Considering Aircraft Modifications & Repairs FAA / TCCA / EASA

1. Federal Aviation Administration FAA

FARs (Title 14 of the Code of Federal Regulations) define a “major alteration” as “an alteration not listed in the aircraft, aircraft engine, or propeller specifications

1) that might appreciably affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness; or

2) that is not done according to accepted practices or cannot be done by elementary operations.”

Appendix A to Part 43 of the FARs provides further guidance on what constitutes a major alteration.

2. Transport Canada Civil Aviation (TCCA)

In Canada, a “major modification” is defined in similar terms in Standard 571 of the Canadian Aviation Regulations (CARs).

3. European Aviation Safety Agency

Under EASA regulations it is, not permitted to modify an aircraft without proper approvals. Even minor modifications for example seat covers, replacement of stickers, or the installation of a magazine holder requires appropriate approved maintenance data.

With the European Union EASA mandates all Mods for Commercial Air Transport (CAT) & Large Aircraft – Minor or Major (STC) are managed through an EASA Part 21 Design Organisation Process.

4. Major / Minor Considerations

According to the FAA Federal Aviation Regulations (FAR’s) an alteration other than a major alteration is considered minor.

In both the U.S. and Canada, minor alterations require only “acceptable data,” which can include drawings and methods recommended by the manufacturer, or relevant advisory circulars.

A major alteration requires “approved data,” which is essentially technical data that has been approved by the regulatory authority.

May include data associated with a type certificate or supplemental Type Certificate (STC).

Note That within the FAA system, there are alternative sources of approved data:

a) technical standard order authorizations,

b) parts manufacturer approvals,

c) airworthiness directives, and

d) maintenance instructions approved by an FAA designated engineering representative (DER).

5. FAA Determination Major / Minor

It is the installer's responsibility to determine whether an installation is minor or major. (with FAA oversight)

6. EASA Determination Major / Minor

Must be performed by EASA Approved Design Organisation.

7. FAA Form 337 Comments

FAA Form 337 is used to record major alterations as well as field approvals not requiring an STC.

Note 1 Major alterations made with an STC also require the Form 337.

Note 2 Form 337 should not be used for minor alterations.

If an alteration introduces a major change in type design, it requires a type certificate (TC) amendment or an STC.

8. The Use of Field Approvals – What are they?

A field approval is one of the means used by the FAA to approve technical data used to accomplish a major repair or major alteration.

It is an approval by the Administrator, through an authorized Aviation Safety Inspector (Airworthiness), of technical data and/or installations used to accomplish a major repair or major alteration.

Technical data so approved becomes "technical data approved by the Administrator."

This type of approval may be accomplished for one-time approval.

Note that the FAA's is showing some reluctance to perform field approvals to avoid inconsistencies and to promote more effective harmonised international standards.

9. How to ensure the Appropriate release of Aircraft Modifications

Supplemental Type Certificates

Modifications requiring an STC are also designed by a Part 21 DOA. However, an STC needs to be separately approved by EASA itself.

As part of the Bi-Lateral Obligations, EASA manages a full list of all approved STCs (available on the website).

The STC becomes a significant part of the aircraft's compliance with design requirements and may affect a Flight Manual change (supplement).

Service Bulletins issued by the Aircraft Manufacturer

Alert, and non-mandatory categories Alert service bulletins typically fix a design problem of the aircraft and usually are adopted and become airworthiness directives.

Non-Mandatory Service Bulletins provide for a modification which delivers economic or operational benefit without having a serious impact on the airworthiness of an aircraft.

Approved Part-21 Design Organization Modifications

A Part 21 Design Organization (often referred to as DOA – Design Organization Approval) is able to develop modifications and issue appropriate airworthiness documentation. Often provided in the form of Service Bulletins.

The Part 21 Organisation is responsible for Instructions for Continued Airworthiness (ICA) detailing maintenance requirements which form part of the operators approved maintenance program (AMP).