Integrated Modular Avionics Platforms & Modules

ETSO-2C153

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Your safety is our mission.
What is an ETSO authorization?

ETSO

- European Technical Standard Order

ETSOA

- European Technical Standard Order Authorization

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What is an ETSO authorization?

» An ETSOA shows that a part or appliance complies with a minimum performance standard

• 748/2012 Article 1 N° 2 (g)

» The ETSOA is optional, installation approval is anyway required
IMA stands for Integrated Modular Avionics
- Modular & incremental development of the aircraft function

FAA released TSO-C153 in June 2002

ED-124/DO-297 was released in November 2005
- Containing letter of acceptance (FAA system)
- Breakdown of tasks/split in incremental steps
- Requirements on the modularity (incl. Partitioning)

During number of years
EU industry expressed the need of an IMA ETSO

2012 : EASA starts to work on ETSO-2C153, considering the EASA system ...and the IMA experience of 15 years
The 2C153 Concept – in EASA system

» ETSO approval independent from the aircraft installation
  » there is no requirement that an installation process is concurrent to the ETSO process
  » The clear EASA intent to keep the two processes interoperable but independent

» No approval letter concept at EASA
  → approval of equipment (ETSOA) or product (TC, STC)

» As a conclusion: EASA intended to have
  ▪ defined perimeter of the IMA platform/modules,
  ▪ + MPS on modular aspects/functions

this is a step forward to FAA TSO-C153 (not incompatible), with Minimum Performance Standard
IMA - incremental process

ED-124/DO-297

- Task 1: Module acceptance
- Task 2: Application acceptance
- Task 3: System level acceptance
- ...

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ETSO-2C153 – EASA intent

- ED-124/DO-297 Task1 – Module acceptance
  - Covering ALL components of a module
    - Hardware + Core Software
    - Tools

- Applicability
  - Module/Platform offering a SHARING function

- Process requirements

- Performance requirements
  - Staying generic… but detailed enough
<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH</td>
<td>Rack Housing</td>
</tr>
<tr>
<td>PR</td>
<td>Processing</td>
</tr>
<tr>
<td>GP</td>
<td>Graphical Processing</td>
</tr>
<tr>
<td>DS</td>
<td>Data Storage</td>
</tr>
<tr>
<td>IF</td>
<td>Interface</td>
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<tr>
<td>PS</td>
<td>Power Supply</td>
</tr>
<tr>
<td>DH</td>
<td>Display Head</td>
</tr>
</tbody>
</table>

**IMA Sharing functions = Classes**

**ETSO-2C153 – Class PR**

**CORE SW**
ETSO-2C153: How does it work?

- **DO-160 ED-14**
- **Functional**
- **Characterization**
ETSO 2C153 Appendices

1. General

2. MPS
   2.1 Common
   2.2 RH Rack Housing
   2.3 PR Processing
   2.4 GP Graphical Processing
   2.5 DS Data Storage
   2.6 IF Interface
   2.7 PS Power Supply
   2.8 DH Display Head

3. Data

4. Environmental Qualification

MPS = Performance + Characterization
2C153: General requirements

» Compliance to

» Common requirements

» Specific requirements on certification basis:
  » At least, one class
  » All classes applicable to the article

» Class DH (Display Head):
  » Concurrent ETSO-C113 required
  » Incomplete ETSO is possible
Emphasis on Data Requirements

- Clear boundary
- Clear covered/not covered aspects
- Transfer of ‘safety’ aspects for further safety analysis
- User Guide concept
- Installation Manual
Environmental qualification

- Standalone Platform (LRU)
  - Classic ED-14/DO-160

- Modules intended for Cabinet installation
  - Partial Qualification required
    - Anticipate a minimum set of conditions
  - Environmental usage domain characterized
  - Complete cabinet qualification data accepted

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IMA ETSO-2C153 - Avionics Workshop
Rulemaking Procedure

4-year Rule making Programme

Task initiation

Consult RAG/TAG/SSCC

Analyse issue and develop Draft RIA

Draft Rule

Public Consult (3 months)

Analysis of comments and final review

Decision with CRD ETSO

Publication is imminent!
ETSO-2C153, different from FAA TSO-C153

14 years later, developed from this experience

ETSO-2C153 is different from FAA TSO-C153:

- Defines classes and Minimum Performances for each class
- Include Health Monitoring
- Requires to characterise the platform/modules to the user & verify
- Use of Ed-124/DO-297, task 1
- Environmental qualification adapted for modules
- User Data (User Guide) to identify/document the requirements/constraints to be respected by User
ETSO Validation aspects

- ETSO-2C153 is different from FAA TSO-C153
  - But not incompatible with FAA TSO-C153

- FAA TSO-C153 is not included in the Reciprocal Acceptance from TIP of Bilateral agreement EU-US

- Additional Activities & Data Package for demonstration of compliance to ETSO-2C153 MPS will be needed (requirements in each Appendix)
IMA ETSO-2C153 in the IMA integration and certification process
Conclusion on IMA certification process

CS-23, CS-25, CS-27, CS-29...

CS-ETSO

RMT.0621
Subpart A

RMT.0456
ETSO-2C153 IMA
Platform & Modules

RMT.0622
AMC 20-170
Incremental certification of IMA (from platform & modules up to aircraft)
On-going drafting of AMC 20-170

- On going rulemaking task to develop AMC on IMA
- Will cover requirements from Platform to the full integration in the aircraft
- Will recognize ED-124/DO-297 tasks and associated objectives
- Will cover the use of ETSO IMA based platforms
- AMC 20-170 will replace the Draft Certification Memorandum published and used through CRI
Thank you for your attention.