approving unintentional deviations from the approved design data occurring in production (concessions or non-conformance's);

   iv. The procedure for classifying and obtaining approval for repairs.

e) 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.

f) A description of the human resources, facilities and equipment, which constitutes the means for design, and where appropriate, for ground and flight testing.

g) 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.

h) A description of the recording system for:

   i. The type design, including relevant design information, drawings and test reports, including inspection records of test specimens;

   ii. The means of compliance;

   iii. The compliance documentation (compliance check list, reports...).

i) A description of the record keeping system to comply with EMAR 21A.55 and EMAR 21A.105.

j) 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 EMAR 21A.3 (see also GM No. 1 to EMAR 21A.239(a), paragraphs 3.1.4(s) and (u)).

k) The names of the design organisation authorised signatories. Nominated persons with specific responsibilities such as mentioned in EMAR 21A.33 and EMAR 21A.35 should be listed.

l) (Reserved).

m) A clear definition of the tasks, competence and areas of responsibility of the Office of Airworthiness.

n) A description of the procedures for the establishment and the control of the maintenance and operating instructions (see EMAR 21A.57, EMAR 21A.61, EMAR 21A.107, EMAR 21A.119, EMAR 21A.120 and EMAR 21A.449).

o) 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 21A.243(a) Data requirements - Model content of MDOE for organisations designing minor changes to type design or minor repairs to products

Part 1. Organisation

1.1 Objective of MDOE and binding statement

1.2 Responsible person for administration of MDOE

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 EMAR 21A.243(d), paragraph 2)

1.12 Independent system monitoring

Part 2. Procedures

2.1 Management of changes to type design and design of repairs

a) configuration control

b) classification

c) approval of minor changes to type design and minor repairs

2.2 Control of design subcontractors

2.3 Collecting/Investigating of failures, malfunctions and defects

2.4 Co-ordination with production

2.5 Documentation control

a) in relations with the changes and repairs

b) in relation with failures/malfunctions and defects (i.e. Services - Bulletins)

2.6 Record keeping

GM No. 1 to 21A.243(d) Statement of qualifications and experience

1 Purpose

This GM provides guidelines on the following points:

a) Who are the persons covered by EMAR 21A.243(d)?

b) 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 EMAR 21 Section A Subpart J or in associated AMC and GM, using qualified and experienced personnel:

a) the Chief Executive [see GM No. 1 to EMAR 21A.239(a), para. 3.1.2, GM EMAR 21A.249, GM EMAR 21A.265(b)].

b) the other management staff:

i. the Head of the design organisation [see GM No. 1 to EMAR 21A.239(a), para.3.1.2, GM No. 1 EMAR 21A.245, para. 4.1, GM EMAR 21A.265(b)];

ii. the Chief of the Office of Airworthiness, or [see GM No. 1 to EMAR 21A.245, para. 4.2];

iii. the Chief of the independent monitoring function of the design assurance system [see EMAR 21A.239(a)(3) and AMC No. 1 to EMAR 21A.243(a), para.2].

c) the personnel making decisions affecting airworthiness and environmental protection (where applicable):

i. compliance verification engineers [see GM No. 1 to EMAR 21A.239(a), para. 3.1.3; AMC EMAR 21A.239(b)];

ii. personnel of the Office of Airworthiness making decisions affecting airworthiness and environmental protection (where applicable), especially

those linked with the EMAR 21A.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 to the aircraft flight manual) [see GM No. 1 to EMAR 21A.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 EMAR 21 Section A 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 Authority on EMAR Form 4 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 (where applicable)

For these personnel, no individual statement is required. The applicant should show to the Authority 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:

a) These personnel should be identified in the MDOE, or in a document linked to the MDOE. This, and the corresponding procedures, should enable them to carry out the assigned tasks and to properly discharge associated responsibilities.

b) The needs, in terms of quantity of these personnel to sustain the design activities, should be identified by the organisation.

c) These personnel should be chosen on the basis of their knowledge, background and experience.

d) 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.

e) Training policy forms part of the design assurance system and its appropriateness forms part of investigation by the Authority within the

organisation approval process and subsequent surveillance of persons proposed by the organisation.

f) This training should be adapted in response to experience gained within the organisation.

g) 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.

h) The following minimum information should be kept on record:

   i. Name;

   ii. Date of birth;

   iii. Experience and training;

   iv. Position in organisation;

   v. Scope of the authorisation;

   vi. Date of first issue of the authorisation;

   vii. If appropriate, date of expiry of the authorisation;

   viii. Identification number of the authorisation.

   The record may be kept in any format and should be controlled.

i) 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.

j) Personnel should be given access to their own record.

k) Under the provision of EMAR 21A.257 the Authority has a right of access (subject to contract) to the data held in such a system.

l) The organisation should keep the record for at least 2 years after a person has ceased employment with the organisation or withdrawal of the authorisation, whichever is the sooner.

GM No. 2 to 21A.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 EMAR 21A.243(d) should be addressed as follows :

a) The nominated managers should be identified and their credentials submitted to the Authority on EMAR Form 4 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.

b) The persons responsible to:

   i. classify changes to type design or repairs;

   ii. verify compliance [EMAR 21A.239(b)];

iii. approve minor changes to type design and minor repairs [EMAR 21A.263(c)(2)];

iv. issue information or instructions [EMAR 21A.263(c)(3)].

Should be selected by the organisation in accordance with a procedure and criteria agreed with the Authority.

GM No. 1 to 21A.245 Requirements for approval

1 General.

The MDOE submitted in accordance with EMAR 21A.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 EMAR 21A.239(a), paragraph 2.3.

2 Personnel.

The applicant should show that the personnel available to comply with EMAR 21A.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 airworthiness and environmental protection (where applicable) 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 airworthiness and environmental protection (where applicable) requirements. The test facilities may be subjected to additional technical conditions related to the nature of tests performed.

4 Organisation.

The MDOE submitted in accordance with EMAR 21A.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 EMAR 21 Section A 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 (where applicable) (see GM No. 1 to EMAR 21A.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 EMAR 21A.239(a)(3) has been established :

a) to ensure quick and efficient reporting and resolution of difficulties encountered using the MDOE and associated procedures;

b) to maintain the design assurance system;

c) to optimise auditing activities.

GM No. 2 to 21A.245 Requirements for approval - Organisations designing minor changes to type design or minor repairs to products

The MDOE submitted in accordance with EMAR 21A.243 should show that:

a) 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.

b) Person(s) have been nominated to liaise with the Authority and to co-ordinate airworthiness and environmental protection (where applicable) matters. Their position in the organisation should allow direct report to the manager responsible for design.

c) 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

d) 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 21A.247 Significant changes in the design assurance system

In addition to a change in ownership (see EMAR 21A.249), the following changes to the design assurance system should be considered as “significant” to the showing of compliance or to the airworthiness or environmental protection (where applicable) of the products:

1 Organisation

a) Relocation to new premises (see also GM EMAR 21A.249).

b) Change in the industrial organisation (partnership, suppliers, design worksharing) unless it can be shown that the independent checking function of the showing of compliance is not affected.

c) Change in the parts of the organisation that contribute directly to the airworthiness or environmental protection (where applicable) (independent checking function, office of airworthiness [or equivalent]).

d) Change to the independent monitoring principles (see EMAR 21A.239(a)(3)).

2 Responsibilities

a) Change of the management staff

i. the Head of the design organisation [GM No. 1 to EMAR 21A.239(a), para. 3.1.2, GM No. 1 to EMAR 21A.245, para. 4.1, GM EMAR 21A.265(b)];

ii. the Chief of the Office of Airworthiness [GM No. 1 to EMAR 21A.245, para. 4.2];

iii. the Chief of the independent monitoring function of the design assurance system [EMAR 21A.239(a)(3) and AMC No. 1 to EMAR 21A.243(a), para.2].

b) New distribution of responsibilities affecting airworthiness or environmental protection (where applicable).

c) For organisations designing minor changes to type design or minor repairs to products, change of the persons identified in GM No. 2 to EMAR 21A.243(d).

3 Procedures

Change to the principles of procedures related to:

a) the type-certification.

b) the classification of changes and repairs as " major " or " minor " [EMAR 21A.263(c)(1)].

c) the treatment of major changes and major repairs.

d) the approval of the design of minor changes and minor repairs [EMAR 21A.263(c)(2)].

e) the issue of information and instructions under the privilege of EMAR 21A.263(c)(3).

f) the approval of documentary changes to the Aircraft Flight Manual [EMAR 21A.263(c)(4)].

g) the approval of the design of major repairs [EMAR 21A.437 or EMAR 21A.263(c)(5)].

h) continuing airworthiness (see EMAR 21A.3).

i) the configuration control, when airworthiness or environmental protection (where applicable) is affected.

j) the acceptability of design tasks undertaken by partners or subcontractors [EMAR 21A.239(c)].

4 Resources

a) Substantial reduction in number and/or experience of staff (see EMAR 21A.245(a)).

GM 21A.249 Transferability

Transfer of the approval would normally only be agreed in cases where the organisation itself remains substantially unchanged.

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.

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 organisation in which case the former paragraphs apply.

GM No. 1 to 21A.251 Terms of approval

The terms of approval are stated on the certificate of approval issued by the Authority. 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 EMTSO authorisation for APU, the list of product types covered by the design assurance system should be included.

Approval of a change in the terms of approval in accordance with EMAR 21A.253 will be confirmed by an appropriate amendment of the certificate of approval.

The certificate references the MDOE of the approved design organisation, provided in accordance with EMAR 21A.243. This MDOE defines the tasks which may be performed under the approval.

Scopes of work are, for example, “subsonic turbojet aircraft”, “turbo-propeller aircraft”, “small aircraft”, “rotorcraft”... Technologies are quoted in the scope of work when it is considered by the Authority as a limitation for the military design organisation approval.

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 21A.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:

a) designing minor changes to type design or minor repairs to [aircraft, engine, propeller] in accordance with the applicable airworthiness and environmental protection requirements (where applicable),

b) showing and verifying the compliance with these airworthiness and environmental protection requirements (where applicable).

2. Category of products

Any other indication if the Authority 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 EMAR 21A.263(c)(1), (2) and (3).

GM 21A.257(a) Investigations

Arrangements that allow the Authority 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 Authority in performing inspections and audits conducted during initial assessment and subsequent surveillance.

Assistance to the Authority includes all appropriate means associated with the facilities of the design organisation to allow the Authority to perform these inspections and audits, such as a meeting room and office support.

GM 21A.263(b) MDOA privilege related to compliance documents

A compliance document is the end result of a certification process, where the showing of compliance is recorded. For each specific certification process, the Authority is involved in the process itself at an early stage, especially through the establishment of the certification programme. The inspections or tests under EMAR 21A.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 Authority should agree with the MDOA holder documents to be accepted without further Authority verification under the MDOA privilege of EMAR 21A.263(b).

AMC 21A.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 military 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 military 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 MDOA, the establishment and substantiation of these conditions should be done under the relevant MDOA procedures. For that purpose, the associated documentation should be processed like any other compliance document. It should be provided to the organisation responsible for the design of the aircraft that will use it for the establishment of the aircraft flight conditions.

AMC No. 1 to 21A.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 MDOA applicant should develop its own internal classification procedure following this AMC, in order to obtain the associated EMAR 21A.263(c)(1) privilege.

2 Procedure for the classification of changes to type design and repairs

2.1 Content

The procedure should address the following points:

a) the identification of changes to type design or repairs;

b) classification;

c) justification of the classification;

d) authorised signatories;

e) supervision of changes to type design or repairs initiated by subcontractors.

For changes to type design, criteria used for classification should be in compliance with EMAR 21A.91 and GM EMAR 21A.91.

For repairs, criteria used for classification should be in compliance with EMAR 21A.435 and GM EMAR 21A.435.

2.2 Identification of changes to type design or repairs

The procedure should indicate how the following are identified:

a) major changes to type design or major repairs;

b) those minor changes to type design or minor repairs where additional work is necessary to show compliance with the airworthiness and environmental protection requirements (where applicable);

c) other minor changes to type design or minor repairs requiring no further showing of compliance.

2.3 Classification

The procedure should show how the effects on airworthiness and environmental protection (where applicable) are analysed, from the very beginning, by reference to the applicable requirements.

If no specific airworthiness or environmental protection requirements (where applicable) are applicable to the change or repairs, the above review should be carried out at the level of the part or system where the change or repair is integrated and where specific airworthiness or environmental protection requirements (where applicable) are applicable.

2.4 Justification of the classification

All decisions of classification of changes to type design or repairs as “major” or “minor” should be recorded and, for those which are not straightforward, also documented. These records should be easily accessible to the Authority for sample check.

2.5 Authorised signatories

All classifications of changes to type design or repairs should be accepted by an appropriate authorised signatory.

The procedure should indicate the authorised signatories for the various products listed in the terms of approval.

For those changes or repairs that are handled by subcontractors, as described under paragraph 2.6, it should be described how the MDOA holder manages its classification responsibility.

2.6 Supervision of changes to type design or repairs initiated by subcontractors

The procedure should indicate, directly or by cross-reference to written procedures, how changes to type design or repairs may be initiated and classified by subcontractors and are controlled and supervised by the MDOA holder.

AMC No. 2 to 21A.263(c)(1) Privileges - Organisations designing minor changes to type design or minor repairs to products : classification procedure

1. Content

The procedure should address the following points:

a) configuration control rules, especially the identification of changes to type design or repairs;

b) classification, in compliance with EMAR 21A.91 and GM EMAR 21A.91 for changes and GM EMAR 21A.435 for repairs;

c) justification of the classification;

d) authorised signatories.

2. Identification of changes to type design or repairs

The procedure should indicate how the following minor changes to type design or minor repairs are identified:

a) those minor design changes to type design or minor repairs where additional substantiation data is necessary to show compliance with the airworthiness or environmental protection requirements (where applicable);

b) other minor design changes to type design or minor repairs requiring no further showing of compliance.

3. Classification

The procedure should show how the effects on airworthiness and environmental protection (where applicable) 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 should be done at the level of the part or system where the change or repair is integrated and where specific airworthiness or environmental protection (where applicable) requirements are applicable.

For repair, see also GM EMAR 21A.435.

4. Justification of the classification

All decisions of classification of changes to type design or repairs as "minor" should be recorded and, for those which are not straightforward, also documented. These records should be easily accessible to the Authority 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 should be accepted by an appropriate authorised signatory.

The procedure should indicate the authorised signatories for the various products listed in the terms of approval.

AMC No. 1 to 21A.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 MDOA applicant should develop its own internal procedures following this AMC, in order to obtain the associated privilege under EMAR 21A.263(c)(2).

2 Procedure for the approval of minor changes to type design or minor repairs

2.1 Content

The procedure should address the following points:

a) compliance documentation;

b) approval under the MDOA privilege;

c) authorised signatories;

d) supervision of minor changes to type design or minor repairs handled by subcontractors.

2.2 Compliance documentation

For those minor changes to type design or minor repairs where additional work to show compliance with the applicable airworthiness and environmental protection (where applicable) requirements is necessary, compliance documentation should be established and independently checked as required by EMAR 21A.239(b).

The procedure should describe how the compliance documentation is produced and checked.

2.3 Approval under the MDOA privilege

2.3.1 For those minor changes to type design or minor repairs where additional work to show compliance with the applicable airworthiness and environmental protection requirements (where applicable) is necessary, the procedure should define a document to formalise the approval under the MDOA privilege.

This document should include at least :

a) identification and brief description of the change or repair and reasons for change or repair;

b) applicable airworthiness or environmental protection requirements (where applicable) and methods of compliance;

c) reference to the compliance documents;

d) effects, if any, on limitations and on the approved documentation;

e) evidence of the independent checking function of the showing of compliance;

f) evidence of the approval under the privilege of EMAR 21A.263(c)(2) by an authorised signatory;

g) date of the approval.

For repairs, see AMC EMAR 21A.433(a).

2.3.2 For the other minor changes to type design or minor repairs, the procedure should 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 should be controlled by the Office of Airworthiness, either directly or through appropriate procedures of the MDOA holder's design assurance system.

2.4 Authorised signatories

The persons authorised to sign for the approval under the privilege of EMAR 21A.263(c)(2) should be identified (name, signature and scope of authority) in appropriate documents that maybe linked to the MDOE.

2.5 Supervision of minor changes to type design or minor repairs handled by subcontractors

For the minor changes to type design or minor repairs described in 2.3.2, that are handled by subcontractors, the procedure should indicate, directly or by cross-reference to written procedures how these minor changes to type design or minor repairs are approved at the subcontractor level and the arrangements made for supervision by the MDOA holder.

AMC No. 2 to 21A.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 should address the following points:

a) compliance documentation;

b) approval under the MDOA privilege;

c) authorised signatories.

2. Compliance documentation

For those minor changes to type design or minor repairs where additional work to show compliance with the applicable airworthiness and environmental protection requirements (where applicable) is necessary, compliance documentation should be established and independently checked as required by EMAR 21A.239(b).

The procedure should describe how the compliance documentation is produced and checked.

3. Approval under the MDOA privilege

For those minor changes to type design or minor repairs where additional work to show compliance with the applicable airworthiness or environmental protection requirements (where applicable) is necessary, the procedure should define a document to formalise the approval under the MDOA privilege.

This document should include at least:

a) identification and brief description of the change or the repair and reason for change or repair;

b) applicable airworthiness or environmental protection requirements (where applicable) and methods of compliance;

c) reference to the compliance documents;

d) effects, if any, on limitations and on the approved documentation;

e) evidence of the independent checking function of the showing of compliance;

f) evidence of the approval under the privilege of EMAR 21A.263(c)(2) by an authorised signatory;

g) date of the approval.

For repairs, see also AMC EMAR 21A.433(a).

For the other minor changes to type design or minor repairs, the procedure should 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 should be controlled through appropriate procedures of the MDOA holder's design assurance system.

4. Authorised signatories

The persons authorised to sign for the approval under the privilege of EMAR 21A.263(c)(2) should be identified (name, signature and scope of authority) in appropriate documents that may be linked to the MDOE.

GM 21A.263(c)(3) Issue of information or instructions

1 Intent

This GM provides guidelines to address the various aspects the MDOA 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 EMAR 21A.263(c)(3) are issued by a MDOA 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 EMAR 21A.61, EMAR 21A.107, EMAR 21A.120 or EMAR 21A.449 (Instructions for Continuing Airworthiness).

This information or instructions may be issued in a format of a Service Bulletin as defined in S1000D Chapters, 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 MDOA holder, the three aspects should be properly handled under the MDOA 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 EMAR 21A.263(c)(3), the MDOA holder should establish a procedure addressing the following points :

a) Preparation;

b) verification of technical consistency with corresponding approved change(s), repair(s) or approved data, including effectivity, description, effects on

airworthiness and environmental protection (where applicable), especially when limitations are changed;

c) verification of the feasibility in practical applications;

d) authorised signatories.

The procedure should include the information or instructions prepared by subcontractors or vendors, and declared applicable to its products by the MDOA holder.

4 Statement

The statement provided in the information or instructions should also cover the information or instructions prepared by subcontractors or vendors and declared applicable to its products by the MDOA holder.

The technical content is related to the design data and accomplishment instructions, and its approval means that:

a) the design data has been appropriately approved; and

b) 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 EMAR 21A.3B(b) (airworthiness directives) are submitted to the Authority to ensure compatibility with Airworthiness directive content (see EMAR 21A.265(e)), and contain a statement that they are, or will be, subject to an airworthiness directive issued by the Authority.

GM 21A.263(c)(4) Procedure for the approval of documentary changes to the Aircraft Flight Manual

1 Intent

This GM provides guidelines to develop a procedure for the approval of documentary changes to the Aircraft Flight Manual (AFM).

Each MDOA applicant should develop its own internal procedure, based on these guidelines, in order to obtain the associated privilege under EMAR 21A.263(c)(4).

2 Definition of documentary changes to the AFM

Examples of documentary changes to the AFM that may be approved under the MDOA privilege:

a) for AFM issued by the military type-certificate holder:

i. Editorial changes or corrections to the AFM;

ii. Changes to weight limitations that are within all previously approved limitations (e.g., structural, etc.);

iii. The addition of compatible and previously approved AFM Temporary changes, appendices or Supplements;

iv. Conversions of previously FAA or EASA approved combinations of units of measurement added to the AFM in a previously approved manner;

v. 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;

vi. The removal of reference to aircraft serial numbers no longer applicable to that AFM.

b) for AFM supplements issued by MSTC holders:

i. Editorial changes or corrections to the AFM Supplement;

ii. Changes to weight limitations that are within all previously approved limitations (e.g., structural, etc.);

iii. Conversions of previously approved combinations of units of measurement added to the AFM Supplement in a previously approved manner;

iv. 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;

v. The removal of reference to aircraft serial numbers no longer applicable to that AFM Supplement.

3 Procedure for the approval of documentary changes

3.1 Content

The procedure should address the following points:

a) preparation of all AFM changes;

b) classification as documentary AFM change;

c) verification by the airworthiness function, especially regarding the classification of the AFM change;

d) approval of AFM changes;

e) approval statement and authorised signatories;

f) distribution.

3.2 Preparation

The procedure should indicate how 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 AFM changes are classified as documentary changes, in accordance with the criteria of paragraph 2.

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:

a) verify the classification as documentary changes;

b) review the content of the AFM changes.

3.5 Approval

Any change to the AFM should be approved, either by the Authority, or under the privilege of EMAR 21A.263(c)(4) for documentary AFM changes.

For documentary AFM changes, the procedure should indicate how the approval under the privilege will be formalised.

3.6 Approval statement and authorised signatories

Revisions of the AFM containing only documentary changes should be issued with the approval statement defined in EMAR 21A.263(c)(4).

When approval status is shown on each page, a simplified statement such as "Approved under the authority of MDOA nr.[Authority].21J.[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 MDOA exposition.

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 EMAR 21A.57 or EMAR 21A.119.

AMC 21A.263(c)(6) Procedure for the approval of the conditions for issue of a military 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 non-compliance with the airworthiness requirements applicable to the aircraft category.

Each MDOA applicant or holder should develop its own internal procedure following this AMC, in order to obtain the privilege to make this determination and approve associated conditions without Authority involvement, under EMAR 21A.263(c)(6). When the privilege MDOEs not apply, the MDOA holder will prepare all necessary data required for the determination in accordance with the same procedure required for the privilege, and will apply for Authority approval.

2 Procedure for the approval of the conditions for issue of a military permit to fly

2.1 Content

The procedure should address the following points:

a) decision to use the privilege;

b) management of the aircraft configuration;

c) determination of the conditions that should be complied with to perform safely a flight;

d) documentation of flight conditions substantiations;

e) approval under the MDOA privilege, when applicable;

f) authorised signatories.

2.2 Decision to use the privilege of EMAR 21A.263(c)(6)

The procedure should include a decision to determine:

a) flights for which the privilege of EMAR 21A.263(c)(6) will be exercised; and

b) flights for which the approval of flight conditions by the Authority will be required according to the criteria of EMAR 21A.263(c)(6).

2.3 Management of the aircraft configuration

The procedure should indicate:

a) how the aircraft, for which an application for military permit to fly is made, is identified;

b) how changes to the aircraft will be managed.

2.4 Determination of the conditions that should be complied with to perform safely a flight

The procedure should describe the process used by the MDOA holder to justify that an aircraft can perform the intended flight(s) safely. This process should include:

a) identification of deviations from applicable airworthiness requirements or non-compliance with EMAR 21 conditions for the issue of a certificate of airworthiness;

b) analysis, calculations, tests or other means used to determine under which conditions or restrictions the aircraft can perform safely a flight;

c) the establishment of specific maintenance instructions and conditions to perform these instructions;

d) 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;

e) 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;

f) approval by an authorised signatory.

2.5 Documentation of flight conditions substantiations

The analysis, calculations, tests, or other means used to determine under which conditions or restrictions the aircraft can perform safely a flight, should be compiled in compliance documents. These documents should be signed by the author and by the person performing the independent technical verification.

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

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 MDOA privilege

2.6.1 Initial approval

The procedure should include EMAR Form 18a (see EMAR Forms Document) to support the approval under the MDOA privilege:

When the privilege of EMAR 21A.263(c)(6) is not applicable, the signed form should be presented by the office of airworthiness (or equivalent) to the Authority.

2.6.2 Approval of changes

Except for changes that do not affect the conditions approved for the issue of the military permit to fly, the procedure should specify how changes will be approved by the MDOA Holder. The form of paragraph 2.6.1 should be updated.

2.7 Authorised signatories

The person(s) authorised to sign the approval form should be identified (name, signature and scope of authority) in the procedure, or in an appropriate document linked to the MDOA exposition.

AMC 21A.263(c)(7) Procedure for the issue of a military permit to fly

1 Intent

This acceptable means of compliance provides means to develop a procedure for the issue of a military permit to fly.

Each MDOA applicant or holder should develop its own internal procedure following this AMC, in order to obtain the privilege of EMAR 21A.263(c)(7) to issue permits to fly for aircraft it has designed or modified, when the design organisation itself is controlling under its MDOA the configuration of the aircraft and is attesting conformity with the design conditions approved for the flight.

2 Procedure for the issue of a military permit to fly

2.1 Content

The procedure should address the following points:

a) conformity with approved conditions;

b) issue of the military permit to fly under the MDOA privilege;

c) authorised signatories;

d) interface with the local Authority for the flight.

2.2 Conformity with approved conditions

The procedure should indicate how conformity with approved conditions is made, documented and attested by an authorised person.

2.3 Issue of the military permit to fly under the MDOA privilege

The procedure should describe the process to prepare the EMAR Form 20b (or MFTP equivalent) and how compliance with EMAR 21A.711(b) and (e) is established before signature of the military permit to fly.

2.4 Authorised signatories

The person(s) authorised to sign the military permit to fly under the privilege of EMAR 21A.263(c)(7) should be identified (name, signature and scope of authority) in the procedure, or in an appropriate document linked to the MDOA exposition.

2.5 Interface with the local Authority for the flight

The procedure should include provisions describing the communication with the local Authority for compliance with the local requirements which are outside the scope of the conditions of EMAR 21A.708(b) (see EMAR 21A.711(e)).

AMC 21A. 265(a) Administration of the MDOE

a) The MDOE of the applicant should 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 MDOE and other supporting documents as necessary for the investigation.

b) The MDOE should be produced in a concise form with sufficient information to meet EMAR 21A.243 relevant to the scope of approval sought by the applicant. The MDOE should include the following:

i. Organisation name, address, telephone, telex and facsimile numbers.

ii. Document title, and company document reference No (if any).

iii. Amendment or revision standard identification for the document.

iv. Amendment or revision record sheet.

v. List of effective pages with revision/date/amendment identification for each page.

vi. Contents list or index.

vii. A distribution list for the MDOE.

viii. 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, should be included to provide background information for the Authority.

ix. The certificate of approval should be reproduced in the document.

x. Identification of the department responsible for administration of the MDOE.

NOTE: In the case of an initial or revised approval it is recognised that certificate will be issued after Authority agreement to the MDOE content in draft form. Arrangements for formal publication in a timely manner should be agreed before the certificate of approval is issued.

c) An updating system should be clearly laid down for carrying out required amendments and modifications to the MDOE.

d) The MDOE may be completely or partially integrated into the company organisation manual. In this case, identification of the information required by EMAR 21A.243 should be provided by giving appropriate cross references, and these documents should be made available, on request, to the Authority.

GM 21A.265(b) Use of the MDOE

a) The MDOE 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.

b) All procedures referenced in the MDOE are considered as parts of the MDOE and therefore as basic working documents.

SUBPART K – PARTS AND APPLIANCES

GM 21A.301 Scope

Parts and appliances can include Government Furnished Equipment.

AMC 21A.303(c) Standard Parts

In this context a part is considered 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.

Equipment which should be approved in accordance to a certification requirement should comply with an applicable EMTSO or an appropriate requirement accepted by the Authority and is not considered a standard part. Examples could be med-evac equipment, non-integrated communications or navigation equipment.

GM 21A.303(c) Officially Recognised Standards

In this context “officially recognised Standards” means:

a) Those standards established or published by an official body whether having legal personality or not, which are widely recognised by the aerospace sector as constituting good practice.

b) The standard used by the manufacturer of the equipment as mentioned in paragraph 2 of AMC EMAR 21A.303(c).

SUBPART L – Not applicable

SUBPART M – REPAIRS

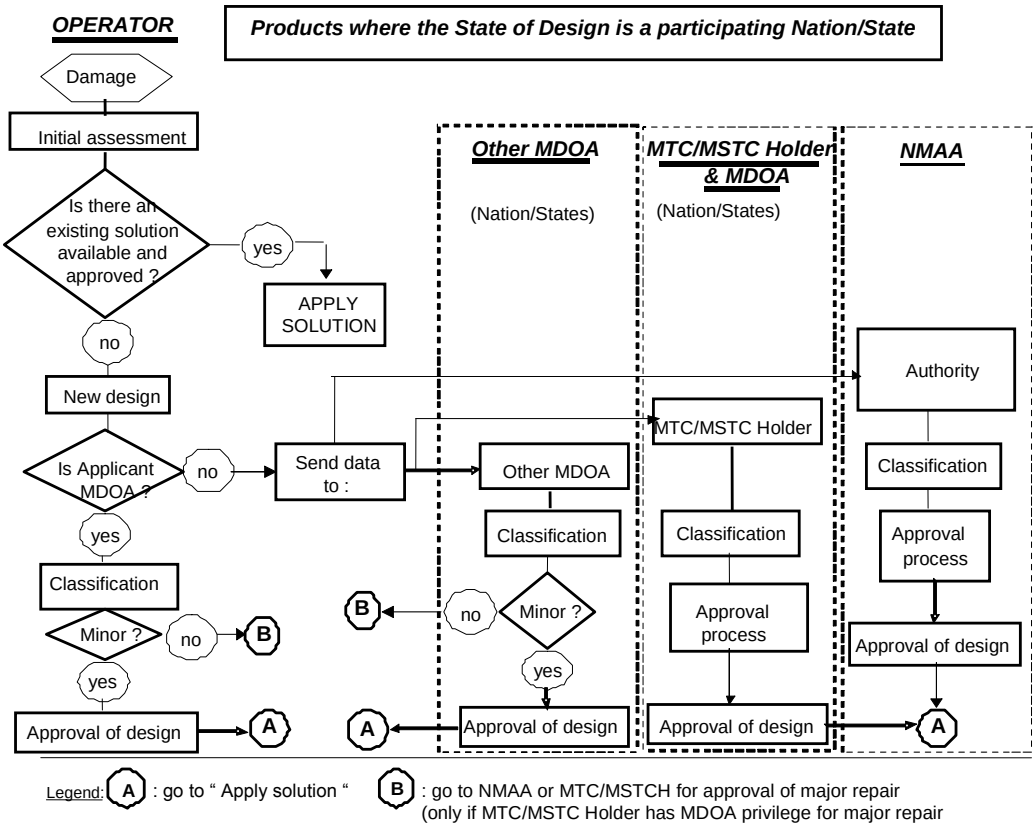
GM 21A.431(a) Scope

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 EMTSO authorisation as applicable) for operators, contain useful information for the development and approval of repairs.

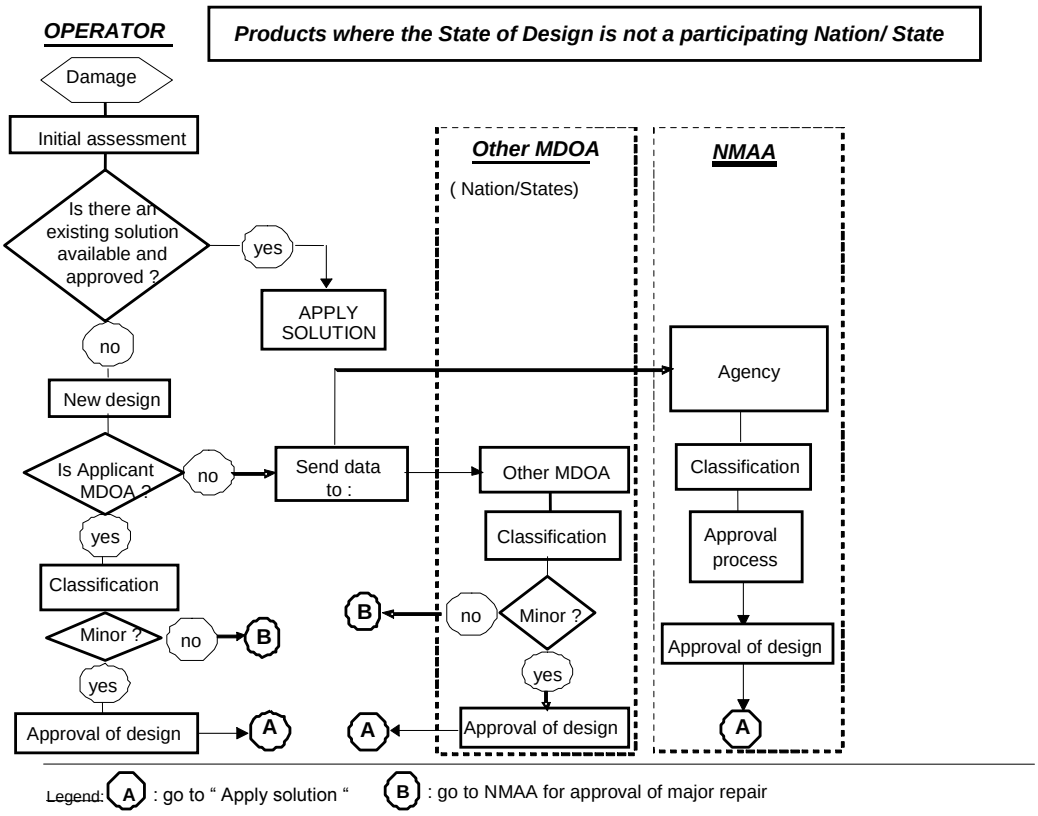
When these data are explicitly identified as approved, they may be used by operators without further approval to cope with anticipated in-service problems arising from normal usage provided that they are used strictly for the purpose for which they have been developed.

Approved data is data which is approved either by the Authority, 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 participating Member State.



Flow Chart 2 addresses procedures that should be followed for products where the State of design is not a participating Member State.



When specific repair data is approved within the participating Member States (pMS), conditions for acceptance may be defined in the respective recognition agreement in accordance with EMAD-R.

When specific repair data is approved outside of the pMS, conditions for acceptance may be defined in the bilateral arrangements between the pMS and the Authority of a third country. In the absence of such arrangement, the repair data should follow the approval route as if it was designed and approved within the pMS.

GM 21A.431(d) Repairs to articles

A repair to an article under EMAR 21A.611 has to be seen in the context of an EMTSO authorisation, i.e., when an article as such is specifically approved under EMAR 21 Section A 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, EMAR 21 Section A Subpart O, and EMAR 21A.611 in particular, should be followed.

When an EMAR 145 / EMAR M organisation is designing a new repair (based on data not published in the MTC 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 EMAR 21 Section A 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 21A.433(a) and 21A.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 and references of justifications;
   c repair drawing and/or instructions and scheme identifier;
   d correspondence with the MTC, MSTC, MDOA or EMTSO 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 military type-certificate or MSTC holder, when deemed necessary under EMAR 21A.433(b).
5. Repairs to engine critical parts would normally only be accepted with the involvement of the MTC holder.

GM 21A.435(a) Classification of repairs

1. Clarification of the terms Major/Minor

In line with the definitions given in EMAR 21A.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, jigging 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.

a) 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.

b) 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 affect upon flutter characteristics and controllability.

c) 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).

d) Operational characteristics

Changes may include:

i. stall characteristics;

ii. handling;

iii. performance and drag;

iv. vibration.

e) Other characteristics

i. changes to load path and load sharing;

ii. fire protection / resistance.

Note: Considerations for classifying repairs 'Major/Minor' should not be limited to those listed above.

3. Examples of 'Major' repairs

a) 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.

b) A repair to life limited or critical parts.

c) A repair that introduces a change to the Aircraft Flight Manual.

GM 21A.437 Issue of repair design approval

1. Approval by MDOA holder

Approval of repairs through the use of procedures agreed with the Authority, means an approval issued by the MDOA holder without requiring Authority involvement. The Authority 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 MDOA 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 EMAR 21A.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 21A.437(a) Issue of repair design approval

1. Products type-certificated by the Authority.

a) Authority approval is required in cases of major repairs proposed by design organisation approval holders, not being the MTC or MSTC holder, and in cases of minor repairs proposed by persons not holding a design organisation approval.

b) Authority approval may be required in cases of major repairs proposed by design organisation approval holders, being the MTC or MSTC holder, if the major repair is:

i. related to new interpretation of the airworthiness requirement as used for type-certification;

ii. related to different means of compliance from that used for type-certification;

iii. related to the application of airworthiness requirements different from that used for type-certification.

NOTE: This should be established at the time of MDOA approval.

2. Products type-certificated other than by Authority.

Authority approval is always required for major repairs on such products

AMC 21A.437(b) Issue of repair design approval

In order for the approved design organisation that is also the type-certificate holder to approve 'Major' repair design the following should be considered applicable:

a) The type-certificate holder being approved under EMAR 21 Section A Subpart J;

b) Procedures having been established that comply with EMAR 21 Section A Subpart M as agreed with the Authority;

c) The type-certification basis for the product, part or appliance to be repaired having been identified together with all other relevant requirements;

d) All records and substantiation data including documents showing compliance with all relevant airworthiness requirements being held for reviews by the Authority;

e) A summary list of all major repair approvals being provided to the Authority on a regular basis as agreed with the Authority:

f) Whether the repair design is affected by the presence of any supplemental type-certificate.

GM 21A.439 Production of repair parts

A maintenance body, (organisation or person), may manufacture parts for repair purposes when approved under EMAR 21 Section A Subpart G. In addition, a maintenance organisation may manufacture parts for its own repair purposes when expressly authorised by the Authority.

GM 21A.441 Repair Embodiment

Repairs should be accomplished by an organisation or person in accordance with the relevant airworthiness requirements.

The holder of a production organisation approval under EMAR 21 Section A Subpart G may accomplish repairs to new aircraft, within its terms of approval, under the privilege of EMAR 21A.163(d).

GM 21A.443 Limitations

Instructions and limitations associated with repairs should be specified and controlled by those procedures required by the applicable procedures.

GM 21A.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.

SUBPART N – Not applicable

SUBPART O – EUROPEAN MILITARY TECHNICAL STANDARD ORDER AUTHORISATIONS

GM 21A.601 Scope

For the purpose of this Subpart:

a) 'Article' means any part and appliance (including Government Furnished Equipment) to be used on military aircraft;

b) 'European Military Technical Standard Order' (referred to in this EMAR as 'EMTSO') is a detailed airworthiness specification issued by the Authority to ensure compliance with the essential airworthiness requirements of the Basic Framework Document, and is a minimum performance standard for specified articles;

c) An article produced under an EMTSO authorisation is an approved article for the purpose of Subpart K.

AMC 21A.602B(b)(2) Procedures for EMTSO authorisations

1 Scope

A manual of procedures should set out specific design practices, resources and sequence of activities relevant for the specific projects, taking account of EMAR 21 requirements.

These procedures should be concise and limited to the information needed for quality and proper control of activities by the applicant/holder, and by the Authority.

2 Management of the EMTSO authorisation process

For EMTSO authorisation, a procedure following the principles of AMC EMAR 21A.14(b), paragraph 2.1, 2.2 and 2.3, with the necessary adaptation related to EMAR 21 Section A Subpart O context, should be established.

3 Management of design changes

A procedure following the principles of AMC EMAR 21A.14(b), paragraphs 3.2 and 3.3, with the necessary adaptation to take into account 21A.611, should be established for the classification and approval of design changes on articles under EMTSO authorisation.

Repairs and production deviations from the approved design data.

A procedure following the principles of paragraph 3.1 should 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 should be established in accordance with EMAR 21 Section A Subpart M and associated AMC or GM. For deviations, the procedure should be established in accordance with EMAR 21A.610.

4 Obligations addressed in EMAR 21A.609

The applicant should establish the necessary procedures to show to the Authority how it will fulfil the obligations under EMAR 21A.609.

For issue of information and instructions, a procedure following the principles of AMC EMAR 21A.14(b), paragraph 4 should be established.

5 Control of design subcontractors

The applicant should establish the necessary procedures to show to the Authority how it will control design subcontractors.

AMC 21A.608 Declaration of Design and Performance

The EMAR Form DDP should be completed by the applicant.

GM 21A.611 Design changes

A change to an EMTSO article can either be seen:

under EMAR 21A.611 in the context of an EMTSO authorisation, i.e., when an article as such is specifically approved under EMAR 21 Section A 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, EMAR 21 Section A Subpart O, and EMAR 21A.611 in particular, should be followed.

or

when an organisation is designing a change (based on data not published in the MTC 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 EMAR 21 Section A 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".

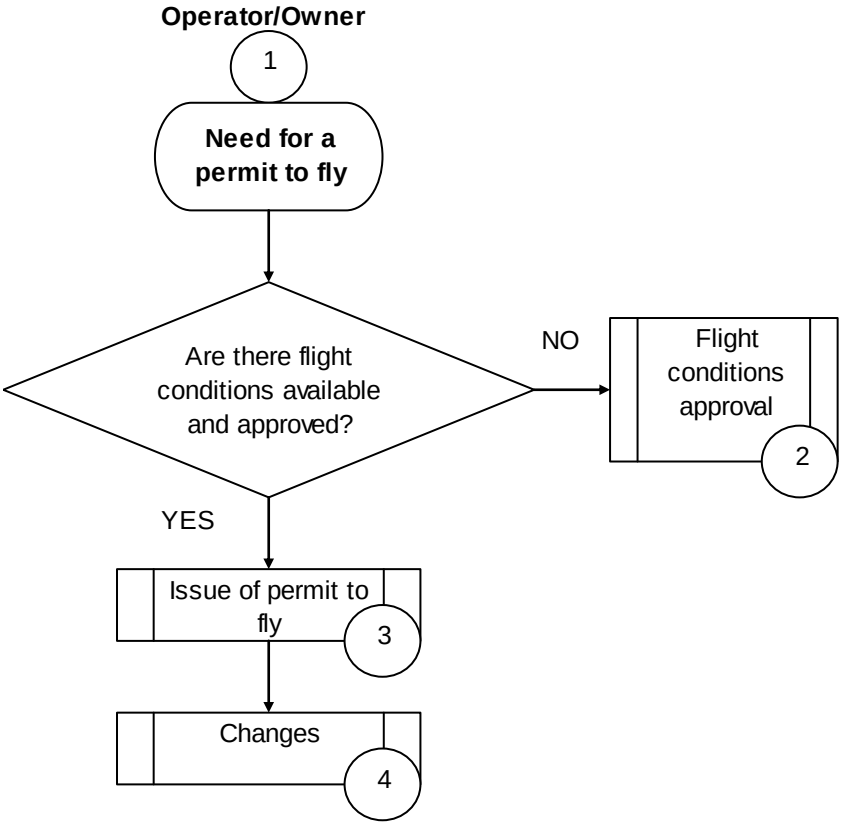
SUBPART P –MILITARY PERMIT TO FLY

GM to Subpart P

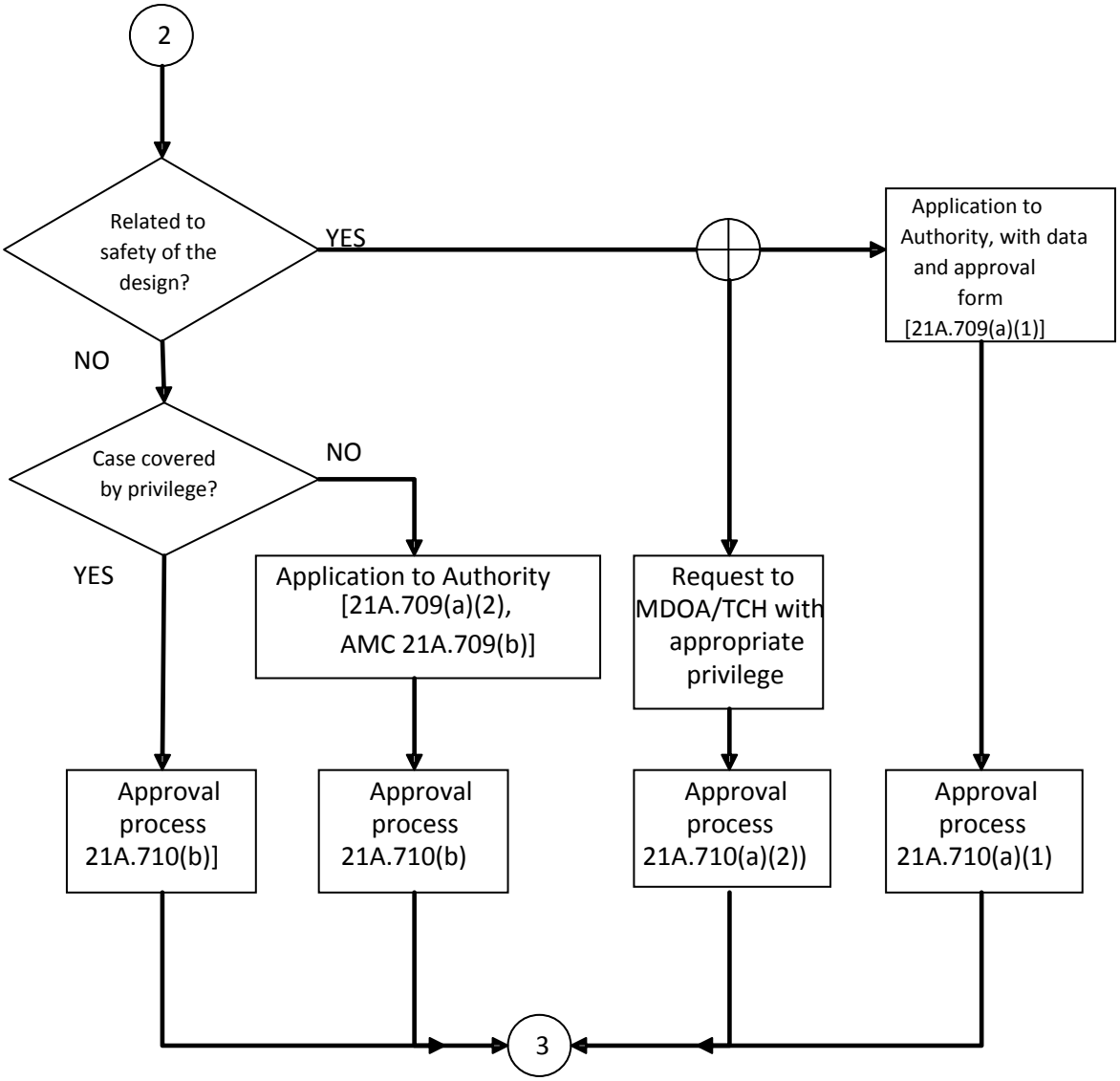
The process allowing a flight under a military permit to fly can be described as follows:

1. Flow-chart 1: overview;
2. Flow-chart 2: approval of flight conditions;
3. Flow-chart 3: issue of military permit to fly;
4. Flow-chart 4: changes after first issue of military permit to fly.

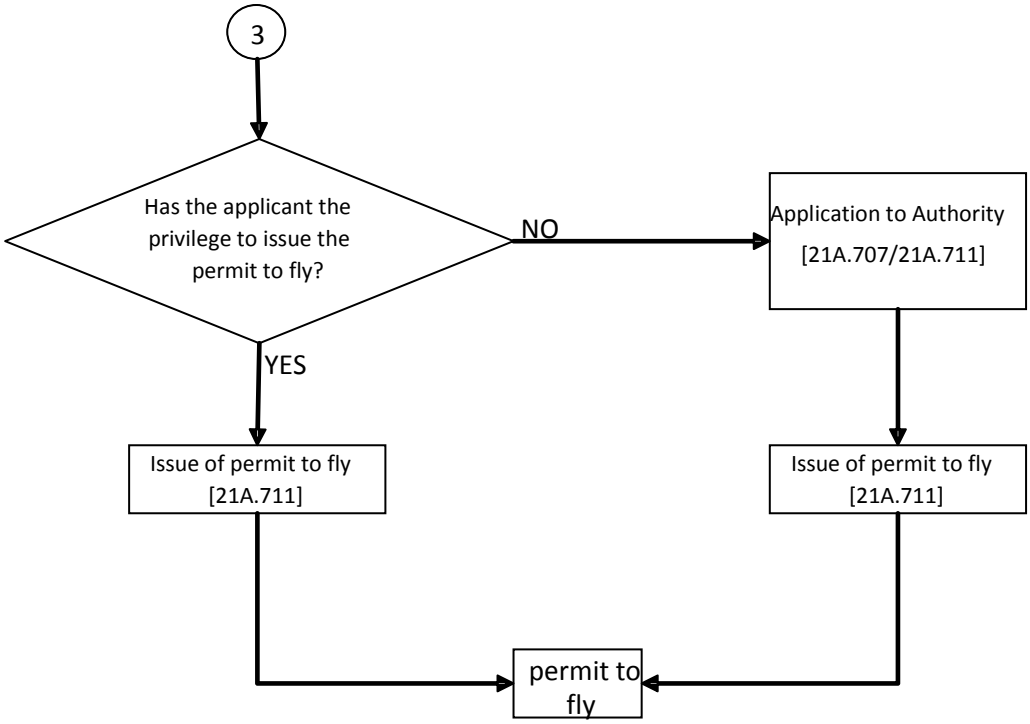
Flow-chart 1: overview



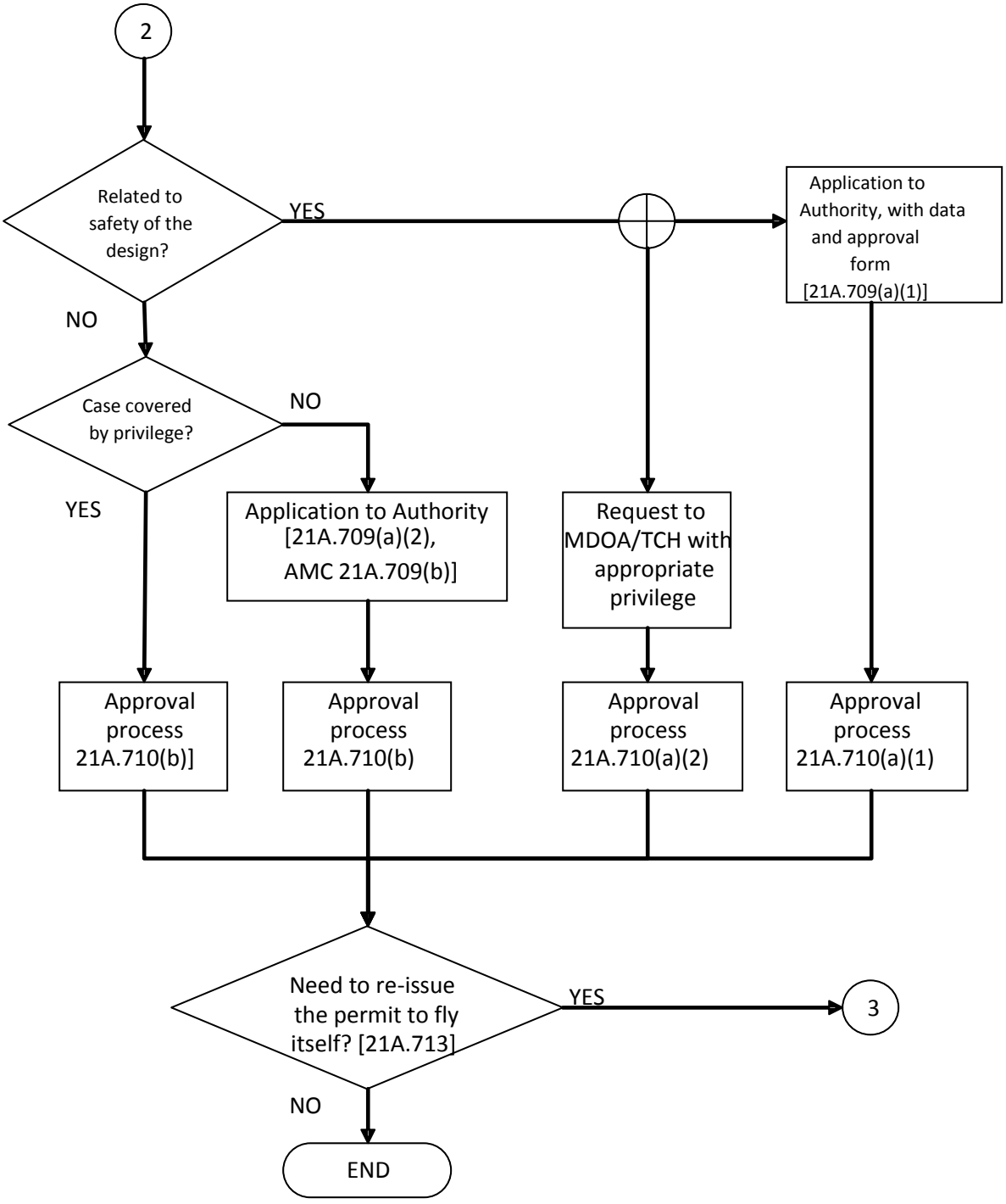
Flow-chart 2: approval of flight conditions



Flow-chart 3: issue of military permit to fly



Flow-chart 4: changes after first issue of military permit to fly



GM 21A.701 Military 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. EMAR 21A.701 identifies cases where the issuance of a (Restricted) Certificate of Airworthiness may not be possible or appropriate and this paragraph provides further information and typical examples for clarification where appropriate: -

Note: This list of examples is not exhaustive

a) Development:
    i. testing of new aircraft or modifications;
    ii. testing of new concepts of airframe, engine propeller and equipment;
    iii. testing of new operating techniques.

b) Showing compliance with regulations or certification requirements:
    i. certification flight testing for military type-certification, military supplemental type certificates, changes to military type certificates or EMTSO authorisation.

c) Design organisations or production organisations crew training:
    i. Flights for training of crew that will perform design or production flight testing before the design approval and Certificate of Airworthiness (C of A) can be issued.

d) Production flight testing of new production aircraft:
    i. For establishing conformity with the approved design, typically this would be the same program for a number of similar aircraft.

e) Flying aircraft under production between production facilities:
    i. green aircraft ferry for follow on final production.

f) Flying the aircraft for customer acceptance:
    i. Before the aircraft is sold and/or registered.

g) Delivering or exporting the aircraft:
    i. Before the aircraft is registered in the State where the C of A will be issued.

h) Flying the aircraft for Authority acceptance:
    i. In the case of inspection flight test by the Authority before the C of A is issued.

i) Market survey, including customer's crew training:
    i. Flights for the purpose of conducting market survey, sales demonstrations and customer crew training with non military type certificated aircraft or aircraft for which conformity has not yet been established or for non-registered a/c and before the C of A is issued.

j) Exhibition and air show:

i. 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.

k) Flying the aircraft to a location where maintenance or airworthiness review are to be performed, or to a place of storage:

i. 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.

l) Flying an aircraft at a weight in excess of its maximum certificated takeoff weight for flight beyond the normal range over water, or over land areas where adequate landing facilities or appropriate fuel is not available:

i. Oversees ferry flights with additional fuel capacity.

m) Reserved.

n) Flying aircraft meeting the applicable airworthiness requirements before conformity to the environmental requirements has been found:

i. Flying an aircraft which has been shown to comply with all applicable airworthiness requirements but not with environmental requirements.

o) For individual aircraft or types for which a certificate of airworthiness or restricted certificate of airworthiness is not appropriate.

i. For aircraft which cannot practically meet all applicable airworthiness requirements, such as certain aircraft without MTC-holder ("generically termed orphan aircraft") or aircraft which have been under national systems of military permit to fly and have not been shown to meet all applicable requirements. The option of a military 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 military permit to fly MAY be issued, in accordance with national regulations; it does not mean that in the described cases a military permit to fly SHOULD be issued. If other legal means are available to allow the intended flight(s) they can also be used.

GM 21A.701 Scope

An aircraft registered outside the pMS and used for flight testing by an organisation which has its principle place of business in the pMS, remains under the Authority of its state of registry. The Authority or an appropriately approved design organisation can provide, on request, technical assistance to the state of registry for the issue of a military permit to fly (EMAR Form 20b or MFTP equivalent), under the state of registry applicable regulations.

GM 21A.703 Applicant for a military permit to fly

The applicant for a military 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 military 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.

An appropriately approved design organisation can apply for the approval of the flight conditions when using its privilege in accordance with EMAR 21A.263(b)(1).

GM 21A.705 Reserved

GM 21A.707(b) Application

The military permit to fly application form (EMAR Form 20b or MFTP equivalent) should be obtained from the Authority.

GM 21A.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.

GM No. 1 to 21A.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.

GM No. 2 to 21A.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.

GM 21A.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 military permit to fly.

All other changes should be approved in accordance with EMAR 21A.713 and when necessary a new military permit to fly should be issued in accordance with EMAR 21A.711.

AMC 21A.709(b) Submission of documentation supporting the establishment of flight conditions

Together with the application, the documentation required by EMAR 21A.709(b) should be submitted with EMAR Form 18b (see EMAR Forms Document), 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 should be provided only when all data are available, to allow the applicant to make the statement required in Block 9 of the Form.

GM 21A.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.
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 Authority for the aircraft or type of aircraft to qualify or re-qualify for a (restricted -) certificate of airworthiness.

GM 21A.711(e) Additional conditions and restrictions

The conditions and restrictions prescribed by the Authority may include airspace restrictions to make the conditions approved under EMAR 21A.710 more concrete, or conditions outside the scope of the ones mentioned in EMAR 21A.708(b) such as a radio station license.

GM 21A.713 Changes

Changes to the conditions or associated substantiations that are approved but do not affect the text on the military permit to fly do not require issuance of a new military permit to fly.

In case a new application is necessary, the substantiation for approval of the flight conditions only needs to address the change.

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

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

SUBPART Q – IDENTIFICATION OF PRODUCTS, PARTS AND APPLIANCES

GM 21A.804(a)(1) Identification of parts and appliances

It is not the intent of EMAR 21A.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 military design approval holder. Therefore, the physical marking of parts and appliances is only required when established by the military design approval (MTC, MSTC, EMTSO, repair, minor change) holder.

AMC 21A.804(a)(3) Identification of parts and appliances

Mark “EMPA” (European Military Part Approval) is a generic designation that is to be adapted by each Nation. Thus, the letter “E” should be replaced by the ISO 3166-1:2006 (or STANAG 1059 Edition 8)* three letter code in order to distinguish identification of parts and appliances produced under each nation approval.

GM 21A.804(a)(3) Identification of parts and appliances

“EPA” (European Part Approval) mark, for parts and appliances produced under EASA approval that can be installed in military aircraft, should be considered as an recognized mark instead of “EMPA” (European Military Part Approval) in the same manner as defined on AMC EMAR 21A.804(a)(3) for parts and appliances produced under each nation approval.