AIRWORTHINESS
EUROPEAN CERTIFICATION REQUIREMENTS

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Contents of the presentation:

• History of European Airworthiness Certification
• EASA regulatory framework
• Airworthiness Certification process
• Part 21 requirements
  – Type certification
  – Design organization approval
History of European Airworthiness Certification
History(1)

• The JAA started as the Joint Airworthiness Authorities in 1970. Originally, its objectives were to produce common certification codes for large aeroplanes and for engines in order to meet the needs of European industry.

• After 1987 its work was extended to Operations, Maintenance, licensing and certification standards for all classes of aircraft.
History(2)

• The National Aviation Authority (NAA) in each country was responsible for approving production, maintenance, and training within in that particular country. The NAA adopt guidance and rules issued by JAA but like soft law.

• In reaction on this state was formed European Aviation Safety Agency (EASA), in an attempt to standardize aviation safety in Europe, according to ideas of European Union.

• The EASA creates and implements aviation safety regulation like hard law.
a matter of differences:

**JAA regulations vs. NAA**
- Standardisation is a *voluntary process* to achieve mutual recognition status
- A JAA Member State may accept or not accept an initial standardisation visit.

**EASA regulations vs. NAA**
- Standardisation is a *binding* process based on EU law.
- A standardisation visit from EASA cannot be refused.
History (3)


- EASA formally started its work on 28 September 2003, taking over the responsibility for regulating airworthiness and maintenance issues within the EU Member States.
History(4)

- After EASA establishment was JAA transition to EASA thought a “Transition Plan”.
- Originally airworthiness and maintenance requirements (JARs) were transposed/converted into EASA regulatory measures. Some (e.g. JAR-21, JAR-145,...) became Implementing Rules (IR) through a Commission Regulation, and others became Acceptable Means of Compliance (AMC) and Certification Specifications (CS) through Agency decisions.
- JAA retained its function for operations and licensing for JAA member states outside EASA.
EASA regulatory framework
The EU Aviation Safety System

- The Chicago Convention provides **minimum standards** to ensure the safety of civil aviation and environmental protection. Therefore Community adopted essential requirements and rules for **high and uniform level** of protection of the European citizen.

- **Fundamental pillar** of the EU system is the **mutual immediate** recognition in all Member States of any certificate issued either by EASA or by a National Aviation Authority.
General EU Principles

- **EU institutions**
  - Council
  - Parliament
  - Commission
  - Court

- **EU is regulator in many domains**
  - Exclusive; or
  - Shared competence

- **EU regulator:**
  - Council & Parliament (co-decision)
  - Commission: implementing rules

**Judicial control:**
- By national courts for MS acts
- By European court for Community acts
Regulatory framework: division of competences

Basic Regulation (EC) 216/2008 of 20/02/2008

Regulation (EC) 1702/2003 on Airworthiness and Environmental Certification

Annex (Part 21)

Section A: Application Requirements
Section B: Administrative Procedures
Appendices: EASA forms

ER:

Annexes I to V

Regulation (EC) 2042/2003 on Continuing Airworthiness

Annex I (Part-M): Continuing Airworthiness Requirements
Annex II (Part-145): Maintenance Organisation Approvals
Annex III (Part-66): Certifying Staff
Annex IV (Part-147): Training Organisation Requirements

Parliament and Council

European Commission

AMC & Guidance Material
Part 21

Certification Specifications
AMC 20
CS 25
CS 34
CS 36
CS E
CS P
CS APU

CS AWO
CS ETSO
CS Definitions

CS 22
CS 23
CS 27
CS 29
CS VLA
CS VLR

AMC & Guidance Material
Parts M, 145, 66, 147

EASA
The Basic Regulation

- The European Parliament and the Council define the Scope of Powers transferred to the Community.
- They adopt the Essential Requirements specifying the objectives to be met.

Basic Regulation (EC) 216/2008 of 20 February 2008
(Replace (EC) 1592/2002)

Annex I: Essential Requirements for Airworthiness
Annex II: Excluded Aircraft
Annex III: Essential Requirements for Pilot Licensing
Annex IV: Essential Requirements for Air Operations
Annex V: Qualified Entities
Annexes Va and Vb: Essential Requirements for Aerodromes, ATM/ANS and Air Traffic Controllers
The Basic Regulation

Basic Regulation (EC) 216/2008 Content:

- Scope
- Repeals
- Entry into force
- Shared competencies
- Pilot Licensing
- Air Operations
- Third Country Operators
- Oversight and Enforcement
- Annex I-IV
The Implementing Rules

**The Commission:**

- *adopts implementing rules* (Commission Regulations 1702/2003 and 2042/2003);
  
  - Recommend a statement that change is to comply with Regulation (EC) No 29/2009

- *oversees* the implementation of common rules by NAAs, including use of safeguard provisions (art. 14 of EASA Regulation);

- negotiates international agreements.
The Commission issued standards for implementing the essential requirements:

- Regulation (EC) 1702/2003 on Airworthiness and Environmental Certification
  - Annex (Part 21)
    - Section A: Application Requirements
    - Section B: Administrative Procedures
    - Appendices: EASA forms

- Regulation (EC) 2042/2003 on Continuing Airworthiness
  - Annex I (Part-M): Continuing Airworthiness Requirements
  - Annex II (Part-145): Maintenance Organisation Approvals
  - Annex III (Part-66): Certifying Staff
  - Annex IV (Part-147): Training Organisation Requirements
  - Section A: Technical Requirements
  - Section B: Administrative Procedures
  - Appendices: EASA forms
Competences of the Agency

The Agency:

- develops opinions for common rules (Basic Regulation and implementing rules);

- adopts material for the application of common rules (certification specifications, airworthiness codes, acceptable means of compliance and guidance material);

- acts as focal point vis-à-vis third countries and international organisations for the harmonisation of rules and the recognition / validation of certificates.
The Agency’s soft laws

- The Agency adopts non binding standards for implementing the essential requirements:

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Competences of the Agency and NAA

The European two-layer regulation system

EASA

Regulations at **European level** Product certification & DOA approval Standardisation.

National authorities

Implementation of EU rules at **national level**
Individual airworthiness certificates Approvals of national organisations + personnel.
The Sharing of Roles

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NAA competences (1)

Member States National Aviation Authorities role:

- provide expertise as appropriate for rulemaking tasks;

- develop national administrative rules for the implementation and enforcement of common rules (administrative procedures);

- may take action on a case by case basis if so required to ensure safety or appropriate operational flexibility (safeguards).
Role of NAA's:

Issue certificates:

- Airworthiness Certificates (C of A, etc.)
- Noise Certificates
- Part M Subpart F MOA, CAMO, Part 145, Part 147, Part 66
- POA, Part 21 Subpart F
NAA competences (3)

Member States may no longer:

- issue their own rules;
- deviate from common rules;
- impose additional requirements;
- conclude arrangements with third countries.
EASA Community system

Role and communications

**Agency**
- Works with States & stakeholders (SSCC)
- Proposes implementing rules
- Adopts AMCs, CSs, GM
- Standardisation
- Issues (some) certificates

**COMMISSION**
- Adopts implementing rules
- Infringement procedures

**Stakeholders**
- The end users

**AGNA**

**STATES**
- Assist Commission
- Advise EASA
- Issue (most) certificates
- Oversee organisations

Opinions

Reports

Comitology

Standardisation
European Aviation Safety Agency
EASA competency

- 27 EU Member States
- 4 EFTA States (Norway, Iceland, Lichtenstein and Switzerland)
- 7 Western Balkan countries are in process of joining the system
European Aviation Safety Agency

The main tasks of the Agency currently include:

- Rulemaking: drafting aviation safety legislation and providing technical advice to the European Commission and to the Member States;
- Inspections, training and standardisation programmes to ensure uniform implementation of European aviation safety legislation in all Member States;
- Safety and environmental type-certification of aircraft, engines and parts;
- Approval of aircraft design organisations world-wide as and of production and maintenance organisations outside the EU; Canada and US:
- Authorization of third-country (non EU) operators;
- Coordination of the European Community programme SAFA (Safety Assessment of Foreign Aircraft) regarding the safety of foreign aircraft using Community airports;
- Data collection, analysis and research to improve aviation safety.
## The scope of EASA competence

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The Agency Structure
Certification Directorate

Certification Director
N. Lohi

Director’s Office

Products
Experts
Certification Policy & Planning
ATM & ANS

Large Aeroplanes
General Aviation
Rotorcraft/Balloons/Airships
Propulsion
Parts & Appliances
Environmental Protection
MRB

Structure
Flight Test & Human Factors
Electrical Systems
Avionics Systems
Safety, Software & Airborne Electronic Hardware
Powerplant
Cabin Safety & Cabin Crew

Certification Policy
Certification Support

...
Rulemaking Directorate contributes to the production of all EU legislation and implementation material related to the regulation of civil aviation safety and environmental compatibility.
The EASA Rulemaking Process

• EASA Management Board Decision MB/08/2007 of 13 June 2007:

  - Programming
  - Initiation
  - Drafting
  - Consultation
  - Review of comments
  - Decision making

Key documents:
- 4-year Rulemaking Programme
- Pre - RIA
- Terms of Reference
- Notice of Proposed Amendment (NPA)
- Regulatory Impact Assessment
- Stakeholder Comments
- Comments Response Document (CRD)
- Opinion
- ED Decision

Comment Response Tool (CRT): http://hub.easa.europa.eu/crt/
Contacting EASA

Postal address:

• For letters only
  European Aviation Safety Agency
  Postfach 10 12 53
  D-50452 Koeln, Germany

• For parcels and other larger consignments
  European Aviation Safety Agency
  Ottoplatz, 1
  D-50679 Koeln, Germany

• Visitors' address
  European Aviation Safety Agency
  Ottoplatz, 1
  D-50679 Koeln, Germany

Internet:
http://www.easa.eu.int
Airworthiness Certification
Basic pillars of Aviation safety

Airworthiness Certificates
Airworthiness Certificates in ICAO (1)

Chicago Convention

**Article 31**

*Certificates of airworthiness*

Every aircraft engaged in international navigation shall be provided with a certificate of airworthiness issued or rendered valid by the State in which it is registered.

**Article 33**

*Recognition of certificates and licenses*

Certificates of airworthiness …. issued or rendered valid by the contracting State in which the aircraft is registered, shall be recognized as valid by the other contracting States, provided that the requirements under which such certificates … were issued or rendered valid are equal to or above the minimum standards which may be established from time to time pursuant to this Convention.
The two annexes covering the airworthiness of aircraft:

- Annex 6 - operations of aircrafts
- Annex 8 - airworthiness of aircrafts

The aircraft is certificated, manufactured and issued a Certificate of Airworthiness in accordance with Annex 8, then operated in accordance with Annex 6.
Airworthiness Certificates in ICAO (3)

Annex 8, Part II Chapter 3

- Defines conditions for:
  - Issuance of CoA
  - Continued validity or renewal
  - Validation by other states
- Defines the standard form
- Requires limitations to be defined
- What to do in case of loss of airworthiness or damage (special flight permit)
Issuance of CoA

The CoA issue process involves ensuring that:

(a) the aircraft conforms with the type design; this in turn ensures that the aircraft meets:
   ✓ a design standard; and
   ✓ the specified airworthiness requirements;

(b) the aircraft is free from defects;
(c) the required modifications, have been embodied;
(d) the required operational equipment has been fitted;
(e) the aircraft’s airworthiness state is properly reflected in the required documentation.
Airworthiness general Approval Process

A process permitting to issue a Certificate of Airworthiness for an aircraft

Aircraft manufacturer

Authority (EASA, FAA, ...)

Compliance with Airworthiness regulation

Certificate of Airworthiness
Regulation 216/2008 article 5 Airworthiness:

• 2.(c) Aircraft registered in a MS shall have a CoA based on a TC

• 4. By derogation from 2.:
  ➢ (a) A permit to fly may be issued
  ➢ (b) A restricted CoA may be issued
  ➢ (c) in case of more aircraft on R-CoA of same design: R-TC may be issued
This means there are **three** possible airworthiness certificates for aircraft:

- **CoA:** the “normal” case: compliance with Essential Requirements (ER).
- **Permit to fly:** if the aircraft can perform safely a basic flight.
- **R-CoA:** deviations from ER still ensure adequate safety with regard to the purpose.
Airworthiness Certificates in EU

There are two possible type certificates for aircraft:

- TC: the “normal” case: compliance with essential requirements (ER).
- R-TC: deviations from ER still ensure adequate safety with regard to the purpose.

Exsample: Restricted Type Certificate covering CS/LSA and CS/VLA.
Airworthiness Certificates in EU

RTC Limitations (for VLA LSA category):

RTC LSA:
- MTOW: 600kg.
- Commercial and Training Operation: Allowed
- Flight under night VFR: Not allowed
- Licensing requirement: PPL is required.
- Maintenance requirement: Maintenance of any RTC aircraft must be in accordance with Part M practice.

RTC VLA:
- MTOW: 750kg.
- Commercial and Training Operation: Allowed
- Flight under night VFR: Allowed
- Licensing requirement: PPL is required.
- Maintenance requirement: Maintenance of any RTC aircraft must be in accordance with Part M practice.

Duration and continued validity: A restricted type certificate is issued for an unlimited duration. It remains valid subject to the certificate not being surrendered or revoked under the applicable administrative procedures established by the Agency.

DOA and POA Privileges: The manufacturer must hold at least the AP (Alternative Procedure) DOA and POA to be eligible to offer this kind of category.
Airworthiness Certificates in EU

Diference between CoA and TC:

- The **type certificate** is a document by which the authority states that an applicant has demonstrated the **compliance** of a type design to all applicable requirements.

- TC is not in itself an authorization for the **operation** of an aircraft, which must be given by an **airworthiness certificate**.
“normal” CoA

• **Issued to aircraft that:**
  - conform to a TC; and
  - are in a conditions for safe operation.

• CoA is valid if aircraft is **maintained** in accordance with **continuing airworthiness** requirements.
“normal” CoA

A standard CoA may be issued in the following categories:

- Transport
- Normal
- Utility
- Acrobatic
- Commuter
- Manned free balloons
"normal" CoA

EASA Form 25

CERTIFICATE OF AIRWORTHINESS
OSVĚDČENÍ LETOVÉ ZPŮSOBLOSTI

Czech Republic
Česká republika
Civil Aviation Authority
Úřad pro civilní letectví

zech. / No: 3005/5

1. Nationality and registration marks
Poznávací značka
OK-6831

2. Manufacturer and manufacturer's designation of aircraft
Výrobce a typ lietadla
LET, n.p.
Uherské Hradiště - Kunovice
Czech Republic
L - 13 "BLANÍK"

3. Aircraft serial number
Výrobní číslo letadla
173408

4. Kategorie
Categories
Sailplanes

5. This Certificate of Airworthiness is issued pursuant to the Convention on International Civil Aviation dated 7 December 1944 and Regulation (EC) No 1592/2002, Article 5(2)(c) in respect of the abovementioned aircraft which is considered to be airworthy when maintained and operated in accordance with the foregoing and the pertinent operating limitations.
Toto osvědčení letové způsobilosti se vydává na základě Umluvy o mezinárodním civilním letectvu ze dne 7. prosince 1944 a příslušných regulativ (ES) č. 1592/2002, článek 5, 2, odst. c) na lietadlo, ktoré je považované za letecké způsobilé, je-li udržiaváno a provozované v souladu s vyšším uvedeným a příslušnými omezeními.

Date of issue:
Datum vydání:
31-05-2007

Limitations/Remarks:
Omezení/Poznámky:
None.

Signature:
Podpis:
(Běda)

EASA Form 25
Formuľať 25 EASA

This permit shall be carried on board during all flights.
Toto osvědčení musí být při všech letech na palubě.
Permit to fly

Exsample:

Permit to Fly for Airplane CTLS Flight condition:

- flight speed MTOW
- noncommercial operation only
- pilot license PPL or NPPL
- maintenance according motor glider requirements
- 2 years duration
Restricted CoA

Restricted CoA is:

- Issued to aircraft for which **no TC** was issued.
- Deviations from the ER shall ensure adequate safety.
- Eligibility and limitations for use defined in IR (Part-21).
Recognition of certificate (Within EU)

Regulation 216/2008 article 11

“Member States shall, without further technical requirements or evaluation, recognise certificates issued in accordance with this Regulation.”
Acceptance of third country certification

**Regulation 216/2008 article 12**

By derogation from BR and its IR, the Agency and NAA may issue certificates on the basis of certificates issued by AA of third countries i.a.w recognition agreements between EU and the third country.
Introduction to Part 21
Certification - requirements

• **Basic Regulation 216/2008:**
  - ✓ All aircraft must have a type certificate (TC)
  - ✓ Parts & appliances **MAY** have their own design approval
  - ✓ All must comply with Essential Requirements:
    - • High level objective airworthiness requirements

• **EASA Certification Specifications:**
  - ✓ Standard means to show that products comply with Essential Requirements
  - ✓ Detailed objective and prescriptive ‘requirements’ per category of product (see later)
Part 21 History

- JAR-21 adopted 30 November 1993
- Implementation slow
- JA DOA limited to TC and STC applicants
- JB DOA for contracted design of parts
- Transposition JAR-21 to Part 21
EASA Part 21

EASA Part 21:

• This document replaces JAR-21, which remain the core of the same document. The changes to the JAR document reflect the new legal status of the EASA towards the national authorities and a full revision of the document in light of the JAA certification experience.
Part 21 reflects certain principles:

- Single investigation concept
- Consistency
- Mandatory approvals of organisations
- Organisation approvals: quality assurance concept
- Important role of Type Certificate holder
- Responsibilities of approval/certificate holder
- Import / Export addressed by international agreements
Part 21 - Principles

Organisation approval:

- No delegation to individuals
- POA and DOA
- No geographical restrictions
- QMS approach (ISO 9000)
## Part 21: Subjects addressed by Part 21

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AMC and GM to Part 21

- ED decision No. 2003/1/RM on acceptable means of compliance and guidance material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations (“AMC and GM to Part 21”)

Available at:

Place of PART 21 in Certification Requirements

Certification Specifications

- CS 23
- CS 25
- CS 29
- CS VLA
- CS E
- ........
Type certification
Part 21 requirements
Type Certification

Three related, required approvals:

- Type Certification (type design approval)
- Design Organisation approval
- Production Organisation approval
Type certification Requirements
21A.13 Eligibility (applicant)

Who is an applicant?

- Any natural or legal person that has demonstrated, or is in the process of demonstrating, its capability in accordance with 21A.14 shall be eligible as an applicant for a type-certificate or a restricted type-certificate.
21A.15 Application

How?

- In a form and manner established by the Agency.

- An application for an aircraft type-certificate or restricted type-certificate shall be accompanied by a three-view, drawing of that aircraft and preliminary basic data, including the proposed operating characteristics and limitations.

- All information are publicised on EASA web.
21A.17 Applicable requirements (1)

Type-certification basis

- The applicable airworthiness code established by the Agency that is effective on the date of application for that certificate.
- Any special condition prescribed in accordance with 21A.16B(a).
- Applicable environmental protection requirements in 21A.18.
- Elects to comply with an amendment to the airworthiness code
- Expectances.
- Compliance with later effective amendments is elected by the applicant.
21A.17 Applicable requirements (2)

An application for type-certification is effective:

- 5 years for large airplanes and large rotorcraft;
- 3 years for any other type-certificate.

If product requires a longer period of time for design, development and testing, may the Agency approves a longer period.
21A.17 Applicable requirements (3)

In the case where a type-certificate has not been issued, or it is clear that a type-certificate will not be issued, within the time limit the applicant may:

- **File a new application** for a type-certificate and comply with all the provisions applicable to an original application;

- **File for an extension of the original application** and comply with the applicable airworthiness codes that were effective on a date, to be selected by the applicant, not earlier than the date which precedes the date of issue of the type-certificate by the time limit.
21A.16B Special conditions (1)

The special conditions are special detailed technical specifications for a product, if the related airworthiness code does not contain adequate or appropriate safety standards for the product, because:

- The product has novel or unusual design features relative to the design practices.
- The intended use of the product is unconventional.
- Experience from other similar products in service or products having similar design features, has shown that unsafe conditions may develop.
21A.16B Special conditions

- Without the special conditions, in this case, did not reach the expected level of safety generally assumed and defined.

- The special conditions keep the level of safety equivalent to that established in the applicable airworthiness code.

SECTION A: MODEL 1

A.I. General

1. Data Sheet No.: EASA A.527
2. a) Type: AT01
3. Airworthiness Category: CS-VLA
4. Type Certificate Holder: Aquila Aviation by Excellence GmbH
5. Manufacturer: Aquila Aviation by Excellence GmbH
6. Certification Application Date: 27-Feb-1998
7. (LBA) National Certifying Authority: 21-Sept-2001 (LBA TCDS Number 1106)
8. (EASA) National Authority Type Certificate Date: 19-Nov-2008 (EASA.A.527)

A.II. EASA Certification Basis

1. Reference Date for determining the applicable requirements: 27-Feb-1998
3. Special Conditions: SC235.01 “Connection Engine Mount Composite Airframe”
   SC235.02 “Winglet” Special Condition to CS-VLA for Night-VFR-Operation according to CRI-AO1
4. Exclusions: none
5. Deviations: none
6. Equivalent Safety Findings: none
7. Requirements elected to comply: none
21A.16B Special conditions (3)

Example of Special condition for composite structure:

- Crashworthiness, whereby the use of composites may change the response of the cabin structure in an otherwise survivable accident. Testing and analysis is required to substantiate that the behavior of the airframe is acceptable compared to existing metallic designs and recognized survivability criteria.

- Fuel tank impact resistance, for which current requirements address only the fuel tank covers as experience for conventional wing panels has generally been good. Fuel tank skin panels at risk from impact due to tire and engine debris must be assessed to demonstrate equivalent or better behavior.
21A.19 Changes requiring a new type-certificate

Proposed change a product is so extensive that a substantially complete investigation of compliance with the applicable type-certification basis is required.

Especially:

- Change number of engines or rotors
- Change of principle work
- Change number blades or principles setting (propeller)
Change in Type Design

Classification of Design Change acc. 21A.91
Goals: - determine approval route
- assess effect on airworthiness

Any of 21A.91 following criteria met?
- appreciable effect on weight
- appreciable effect on balance
- appreciable effect on structural strength
- appreciable effect on reliability
- appreciable effect on operational characteristics
  ... of the product

yes

Any of following criteria met?
(i) adjustment of certification basis
(ii) new interpretation of the requirements used for the TC basis
(iii) aspects of compliance demonstration not previously accepted
(iv) extent of new substantiation data and degree of reassessment and reevaluation considerable
(v) alters the limitations directly approved by the Agency
(vi) mandated by AD or terminating action of AD
(vii) introduces or affects function where failure condition is catastrophic or hazardous

See also Appendix A: Examples:

Agency decides classification
Request for reclassification
Any good reason to reclassify minor?

Minor

Major
21A.20 Compliance with the type-certification basis and environmental protection requirements

The applicant for a type-certificate or a restricted type-certificate shall show compliance:

- with the applicable type certification basis and environmental protection requirements;
- shall provide to the Agency the means by which such compliance has been shown.
21A.31 Type design (1)

The type design shall consist all relevant information for:

- complete definition of the type design of the product to ensure comparing the airworthiness of later products of the same type produced;
- ensure repeatable production in conformity with the approved type.
21A.31 Type design (2)

The type design consist:

- The drawings and a listing of those drawings
- Technical specifications
- Information on materials and processes and on methods of manufacture
- Assembly process of the product
- Any other data necessary to allow by comparison, the determination of the airworthiness:
  - Time limits of parts
  - Certification maintenance requirements
21A.33 Investigation and tests (1)

The applicant shall perform all inspections and tests necessary to show compliance with the applicable type-certification basis and environmental protection requirements.

The applicant shall allow the Agency to review any report and make any inspection and to perform or witness any flight and ground test necessary to check the validity of the declaration of compliance submitted by the applicant under 21A.20(b) and to determine that no feature or characteristic makes the product unsafe for the uses for which certification is requested.
21A.33 Investigation and tests (2)

Conditions for product demonstration and testing by the Agency:

- The successful accomplishment of its own inspections, ground and flight tests in accordance with 21A.20, before testing by the Agency;

- submit to the Agency a statement of compliance with type design and exposure declaration of conformity;

- any changes are not possible after exposure declaration of conformity before testing by the Agency.
21A.33 Investigation and tests (3)

More information can find in document:

ED Decision 2003/1/RM (on acceptable means of compliance and guidance material for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations (“AMC and GM to Part 21”))

Pragraph GM 21A.33 on page 30
21A.33 Investigation and tests (4)

Full scale test is generally required for composite structure to show compliance with static strength and damage tolerance requirements and is an expensive process for the applicants.

- Different failure modes attract different knock down factors for environment and variability (e.g. buckling, dependent on modulus, may not be affected as much as other properties) and unrealistic load levels may promote premature failure.

- Interfaces with metallic structure.

- Adequate representative component tests are needed to address failure modes that will not be interrogated in full scale test to ensure a complete and adequate test pyramid.
21A.35 Flight Tests (1)

Flight testing for the purpose of obtaining a type certificate shall be conducted in accordance with conditions for such flight testing specified by the Agency.

The applicant shall make all flight tests that the Agency finds necessary:

- To determine compliance with the applicable type-certification basis and environmental protection requirements,

- to determine that the aircraft, its parts and appliances are reliable and function properly (except sailplanes and powered sailplanes and except aeroplanes of 2 722 kg or less Maximum Take-Off Mass.
21A.35 Flight Tests (2)

The flight tests prescribed above (in 21A.35(b)(2)) shall include:

- For aircraft incorporating turbine engines of a type not previously used in a type-certificated aircraft, **at least 300 hours** of operation with a full complement of engines that conform to a type-certificate; and

- for all other aircraft, **at least 150 hours** of operation.
21A.35 Flight Tests (3)

Part 21 definitions - categories of flight test:

- **Category one** - Correspond broadly to opening and expending the flight envelope.

- **Category two** - Correspond broadly to “engineering flight test” on new aircraft or on aircraft modifications that do not significantly modify the aircraft behaviour.

- **Category Three** - Flights performed for the issuance of statement of conformity for a new-built aircraft which do not require flying outside of the limitations of the type certificate (TC) / aircraft flight manual (AFM).

- **Category Four** - Flights not classified as Category 1 or 2 on an aircraft of an already certified type, in case of an embodiment of a not yet approved design change.
21A.21 Issue of a type-certificate

Admission requirements:

- DOA or APDOA for simple design
- Submitting the declaration referred to in 21A.20 (b)
- It is shown that:

  - the product meets the applicable requirements accordance with 21A.17 and 21A.18;
  - any airworthiness provisions not complied with are compensated for by factors that provide an equivalent level of safety;
  - no feature or characteristic makes it unsafe for the uses for which certification is requested; and
  - the type-certificate applicant has expressly stated that it is prepared to comply with 21A.44.
21A.41 Type-certificate

The type-certificate and restricted type-certificate are both considered to include:

- the type design;
- the operating limitations;
- the type-certificate data sheet (TCDS) for airworthiness and emissions;
- applicable requirements (21A.17);
- other conditions or limitations prescribed for the product.

Don't cover requirements EASA-OPS and other operational requirements, PART 145/147/66.
21A.44 Obligations of the holder

Each holder of a type-certificate or restricted type-certificate shall:

- 21A.3 Failures, malfunctions and defects;
- 21A.4 Coordination between design and production;
- 21A.55 Record keeping;
- 21A.57 Manuals;
- 21A.61 Instructions for continued airworthiness;
- Don't lose qualification DOA or APDOA.
21A.3 Failures, malfunctions and defects (1)

Each holder of a type-certificate or restricted type-certificate shall:

- Develop a System for Collection, Investigation and analysing reports of and information related to failures, malfunctions, defects or other occurrences which cause or might cause adverse effects on the continuing airworthiness of the product.

- Information about this system shall be made available to all known operators of the product, part or appliance and, on request, to any person authorised under other associated implementing regulations.

cont....
21A.3 Failures, malfunctions and defects (2)

Each holder of a type-certificate or restricted type-certificate shall report to the Agency:

- any occurrence which has resulted in or may result in an unsafe condition.

- These reports shall be made in a form and manner established by the Agency, as soon as practicable and in any case dispatched not later than 72 hours after the identification of the possible unsafe condition.
21A.3 Failures, malfunctions and defects (3)

Each holder of a type-certificate or restricted type-certificate shall investigate:

➢ reason for the deficiency and report to the Agency the results of its investigation and any action it is taking or proposes to take to correct that deficiency (if occurrence results from a deficiency in the design, or a manufacturing.

➢ Submit correct the deficiency to the Agency with all relevant data.
21A.4 Coordination between design and production

Each holder of a type-certificate or restricted type-certificate shall collaborate with the production organisation as necessary to ensure:

- The satisfactory coordination of design and production required by 21A.122 or 21A.133 or 21A.165(c)(2) as appropriate, and;
- The proper support of the continued airworthiness of the product, part or appliance.
21A.47 Transferability (TC)

Transfer of a type-certificate or restricted type-certificate may only be made to a natural or legal person that is able to undertake the obligations under 21A.44, for this purpose is necessary demonstrated ability by DOA or APDOA approval.
21A.51 Duration and continued validity

A type-certificate and restricted type-certificate shall be issued for an unlimited duration until:

- The holder remaining in compliance with this Part.
- The holder surrendered TC.
- The certificate is revoked under the applicable administrative procedures established by the Agency.
21A.55 Record keeping

Type-certificate or restricted type-certificate holder have to hold:

- all relevant design information;
- drawings and test reports;
- inspection records for the product tested.

These information shall be at the disposal of the Agency and shall be retained in order to provide the information necessary to ensure the continued airworthiness.
The holder of a type-certificate or restricted type-certificate shall:

- produce, maintain and update master copies of all manuals required by the applicable type-certification basis and environmental protection requirements for the product.
- provide copies, on request, to the Agency.
21A.57 Manuals (2)

The manuals required for the product are:

- Flight Manual (AFM)
- part „Airworthiness Limitations“ (include CMR)
  - Maintenance handbook
- Type Design Definition
- Compliance checklist
- Draft TCDS
The manuals work in process required for issuing TC:

- Operations Manual
- Weight and Balance Manual (WBM)
- Master Minimum Equipment List (MMEL)
- Maintenance Review Board (MRB) Report
- Maintenance Planning Guide/Maintenance Schedule
- Maintenance Manual
- Wiring Diagram Manual
- Illustrated Parts Catalogues
- NDT Manual
- Structural Repair Manual
- Overhaul Manual
21A.61 Instructions for continued airworthiness (1)

- Instructions for continued airworthiness (ICA) are required for the issue of a (type) certificate.

- ICA are provided to maintain the certification airworthiness standard.

- Two Implementing Rules for this Basic Regulation: Part 21, Part M.
21A.61 Instructions for continued airworthiness (2)

Form of ICA:

Accordance Basic regulation (EC) No 216/2008, ANNEX I “Essential requirements for airworthiness referred to in Article 5” states:

- 1.d.3. ... in the form of a manual, or manuals, as appropriate for the quantity of data .... ... must cover maintenance and repair instructions, servicing information, trouble-shooting and inspection procedures, ...

- 1.d.4. ... must contain airworthiness limitations...”
21A.61 Instructions for continued airworthiness (3)

The holder of a type-certificate or restricted type-certificate shall:

- Furnish at least one set of complete instructions for continued airworthiness, prepared in accordance with the applicable type-certification basis, to each known owner of one or more aircraft, engine or propeller upon its delivery or upon issue of the first certificate of airworthiness for the affected aircraft.

- Make those instructions available on request to any other person dealing with overhaul or other forms of heavy maintenance.
21A.61 Instructions for continued airworthiness (4)

The holder of a type-certificate or restricted type-certificate shall:

- changes to the instructions for continued airworthiness made available to all known operators of the product and shall be made available on request to any person required to comply with any of those instructions. A programme showing how changes to the instructions for continued airworthiness are distributed shall be submitted to the Agency.
21A.61 Instructions for continued airworthiness (4)

ICA content:

- Descriptive data
- Overall information for maintenance
- Technical description of the product and its systems
- Description of functions and control
- Detailed maintenance information (service points, the type and amount of fuel, fuel tank capacity etc.)
- The recommended period and maintenance work for aircraft and engines, APU, propeller, instruments.
21A.61 Instructions for continued airworthiness (5)

ICA content:

- Inspection and troubleshooting
- Information for part removal and replacement
- Ways of checking the correct function, etc…
- **Part „Airworthiness Limitations“**
  - Separate part of the instructions, visible separated
  - Mandatory part time limit exchanges and inspections and procedures
  - Applicant must defined and Agency approved for issuing the TC
Type Certification process
"TYPE" means a design and make of aircraft and refers to a group of essentially similar aircraft which, although possibly existing in different models or variants, stem from a common basic design and are certificated under the same type certificate;
Type certification

“MODEL’ means a particular version of an aircraft type, such as would be distinguished from another version of the same type by a change of sufficient effect on the weight and balance, structural strength, operational characteristics, or other characteristics as would require a separate entry on the type certificate identifying and approving the particular version as distinct from the identification and approval of other models.
Type Certification

Type Certification process:

- Application
- Agency established Certification Basis:
  - applicable CS
  - special conditions if needed
  - possible equivalent safety findings
  - if no CS available: only special conditions (could be the draft CS)
- Applicant shows compliance
- Agency issues TC after finding of compliance
- Use of Design Organisation Approvals
TC: The elements of the process

- Analyses
- Structural Test
- Flight Test
- Flight Manual etc....
Application

EASA FORM 30 Application for
Type Certificate (TC)/
Restricted Type Certificate (RTC)

European Aviation Safety Agency
Application for
Type Certificate (TC)/
Restricted Type Certificate (RTC)

1. Applicant

1.1 Applicant’s Reference
Determination

1.2 Name

1.3 Address (registered
business/postal address)

1.4 Contact Person

1.5 Telephone

1.6 Fax

1.7 E-mail

1.8 Part 21
Demonstration of
Capability

1.9.1 Financial
Contact

1.9.2 Complete
Address

2. Product Identification and Fees Information

Type Certificate
Derivative
Restricted Type Certificate

Application will be charged in accordance with the Commission Regulation (EC) No 560/2008 of 31 May 2008 and any subsequent amendments, on the fees and charges levied by the European Aviation Safety Agency (http://www.easa.europa.eu/charges.php)

In the case of withdrawal of the application, all fees paid for the examination that qualified under Article 17 of Regulation 560/2008 will be refunded in full and will be credited to the applicant’s bank account. In case the examination fees are levied as a fixed rate, the refund amount will be fully recoverable. EASA will also recover travel costs outside the territory of the EU Member States.

2.1 Fixed wing aircraft

Larger Aeronautics

- over 5,700 kg up to 10,000 kg
- over 10,000 kg up to 25,000 kg
- over 25,000 kg up to 50,000 kg
- over 50,000 kg up to 100,000 kg

Small Aeronautics

- over 5,700 kg up to 22,000 kg (good community)
- over 22,000 kg up to 50,000 kg
- over 50,000 kg up to 100,000 kg (good community)

2.2 Helicopter

Large (CS-22 and CS-27 A)

Medium (CS-33, CS-37 A)

Small (CS-22 or less)

2.3 Balloons, Airships

- Balloon
- Airship

2.4 Propulsion

Engines

- Diesel engine above 1,000 kW take-off thrust
- Diesel engine up to 1,000 kW take-off thrust
- Diesel engine with take-off power
- Diesel engine up to 1,000 kW take-off power
- Turbofan engines
- Turbojet engines
- Gas-turbine engines
- CS-9290 gas-turbine engine, CS-V9R App B

AFU

- Propeller
- Rotorcrafts
- Rotorcrafts for use on aircraft only
- Rotorcrafts for use on aircraft up to 5,700 kg MTOM

- Rotorcrafts for use on aircraft up to 5,700 kg MTOM

3.1 Foreign Approval Reference

3.2 Foreign Approval Reference (of applicant)

3.3 Restrictions

The ‘Certification Basis’

• **Mandatory Requirements** [applicable cert code in place at time of TC application, e.g. CS-25]
  - **Reversions** [Use of ‘older’ reqs.]
  - ‘**Special Conditions**’ (Novel design features [CCD], Unconventional use [Steep Appr.], General experience [HIRF])
  - **Exemptions** [Non-applic. of req.]
  - ‘**Equivalent Safety Findings**’ [Not specified AMC]
  - **Environmental Standards** [Noise & emissions]

• **Elect to Comply Requirements**
(Main) current Certification Codes

**Aeroplanes**
- CS-22 (Sailplanes and Powered Sailplanes)
- CS-23 (Normal, Utility, Aerobatic and Commuter Aeroplanes)
- CS-25 (Large Aeroplanes)
- CS-VLA (Very Light Aeroplanes/750kg)

**Rotorcraft**
- CS-27 (Small Rotorcraft/3175kg)
- CS-29 (Large Rotorcraft)
- CS-VLR (Very Light Rotorcraft/600kg)
- CS-APU (Auxiliary Power Units)
- CS-E (Engines)
- CS-P (Propellers)

**Other**
- CS-ETSO (European Technical Standard Orders)
- CS-Definitions (Definitions and Abbreviations)
- CS-34 (Aircraft Engine Emissions and Fuel Venting)
- CS-36 (Aircraft Noise)
- CS-AWO (All Weather Operations)

http://www.easa.eu.int/home/rg_certspecs.html
Certification Codes content

- **Most CS:**
  - Book 1: the standard
  - Book 2: Acceptable Means of Compliance
Certification of composite structure

The general principles:

- The regulatory authorities pay particular attention to new and novel design features and may raise special conditions (per Part 21) if the existing CS does not address such items.
- Composites are no longer novel in a generic sense, but some of the recent applications of composites are relatively unproven and the materials are being continually developed.
- The Agency endeavours to take a proactive approach to safety, trying to anticipate potential issues through research programmes.
- EASA advisory material AMC 20-29 provides extensive guidance on how to show compliance with static strength and damage tolerance requirements when using composite materials for airframe structures.
Research projects - Large aeroplanes

This section covers research activities in the following areas:

- Airframe structure including new and advanced materials
- Aircraft systems
- Power plant and propulsion
- Avionics, software and complex electronic hardware
- Fire and cabin safety (click here for a related study on Carriage By Air of Special Categories of Passengers (SCPs))


**EASA/2010/3 (14/10/2011)** "Safety implications in performing Software Model Coverage Analysis (SOMCA)"


**EASA/2009/1 (15/02/2008)** "Safety Implications of the use of system-on-chip (SoC) on commercial off-the-shelf (COTS) devices in airborne critical applications"

Agreement of the certification program

The objective of this initial phase is the definition of and agreement on the proposed means of compliance with each paragraph of the certification basis and the identification of the team involvement.

Technicalities and documents associated with this phase are:

- Terms of reference (ToR)
- Means of compliance (MoC)
- The compliance checklist CCL
Agreement of the certification program

**Terms of reference (ToR)s** is a list of all paragraphs of the relevant certification basis, normally produced by the authority with the identification of the specialist responsible for compliance with the same requirements.
Agreement of the certification program

Means of compliance (MoC) The MoC are the categorization of the means used to demonstrate compliance with the requirements. A requirement can be complied with, for example, by flight test, a static test and/or substantiation report. These MoCs are defined in the EASA procedures, and some examples are as follows:

- MC2: Calculation / analysis
- MC3: Safety assessment
- MC6: Flying tests
- MC7: Inspection
Agreement of the certification program

• The **compliance checklist (CCL)** is a record of compliance with every applicable certification requirement must be produced by the applicant. This record based on MoC refer to the documents which demonstrate compliance with the applicable requirements.

• The CCL is a key document in type certification and it is fundamental in the post-TC phase for approval of changes or in cases incident/accident investigation.
Compliance demonstration

- ‘Compliance checklist’

### 4.7 Certification Requirements and Means of Compliance

#### 4.7.1 Applicable JAR 25 Compliance Matrix

The following table lists the compliance methods used in the following matrix with additional explanations.

<table>
<thead>
<tr>
<th>Code</th>
<th>Compliance Method</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Compliance Statement</td>
<td>Type design documents, recorded statements, such as Type Certificate (TC),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technical Standard Order (TSO), Declaration of Design and Performance (DDP).</td>
</tr>
<tr>
<td>1</td>
<td>Design Review</td>
<td>Review of drawings, layouts, routings, CATIA, etc.</td>
</tr>
<tr>
<td>2</td>
<td>Calculations/Analysis</td>
<td>Checking or similarity analysis.</td>
</tr>
<tr>
<td>3</td>
<td>Safety Assessment</td>
<td>FMEA/PHA/SSA/Reliability Predictions.</td>
</tr>
<tr>
<td>4</td>
<td>Lab Test</td>
<td>Done on vehicle simulating airplane/system.</td>
</tr>
<tr>
<td>5</td>
<td>Ground Test</td>
<td>Done on airplane while in ground environment.</td>
</tr>
<tr>
<td>6</td>
<td>Flight Test</td>
<td>Test on airplane while in flight environment.</td>
</tr>
<tr>
<td>7</td>
<td>Inspection</td>
<td>Physical examination.</td>
</tr>
<tr>
<td>8</td>
<td>Simulation</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Equipment</td>
<td></td>
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</tbody>
</table>

**SUBPART B - FLIGHT**

**PERFORMANCE**

<table>
<thead>
<tr>
<th>25.101 General</th>
<th>Compliance statement (0) Analysis (2) Ground test (5) and flight test (6) (Bleeds-off takeoff, thrust increase, high altitude ops &amp; FADEC P0 sensing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c) Performance must correspond to the available propulsive thrust.</td>
<td>Analysis (2) Flight test (6)</td>
</tr>
<tr>
<td>25.103 Stalling Speed</td>
<td>Analysis (2) Flight test (6)</td>
</tr>
<tr>
<td>(a) The reference stall speed</td>
<td>Flight test (6)</td>
</tr>
<tr>
<td>(b) ( V_{CSM} ) is determined</td>
<td>Flight test (6)</td>
</tr>
<tr>
<td>25.105 Take-off</td>
<td>Analysis (2) Flight test (6)</td>
</tr>
</tbody>
</table>
## Example of TC

### European Aviation Safety Agency

**EASA TYPE-CERTIFICATE DATA SHEET**

**LAK-19**

**Type Certificate Holder:**
Joint Stock Company „Sporting Avia“
Počiūnų k., Atvyklos sen.
LT-50127 Palanga
Republic of Lithuania

**EASA TCCS No. A.6/2**

**For variants:** LAK-19

**Issue:** 03, 16 October 2005

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<td>List of Effective Pages</td>
</tr>
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<td>Change Record</td>
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<td>Notes</td>
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### List of Effective Pages

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<th>Effective</th>
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<tbody>
<tr>
<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Change Record

<table>
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<th>Issue Date</th>
<th>Changes</th>
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<tbody>
<tr>
<td>12 August 2005</td>
<td>Amended from Lithuanian Type Certificate No. 15 to the EASA Type C Certificate No. A.6/2</td>
</tr>
</tbody>
</table>

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### Certification Basis

1. **Certification Basis:**

2. **Aircraft Approval Requirements:**
   - JAR 29/.miscellaneous
   - JAR 29/miscellaneous
   - JAR 29/miscellaneous
   - JAR 29/miscellaneous
   - JAR 29/miscellaneous
   - JAR 29/miscellaneous

3. **Design and Development:**
   - General Description
   - General Description
   - General Description
   - General Description
   - General Description

4. **Special Conditions:**
   - None

5. **Resolution:**
   - N/A

6. **Equivalent Approval:**
   - For JAR 22/64, NPA 021/64 (VFR operations in accordance with NPA 021 CAA/I EULC 04-40, London 1992)
Example of RTC

PS-26 Cruiser
Design Organisation approval
DOA in Basic Regulation

BR 216/2008 Article 5(2)(e):

- Organisation responsible for design … demonstrate their capability
- Capability recognised through organisation approval (in most cases)
- Privileges are defined in terms of approval
DOA in Basic Regulation

Annex 1, paragraph 3

- Organisation must have means (facilities, personnel, equipment, procedures, responsibilities, ....)
- Management system
- Arrangements with other organisations
- Occurrence reporting and handling (internal + external)
Part 21 – Subpart J

\[ J = \left\{ \right. \\
\text{Procedure for the approval of a DO} \\
\text{Rights and obligations of an applicant} \\
\text{Rights and obligations of an approved DO} \\
\left. \right\} \]

21A.231 – Scope

This Subpart establishes the procedure for the approval of design organisations and rules governing the rights and obligations applicants for, and holders of, such approvals.
DOA in Part 21

Main principles:

- To establish a “qualified framework” for the various activities related to the compliance demonstration with applicable requirements.

- To set the basis to enable the Authorities to accept statements, from DOA organisations, that the regulations have been complied with.
DOA in Part 21

Purpose:

• Increase confidence in compliance statements
• Allow Agency to step back
• Moving from individual certification task review to design assurance system review
• For:
  – Type and Supplemental Type certification
  – Design approval of changes and repairs
  – Continued Airworthiness activities
DOA in Part 21

DOA mandatory:
- Proof that applicant for design approval has capability
- Proof that holder of design approval is able to discharge responsibilities

DOA eligibility:
- Only in conjunction with application
- Or to obtain privilege to approve minor changes/repairs
DOA or APDOA

• DOA: possible for most design approvals
• DOA mandatory for TC "non-simple" + APU
• APDOA for:
  ➢ TC "simple design"
  ➢ STC
  ➢ Major repair design
  ➢ All ETSO

Relevant section of AMC & GM document:
✓ Subpart B - 'AMC 21A.14(b) Alternative Procedures,'
✓ Subpart E - 'GM 21A.112B Demonstration of capability for supplemental type-certificate cases'
✓ Subpart O - 'AMC 21A.602B(b)(2)Procedures for ETSO authorisations'
DOA Concept

A Design Assurance System
(21A.239)

A Handbook
(21A.243)

The RIGHT PEOPLE, in the RIGHT PLACES, with the RIGHT MEANS
(21A.243 + 21A.245)

Terms of Approval
(21A.251 + 21A.263)
21A.233 – Eligibility

Any natural or legal person (‘organisation’) shall be eligible as an applicant for an approval under this Subpart:

(a) in accordance with:

- **21A.14** TCs & Restricted TCs - Demonstration of capability,
- **21A.112B** STCs - Demonstration of capability,
- **21A.432B** Repairs - Demonstration of capability,
- **21A.602B** ETSOA - Demonstration of capability;
or

(b) for approval of minor changes or minor repair design, when requested for the purpose of obtaining privileges under **21A.263** DOA – Privileges.
21A.234 – Application

Each application for a design organisation approval:

shall be made in a form & manner established by the Agency

[EASA Form 80 (new DOA)]

and shall include:

- an **outline** of the **information** required by 21A.243 [Data]
- and the **terms of approval requested** to be issued under 21A.251 [T of A].
21A.239 - Design assurance system (1)

The design organisation shall demonstrate that it has established and is able to maintain a design assurance system for the control and supervision of the design, and of design changes, of products, parts and appliances covered by the application.
This system shall be such as to enable the organisation:

1. To ensure that the design of the products, parts and appliances or the design change thereof, comply with the applicable type-certification basis and environmental protection requirements; and

2. To ensure that its responsibilities are properly discharged in accordance with:
   (i) The appropriate provisions of this Part
   (ii) The terms of approval issued under 21A.251.

3. To independently monitor the compliance with, and adequacy of, the documented procedures of the system. This monitoring shall include a feedback system to a person or a group of persons having the responsibility to ensure corrective actions.
21.A239(a)(2)(i) refers to **ALL** applicable Part 21 requirements related to the scope of the DOA:

- TC : Part 21 Subpart B
- Changes to TC : Part 21 Subpart D
- STC : Part 21 Subpart E
- Repairs : Part 21 Subpart M

Corresponding Part 21 requirements should be considered when investigating an organisation, because they must be properly addressed in the procedures of the Design Assurance System.
RELATIONSHIPS BETWEEN DESIGN, DESIGN ASSURANCE & TYPE INVESTIGATION

- AIRWORTHINESS REQUIREMENTS
- PRODUCT SPECIFICATION
- DESIGN
- ANALYSIS & TEST
- SHOW COMPLIANCE
- VERIFICATION OF COMPLIANCE
- DECLARATION OF COMPLIANCE JAR 21.20 (b)
- ACCEPTANCE BY AUTHORITY
- TYPE CERTIFICATE
- DESIGN ORGANISATION SYSTEM
- SYSTEM MONITOR

Type investigation

Audits
21A.239 - Design assurance system (3)

(b) The design assurance system shall include an independent checking function of the showings of compliance on the basis of which the organisation submits compliance statements and associated documentation to the Agency.

(c) The design organisation shall specify the manner in which the design assurance system accounts for the acceptability of the parts or appliances designed or the tasks performed by partners or subcontractor according to methods which are the subject of written procedures.
21A.243 - Data (1)

(a) The Design Organisation shall furnish a handbook to the Agency describing, directly or by cross-reference:

- the organisation
- the relevant procedures, and
- the products or changes to products to be designed.
21A.243 - Data (2)

(b) Where any parts or appliances or any changes to the products are designed by partner organisations or subcontractors, the handbook:

- shall include a statement of how the design organisation is able to give, for all parts and appliances, the assurance of compliance required by 21A.239(b) [independent checking function], and
- shall contain, directly or by cross-reference, descriptions and information on the design activities organisation of those partners or subcontractors, as necessary to establish this statement.
21A.243 - Data (3)

(c) The handbook shall be amended as necessary to remain up-to-date description of the organisation, and copies of amendments shall be supplied to the Agency.

(d) The design organisation shall furnish a statement of the qualifications and experience of the management staff and other persons responsible for making decisions affecting airworthiness and environmental protection in the organisation.
21A.245 - Approval requirements

The design organisation shall demonstrate, on the basis of the information submitted i.a.w. 21A.243 that, in addition to complying with 21A.239:

- The staff in all technical departments are of sufficient numbers and experience and have been given appropriate authority to be able to discharge their allocated responsibilities and that these, together with the accommodation, facilities & equipment are adequate to enable the staff to achieve the airworthiness, noise, fuel venting & exhaust emissions objectives for the product.

- There is full and efficient coordination between departments and within departments in respect of airworthiness and environmental protection matters.
21A.251 – Terms of approval (1)

The terms of approval shall identify:

- the **types of design work**, the **categories of products, parts** and **appliances** for which the design organisation holds a design organisation approval;

- the **functions and duties** that the organisation is **approved to perform** in regard to the airworthiness and characteristics of noise, fuel venting and exhaust emissions of products.
21A.251 – Terms of approval (2)

For design organisation approval covering type-certification or ETSO authorisation for APU, the terms of approval shall contain in addition the list of products or APU.

Those terms shall be issued as part of a design organisation approval.
21A.253 – Changes to the terms of approval

Each **change** to the terms of approval shall be **approved** by the Agency.

An **application** for a change to the terms of approval shall be made in a form and manner established by the Agency.

[EASA Form 82 - significant changes] —

The design organisation shall comply with the applicable requirements of this Subpart.
21A.263 - Privileges (1)

(a) The holder **entitled to perform design activities** under this Part and within its scope of approval.

(b) Subject to 21A.257(b), **compliance documents** submitted by the applicant for the purpose of obtaining:

- TC approval of a major change to a type design
- STC or
- ETSO authorisation under 21A.602(b)(1);
- major repair design approval;

shall be **accepted** by the Agency **without** further verification.
21A.263 - Privileges

The holder of a design organisation approval shall be entitled, within its terms of approval and under the relevant procedures of the design assurance system:

- to classify changes to type design & repairs as 'major' or 'minor'.
- to approve minor changes to type design and minor repairs.
- to issue information or instructions containing the following statement: "The technical content of this document is approved under the authority of DOA nr.[EASA]. J. [xyz]."
- to approve documentary changes to the aircraft flight manual, and issue such changes.
- to approve the design of major repairs to products for which it holds the type-certificate or the supplemental type-certificate.
21A.265 Obligations of the holder (1)

The holder of a design organisation approval shall:

(a) Maintain the **handbook** in conformity with the design assurance system;

(b) Ensure that this handbook is **used** as a basic **working document** within the organisation;

(c) Determine that the **design** of products, or **changes** or **repairs** thereof, as applicable, **comply** with applicable requirements and have **no unsafe** feature; (cont.)
21A.265 Obligations of the holder (2)

....cont.

(d) Except for minor changes or repairs approved under the privilege of 21A.263, provide to the Agency statements and associated documentation confirming compliance with paragraph (c);

(e) Provide to the Agency information or instructions related to required actions under 21A.3B [Airworthiness directives].
DOA certificate
EASA Fees

• EASA Fees & Charges are set by the European Commission, with the agreement of the EU Member States. They are laid down in Commission Regulation 593/2007, as last amended, and are subject to regular reviews.

• Most applications (e.g. new type certificates, changes, repairs, supplemental type certificates, organisations approvals) are subject to flat fees. Hourly fees only apply for a limited number of specific applications (e.g. alternative procedures to DOA, AMOCs, validation support, MRB, flight conditions for permits to fly).
EASA Fees

**Type Certificate** application:

- Type Certificates and Restricted Type Certificates or equivalent (referred to in subparts B and O of the Annex to Commission Regulation (EC) No 1702/2003 (1))

- All applications attract the **fixed fee** A shown in the table, multiplied by the **coefficient** indicated for the product in question
EASA Fees

**Type Certificates Annual fee:**

- **Annual fee for holders of EASA Type Certificates and Restricted Type Certificates and other Type Certificates deemed to be accepted under Regulation (EC) No 1592/2002.**
- The level of the fee to be paid is shown in the table below with the corresponding product category:

<table>
<thead>
<tr>
<th>Product type</th>
<th>Type Certificate EU Member State of design products (EUR)</th>
<th>Type Certificate third country State of design products (EUR)</th>
<th>Restricted Type Certificate EU Member State of design products (EUR)</th>
<th>Restricted Type Certificate third country State of design products (EUR)</th>
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<tr>
<td>CS-25 (Large aeroplanes with MTOW greater than 50 tonnes)</td>
<td>120 000</td>
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<td>10 000</td>
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<td>CS-25 (Large aeroplanes with MTOW between 22 tonnes and 50 tonnes)</td>
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<td>16 667</td>
<td>12 500</td>
<td>4 167</td>
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<td>CS-25 (Large aeroplanes with MTOW of less than 22 tonnes)</td>
<td>25 000</td>
<td>8 333</td>
<td>6 250</td>
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<td>3 000</td>
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<td>500</td>
<td>167</td>
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<td>CS-23.C</td>
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<td>333</td>
<td>250</td>
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THANK YOU FOR YOUR ATTENTION