EUROPEAN AVIATION SAFETY AGENCY
AGENCE EUROPÉENNE DE LA SÉCURITÉ AÉRIENNE
EUROPÄISCHE AGENTUR FÜR FLUGSICHERHEIT

ACARE

ACARE Workshop on Certification

Certification today:
Background, processes, typical example project and occurred issues

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History

Part 25

JAR-25

CS-25

JAA Time

First JAR-25 in the early 70's

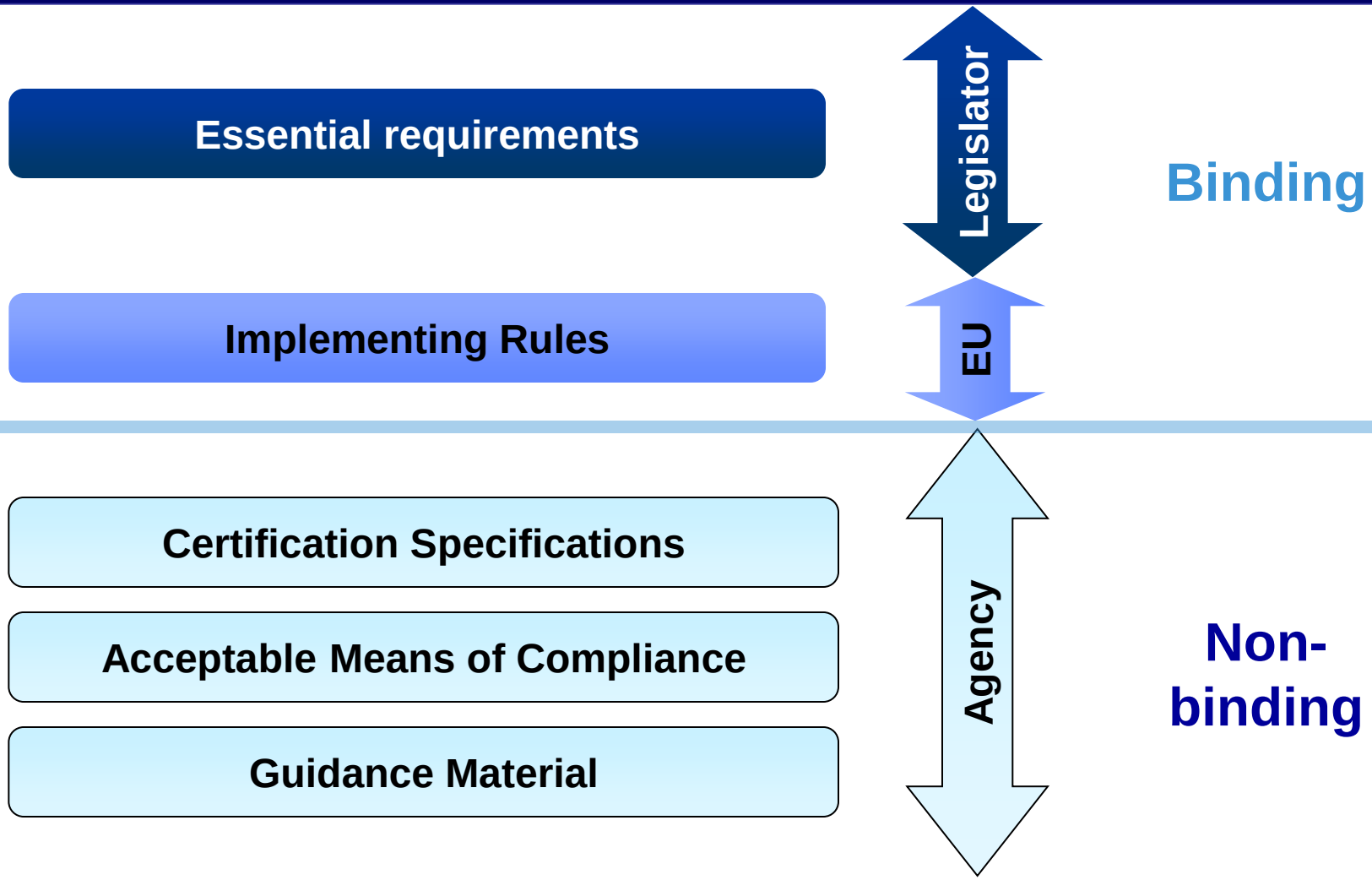
- Was based at the time on FAR 25 and NAA's regulations
- Contained "national variants" for cases that could not be harmonised
- Text was underlining differences with FAA
- Text was identifying unique JAR-25 requirements with "X"

First harmonised text with no more "national variants" was set in the 80's when JAR-25 began to be really applied to certification projects

CS maintained by standing groups composed of NAAs and Industry

- Flight Study Group, Structure, D&F (Systems), Cabin Safety, Powerplant SG

EASA Regulatory System

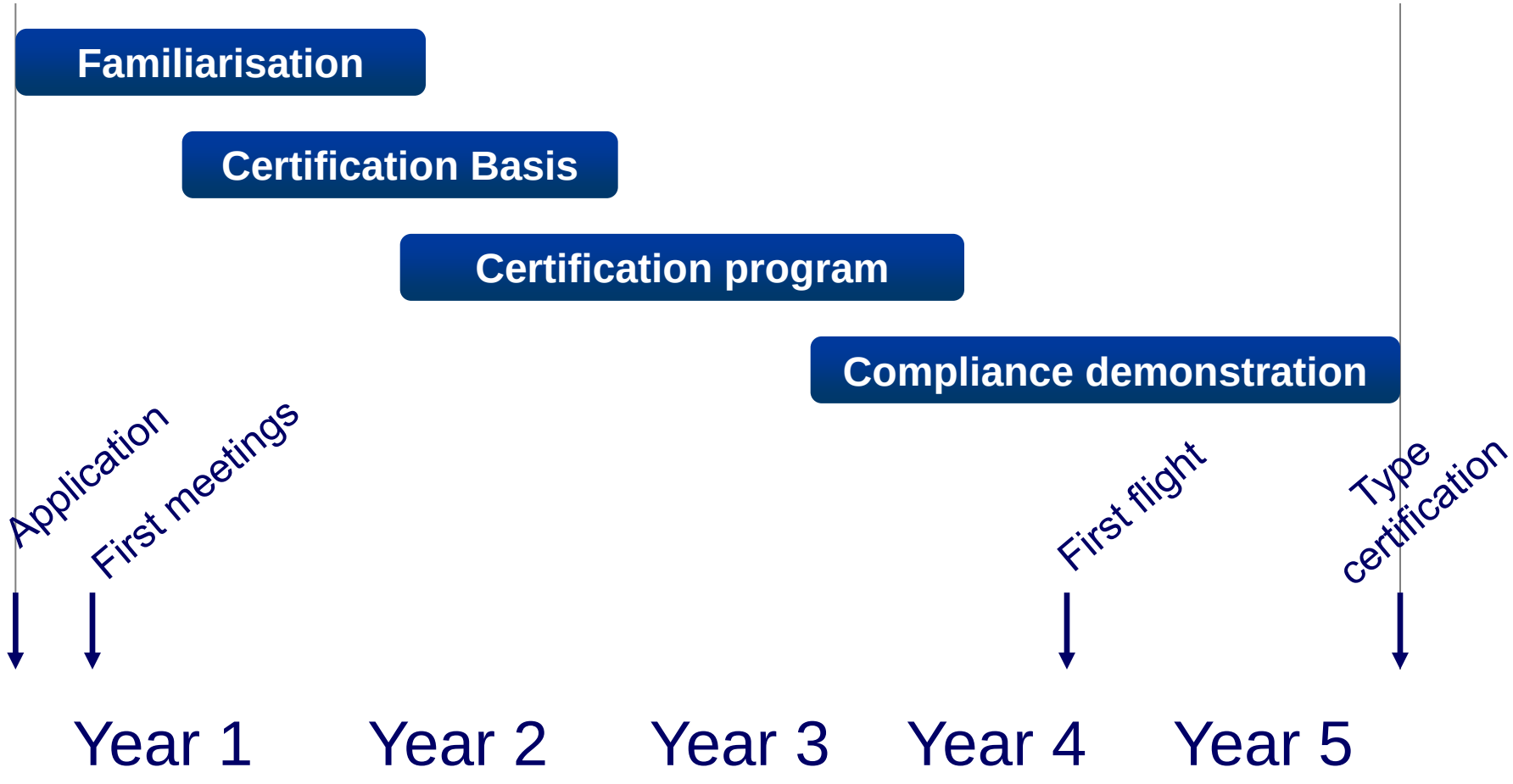


Certification Specifications

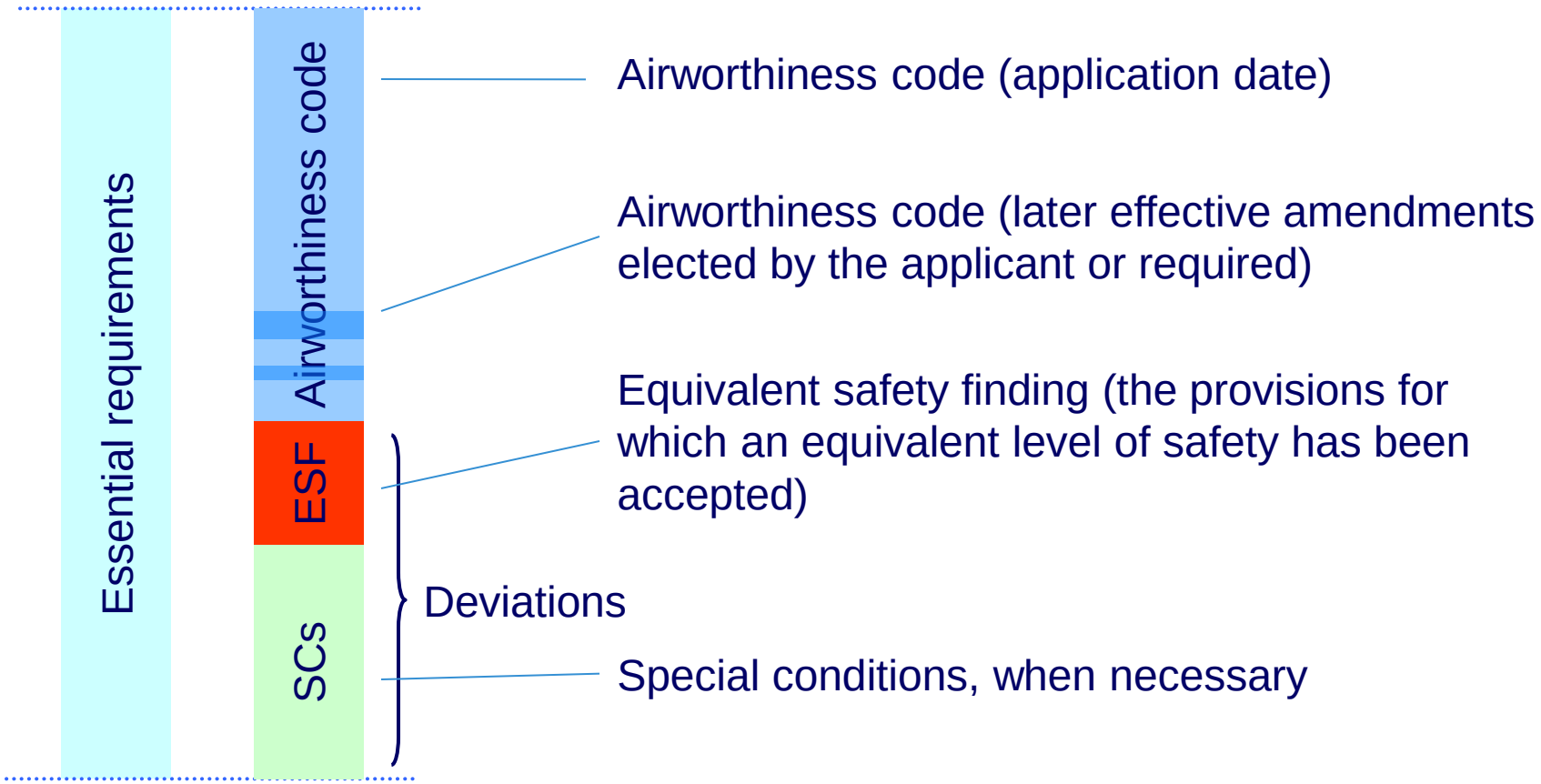
CS-22	Sailplanes and Powered Sailplanes
CS-23	Normal, Utility, Aerobatic and Commuter Aeroplanes
CS-25	Large Aeroplanes
CS-27	Small Rotorcraft
CS-29	Large Rotorcraft
CS-31HB	Hot Air Balloons
CS-34	Aircraft Engine Emissions and Fuel Venting
CS-36	Aircraft Noise
CS-APU	Auxiliary Power Units
CS-AWO	All Weather Operations
CS-E	Engines
CS-ETSO	European Technical Standard Orders
CS-Definitions	Definitions and Abbreviations
CS-P	Propellers
CS-VLA	Very Light Aeroplanes
CS-VLR	Very Light Rotorcraft
AMC-20	General AMC for Airworthiness of Products, Parts and Appliances

Applicable requirements are those effective at the date of application

5 years for large aeroplanes



Type-Certification basis



Means of Compliance

Type of compliance	Means of Compliance	Associated Compliance Documents
Engineering Evaluation	MC0: Compliance statement: -Reference to Type Design documents -Election of methods, factors -Definitions	Type Design Documents Recorded Statements
	MC1: Design Review	Description, Drawings
	MC2: Calculation, Analysis	Substantiation Reports
	MC3: Safety Assessment	Safety Analysis
Test	MC4: Laboratory Test	Test Programmes Test Reports Test Interpretations
	MC5: Ground Test on related Product	
	MC6: Flight Test	
	MC8: Simulation	
Inspection	MC7: Design Inspection	Inspection Reports
Equipment Qualification	MC9: Equipment Qualification	May include all the rest MC

Design or not Design

CERTIFICATION

CERTIFICATION BASIS

- APPLICABLE REQUIREMENTS (DATE OF APPLICATION)
- NEED FOR SPECIAL CONDITIONS? (DESIGN)

DESIGN

COMPLIANCE

- DEFINITION OF MEANS OF COMPLIANCE
- VERIFICATION OF COMPLIANCE

APPLICABLE REQUIREMENTS

DESIGN REQUIREMENTS - 25.1307 (TWO INDEPENDENT SOURCES OF ELECTRICAL POWER)

OBJECTIVES
- 25.1351 (TOTAL LOSS OF ELECTRICAL POWER EXTREMELY IMPROBABLE)
- 25.1357 (MINIMISE FIRE RISKS)
- 25.581 (PREVENT CATASTROPHIC EFFECTS OF LIGHTNING)

SOMETIMES DIFFICULT TO SEPARATE CERTIFICATION AND DESIGN

CS-25 Status

CS-25 initial issue 17 Oct. 2003

- Based on JAR-25 Amdt 16

CS-25 Amendment 13 dated 10 June 2013

- Current Issue

Harmonisation with FAA and others ongoing

- Still some differences
- Significant Standard Differences List (SSD)
- Validation Items

CS-25 Structure – Books 1/2

- The CS provide a set of “minimum requirements” and are inclusive of interpretative material:
  - Book 1 Airworthiness Code
  - Book 2 Acceptable Means of Compliance
- AMC’s provide a compliance method accepted and consolidated by previous experience. Alternative methods of compliance could however be acceptable, different from the ones quoted in the AMC

CS-25 – Large aeroplanes

SUBPART A	GENERAL
SUBPART B	FLIGHT
SUBPART C	STRUCTURE
SUBPART D	DESIGN AND CONSTRUCTION
SUBPART E	POWERPLANT
SUBPART F	EQUIPMENT
SUBPART G	OPERATING LIMITATIONS AND INFORMATION
SUBPART H	ELECTRICAL WIRING INTERCONNECTION SYSTEMS
SUBPART J	AUXILIARY POWER UNIT INSTALLATION

Occurred Issues

- Applicant delays, CS 25 applications may not be completed in the 5 year period,
- Failed tests or incomplete substantiations leading to additional discussions (and delays),
- Continued Airworthiness

New Technologies

- Introduction of novel technologies, innovative operational concepts, new requirements and processes is well defined by Airworthiness Authorities

- Examples:
  - Forward Facing Cockpit 1983
  - ETOPS (Extended Range Twin Operations) 1985
  - Fly-By-Wire 1988
  - Very Light Jets “CS 23+” 2008
  - Boeing 787 Composite material 2011

« Certifyability »

- Most important: before introducing new technologies, new operational concepts or requirements “Certification” has to be taken into account
  - Feasibility has to be checked
  - Design/processes must be „certifyable“
  - Certification specifications have to be design criteria
  - Amended/changed Certification specifications have to be created if necessary

- Virtual compliance demonstrations are acceptable to a certain extend but the „reality“ has always to be taken into account
  - Example:
    - Full scale emergency passenger evacuation test
    - Each new aircraft has to be subject of such a test
    - However, for changed interior configuations and stretched cabins a combination of the initial full scale test and additional partial tests as well as computer simulations may be taken into account

Outlook

- In summary:
  - Better integration of Certification Process in early phase of Research & Development
  - Better support from Research to Certification
  - Earlier guidance and support from EASA for Research (with available resources)
  - Direct access to Research Facilities for EASA would be helpful
  - Virtual means have to be carefully assessed before implementing them

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