



**EASA**  
European Aviation Safety Agency

# ETSO process clarifications

Anne Sénéchal  
Xavier Audouze  
PCM Parts & Appliances,  
Avionics & Electrical

Your safety is our mission.

EASA is an agency of the European Union



ETSO Workshop - Cologne - June 2015



# Agenda

- Part numbering & design changes
- Conflicting requirements
- Reporting of design changes
- Deviation management
- Incomplete ETSO
- DDP



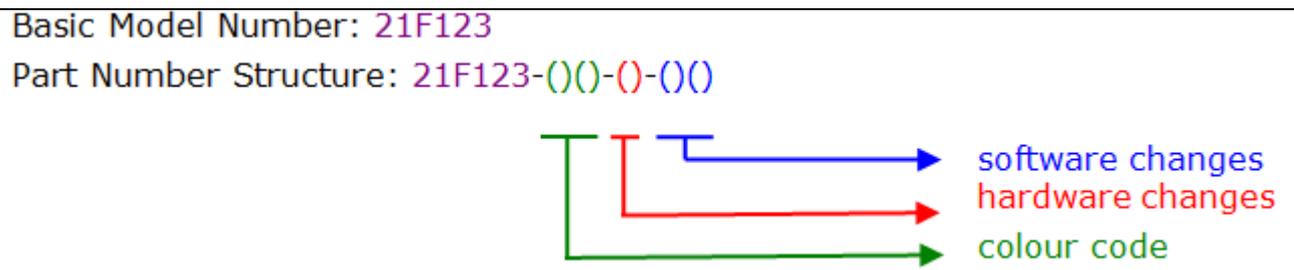
# Agenda

- ▶ Part numbering & design changes
- Conflicting requirements
- Reporting of design changes
- Deviation management
- Incomplete ETSO
- DDP



# Part Numbering & design changes

- ▶ 21.A.603 (b) *When a series of minor changes in accordance with point 21.A.611 is anticipated, the applicant shall set forth in its application the basic model number of the article and the associated part numbers with open brackets after it to denote that suffix change letters or numbers (or combinations of them) will be added from time to time.*



- ▶ Design changes under the ETSO certificate  
→ anticipate in P/N
- ▶ Eventhough anticipated ,  
those changes should only be minor ...



# Design changes to an ETSO article Minor ? Major?



# 21.A.611 Design changes

*21.A.611 (b) Any design change by the holder of the ETSO authorisation that is extensive enough to require a substantially complete investigation to determine compliance with an ETSO is a major change. Before making such a change, the holder shall assign a new type or model designation to the article and apply for a new authorisation under point 21.A.603.*

- ▶ Major/Minor classification
  - ▶ Process to be defined in APDOA manual
  - ▶ Refined per scope of work/ETSO standard



# Design changes classification

- Start with Change Impact analysis
- Defined key criteria for Major/Minor
- Sufficiently detailed for recurring internal company process

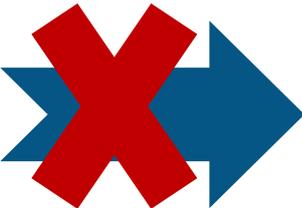
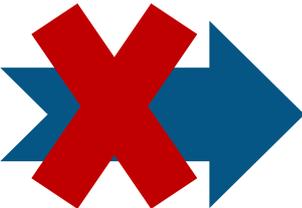


# Minor/Major : Impact evaluation ...

- The article performance regarding
  - ETSO performance, ETSO MOPS , including deviations,
  - Non-ETSO functions,
  - The article specifications,
  - The article environmental qualification...
  
- The article design regarding
  - Architecture,
  - Software,
  - Airborne Electronic Hardware....
  
- The necessity of re-verification...
  
- The use of the article :
  - Installation restrictions, Operation, Maintenance, Limitations....

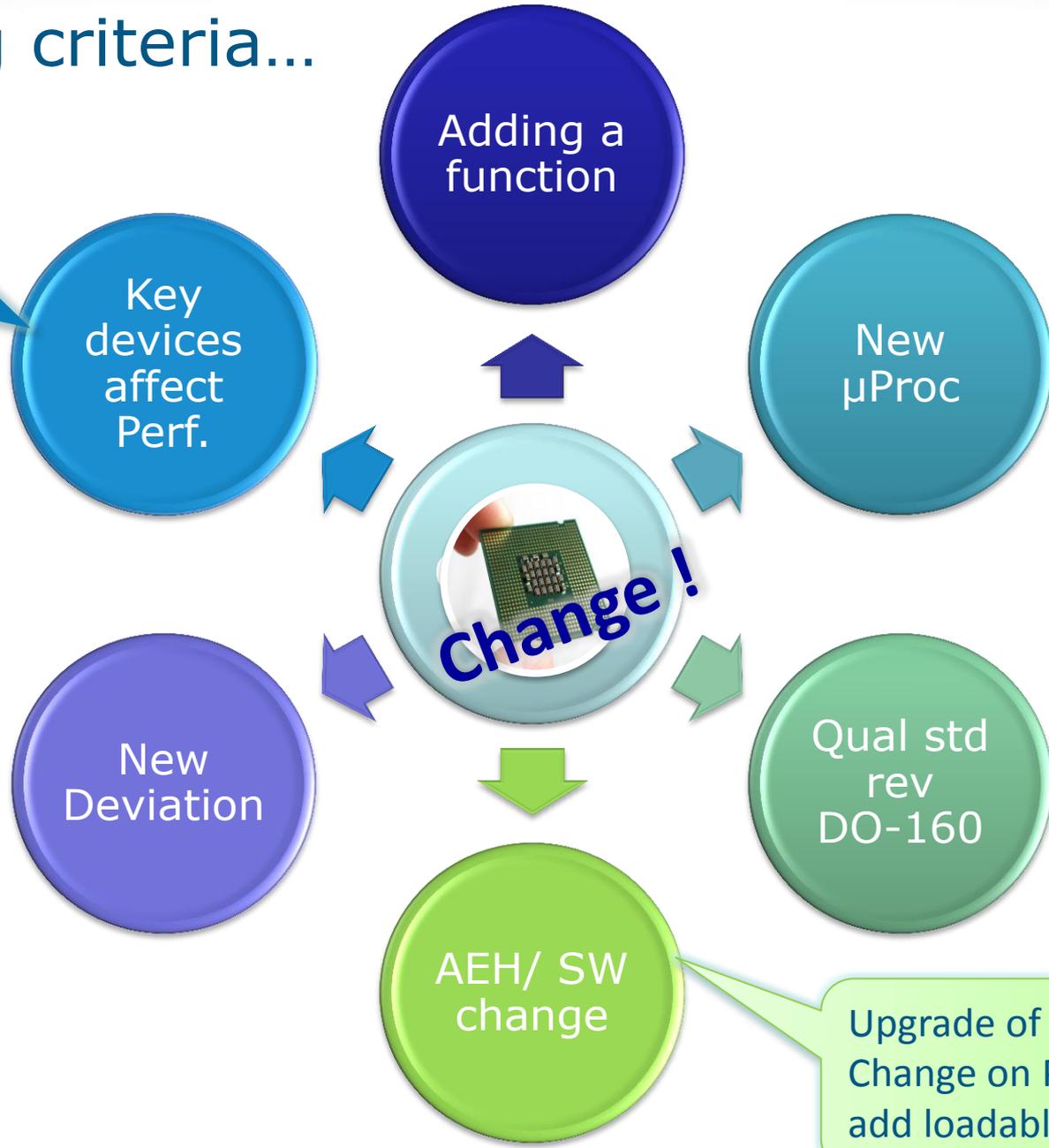


# EASA expectations

- Changes to be exhaustively defined
  - Change Impact Analysis, AEH & SW CIA
- Process to classify : required !
  - Generic process in AP-DOA manual
  - but Detailed criteria expected in company procedure
    - Adapted to scope of work / type of equipment
    - Harmonized/recurring process within applicant development teams
- Do not forget
  - Major at ETSO  Major at aircraft level
  - Minor at ETSO (21.A.611)  Minor at aircraft level (21.A.91)

# Refining criteria...

Examples  
...next  
slide



Upgrade of DAL,  
Change on Partitions, OS,  
add loadable SW, AEH...etc



# Criteria vs Scope of work...

Typical examples ....

➤ Change of LCD for ETSO-C113



➤ Change of gyro technology for ETSO-C3, -C6,-C201  
...

➤ Change of transmitting power for transponder



➤ Change on the material of the foam  
for floatation cushion





# Major design changes – Seats...

Typically limited to changes that effect the primary load path of the seat such as:

Important base material changes to the seat frame

- For example: metal seat frame to composite seat frame.



Important structural design changes

- For example: Seats with one lateral beam to two lateral beams
- Changes to lateral beam spacing
- Floor mounted versus side-mounted legs

Change from rigid seat frame to energy absorbing seat frame

Important changes to belt anchor point configuration

- For example: lapbelt to shoulder harness.





# Summary

- ▶ Detailed criteria expected in company procedures
  - ▶ refined to the scope of work
- ▶ Change of P/N when Major
- ▶ If unsure, request advise/concurrence from the EASA PCM



# Agenda

- Part numbering & design changes
- ▶ Conflicting requirements
- Reporting of design changes
- Deviation management
- Incomplete ETSO
- DDP



# 21.A.606 (b)

The applicant shall be entitled to have an ETSO authorisation issued by the Agency after:

(...)

(b) demonstrating that the article complies with the technical conditions of the applicable ETSO, and submitting the corresponding statement of compliance;

(...)

**CS-ETSO  
subpart A**

**CS-ETSO  
subpart B**

**MPS**

**A FEW REQUIREMENTS MAY APPEAR INHOMOGENEOUS**



# General principles for CS-ETSO



- Both subpart A and B apply
- CS-ETSO requirements prevail over referenced MPS
- Contradictions may exist...

**CONTACT PCM IF ANY DOUBT**

- The following examples illustrate typical cases



# Example 1:

➔ E.g. Subpart B rqt amends subpart A

ETSO-C142a  
Date: 28/11/2008

**European  
Aviation  
Safety  
Agency**

European Technical Standard Order (ETSO)

Subject: **NON-RECHARGEABLE LITHIUM CELLS and BATTERIES**

ETSO-2C514  
Date: 28/11/2008

**European  
Aviation  
Safety  
Agency**

European Technical Standard Order (ETSO)

Subject: **AIRBORNE SYSTEMS FOR NON REQUIRED  
TELECOMMUNICATION SERVICES (IN NON AERONAUTICAL  
FREQUENCY BANDS) (ASNRT)**

### 3.1.2 - Environmental Standard

Non-Rechargeable Lithium Cells and Batteries must be tested according to RTCA DO-227 Section 2.3 unless otherwise specified by **Appendix 1** of this ETSO

### 3.1.2 - Environmental Standard

The equipment must be tested according to the applicable environmental standards contained in EUROCAE ED-14E (RTCA/DO-160E) "*Environmental Conditions and Test Procedures for Airborne Equipment*" from March 2005.

**More stringent conditions**

⇒ **Deviation if rev F or G**



# Example 2:

- Eg. subpart B does not properly cover
  - Anyway, subpart A applies
  - Example:

<b>ETSO-C4c</b> Date : 24.10.03
<b>European Aviation Safety Agency</b>
European Technical Standard Order
<b>Subject:</b> BANK AND PITCH INSTRUMENTS
3.1.3 – Computer Software None
3.2 – Specific None

- Subpart A 2.2 (resp. 2.3) applicable if SW (resp. AEH) embedded.



# Example 3:

- ▶ Subpart B rqt prevails over referenced MPS
  - ▶ Referenced MPS amended by subpart B

ETSO-C142a  
Date: 28/11/2008

**European  
Aviation  
Safety  
Agency**

European Technical Standard Order (ETSO)

Subject: **NON-RECHARGEABLE LITHIUM CELLS and BATTERIES**

### 3 - Technical Conditions

#### 3.1 - Basic

##### 3.1.1 - Minimum Performance Standard

RTCA DO-227 "Minimum Operational Performance Standard for Lithium Batteries" from June 1995 unless otherwise specified by **Appendix 1** of this ETSO



# Example 4:

- E.g. subpart B and referenced MPS overlap
- In this case, most stringent or applicable rqt
- Example :

ETSO-C126a  
Date: 05.07.2012

**European  
Aviation  
Safety  
Agency**

European Technical Standard Order

**Subject:** 406MHz Emergency Locator Transmitter

3.1.1 - Minimum Performance Standard

Standards set forth in the EUROCAE ED-62A, Minimum Operational Performance Specification for Aircraft Emergency Locator Transmitters 406 MHz and 121.5 MHz (Optional 243 MHz), dated February 2009.

3.1.2 - Environmental Standard

See CS-ETSO Subpart A paragraph 2.1.

- ED-62A
  - crash test
  - ELT unit
- Subp. A2.1/ED-14
  - Others
  - = performance required before crash only



# At any rate...

- Both subpart A & B apply
- Contradictions may exist in specific cases
  - No generic rule can be defined
  - Often, most stringent requirement applies
  - Case by case review by PCM and experts
- Deviation may be needed

**CONTACT PCM IF ANY DOUBT**



# Agenda

- Part numbering & design changes
- Conflicting requirements
- ▶ Reporting of design changes
- Deviation management
- Incomplete ETSO
- DDP



# Reporting Design changes

21.A.611 (a) The holder of **the ETSO authorisation may make minor design changes** (any change other than a major change) without further authorisation by the Agency. In this case, the changed article keeps the original model number (part number changes or amendments shall be used to identify minor changes) and the **holder shall forward to the Agency any revised data** that are necessary for compliance with point 21.A.603(b).

## ➤ EASA expectations

### ➤ **Regularly** inform on design changes

➤ Some flexibility, minimum every year

### ➤ Means to report :

➤ DDP, Change Impact Analysis, classification...

## ➤ there is room for improvement ...



# Reporting Design changes

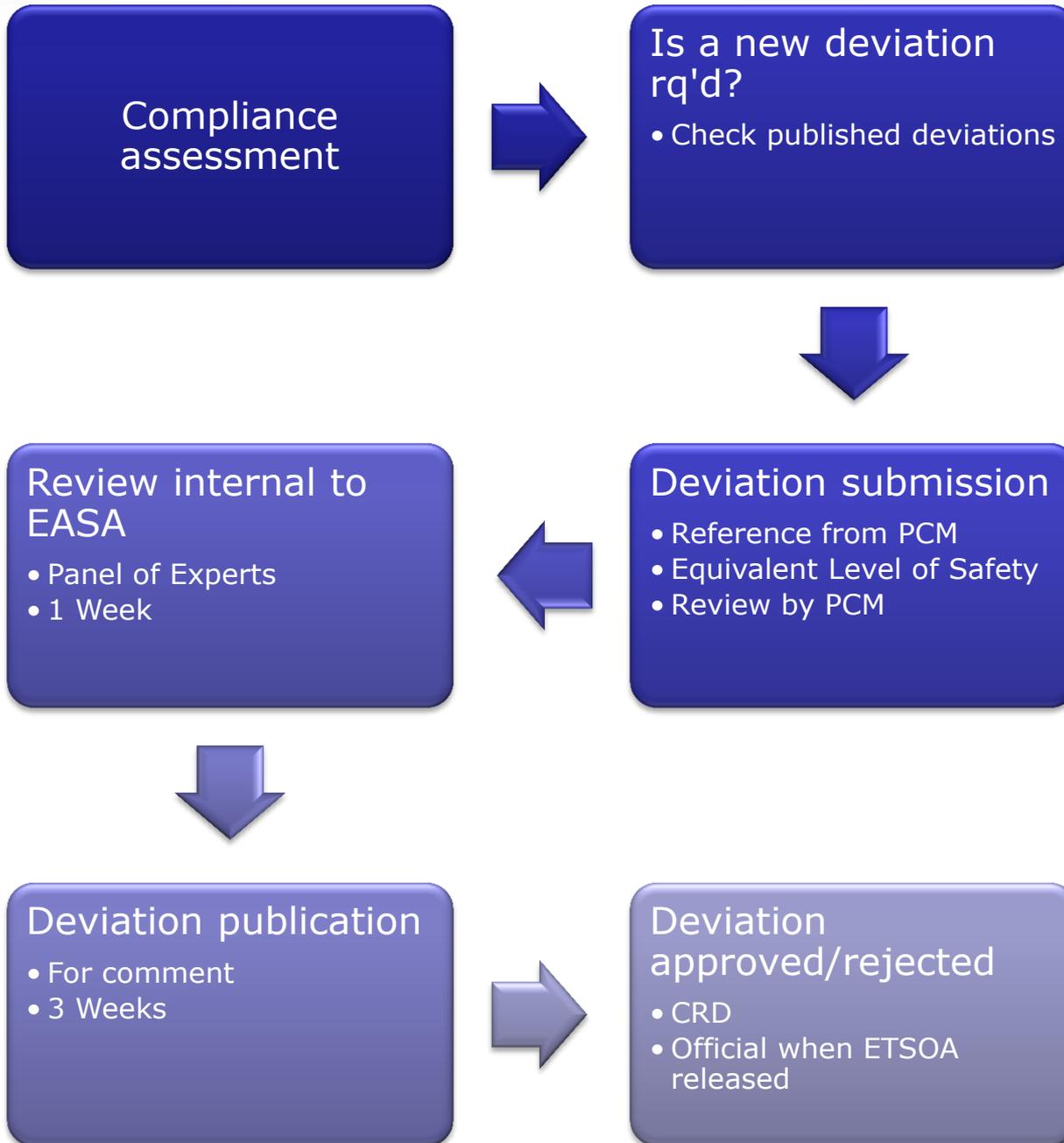
- ▶ Reporting (minor) Design Changes is evaluated in ETSO applicant Risk Register
  - ▶ Yearly, early in **January**
- ▶ Advise :
  - ▶ Inform EASA regularly depending on the 'volume' of changes every 6 months or 12 months
  - ▶ When no change, send an email mentioning Model name, certificate & no change

**Tip : You can do the same for Occurrence reporting**



# Agenda

- Part numbering & design changes
- Conflicting requirements
- Reporting of design changes
- ▶ Deviation management
- Incomplete ETSO
- DDP





# Deviation request

- PCM will provide
  - Form
  - Deviation reference
  
- Industry
  - Anonymous content
  - Equivalent of Safety



## Deviation Request ETSO-C55a#1 for an ETSO approval for CS-ETSO applicable to Fuel and Oil Quantity Instruments (ETSO-C55a) Consultation Paper

### 1 Introductory Note

The hereby presented deviation requests shall be subject to public consultation, in accordance with EASA Management Board Decision No 7-2004 as amended by EASA Management Board [Decision No 12-2007](#) products certification procedure dated 11th September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

### 2 ETSO-C55a#1 Fuel and Oil Quantity Instruments

#### 2.1 Summary of Deviation

To replace every reference to SAE AS 405C by a reference to SAE AS 405D to demonstrate compliance for Fuel and Oil Quantity Instruments.

#### 2.2 Original Requirement

##### 3.1.1 - Minimum Performance Standard

Standards set forth in the SAE AS 405C, Fuel and oil quantity Instruments, dated July 2001, as amended and supplemented by this ETSO.

#### 2.3 Industry

Equivalent level of safety is provided by use of a later revision of the requirement document.

#### 2.4 Equivalent Level of Safety

The requirements of revision D are identical with revision C of the document. SAE declared at the beginning of the document: "This document has been declared "Stabilized" by the SAE A-4 Aircraft Instruments Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist."

#### 2.5 EASA position

We accept the deviation.





# Agenda

- Part numbering & design changes
- Conflicting requirements
- Reporting of design changes
- Deviation management
- ▶ Incomplete ETSO
- DDP



# Applicable ETSO but incomplete

- Incomplete system :
  - provides a major and independent function
  - At least one ETSO requirement applies
    - Other than SW/AEH and environmental
  
- Installation Manual:
  - detailed instructions and limitations for the installation and use of the incomplete article
  
- DDP + Installation Manual:
  - list the specific MOPS that the article meets



# Agenda

- Part numbering & design changes
- Conflicting requirements
- Reporting of design changes
- Deviation management
- Incomplete ETSO
- ▶ DDP



# Declaration of Design and Performance

- AMC 21.A.608
  - to be updated
- Declaration
- Self-sustaining
- Entry point for EASA investigations
  - Formal reference to evidence required



- Configuration
  - Part numbers
    - Incl. scheme for minor changes
- Ref. to documents
  - Specification
  - Compliance Reports
  - Manuals
- Performance
  - Statement of Compliance
    - Deviations
    - Limitations
  - Non-ETSO functions
- Signature



**EASA**  
European Aviation Safety Agency

**Thank you**

**Any question ?**

**Your safety is our mission.**

EASA is an agency of the European Union





**EASA**  
European Aviation Safety Agency

# Back-up slides

Your safety is our mission.

EASA is an agency of the European Union





# Change classifications

Minor change application  
(only if the certificate needs to be changed)



The PCM verifies the classification



Major changes are considered as new applications

[21.A.611 \(b\)](#)





# Change classifications

## Minor design changes

Definition: *any change other than a major*

Original model number is kept, changes in part number, the holder shall forward to the Agency any revised data necessary for compliance with 21.A.603(b)

ETSOA holder may make minor changes without further authorization by EASA to comply with 21.A.603(b)

If the minor change requires a change of the ETSO certificate, the ETSOA holder must apply for a revision / reissuance of documents



# Change classifications

## Major design changes

