



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

EASA approach for assessing the 482/2008 compliance

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- EASA Safety Oversight in ATM
- Airworthiness/ATM software regulatory outline
- Assessment of software aspects in airworthiness
- Assessment of software aspects in ATM (482/2008)
- Conclusions



EASA Safety Oversight in ATM (I)

► **Sources:**

- » Legal basis in Art. 22a of Reg. 216/2008
- » Implementing Rule 805/2011 on ATCO Licensing
- » Implementing Rule 1034/2011 on Safety Oversight
- » Implementing Rule 1035/2011 on Common Requirements for the provision of Air Navigation Services.

► **EASA Responsibilities:**

- » Standardisation Inspections of NSAs
- » Safety Oversight of:
 - » ANSP organisations located outside the EU
 - » ANSP organisations providing Pan-European Air Navigation Services
 - » ATOs for ATCOs located outside the EU
 - » Note: “Pan-European ANS means a service which is designed and established for users **within most or all Member States** and which may also extend beyond the airspace of the territory to which the Treaty applies”
- » Assisting the European Commission, Safety Oversight of the Network Manager.

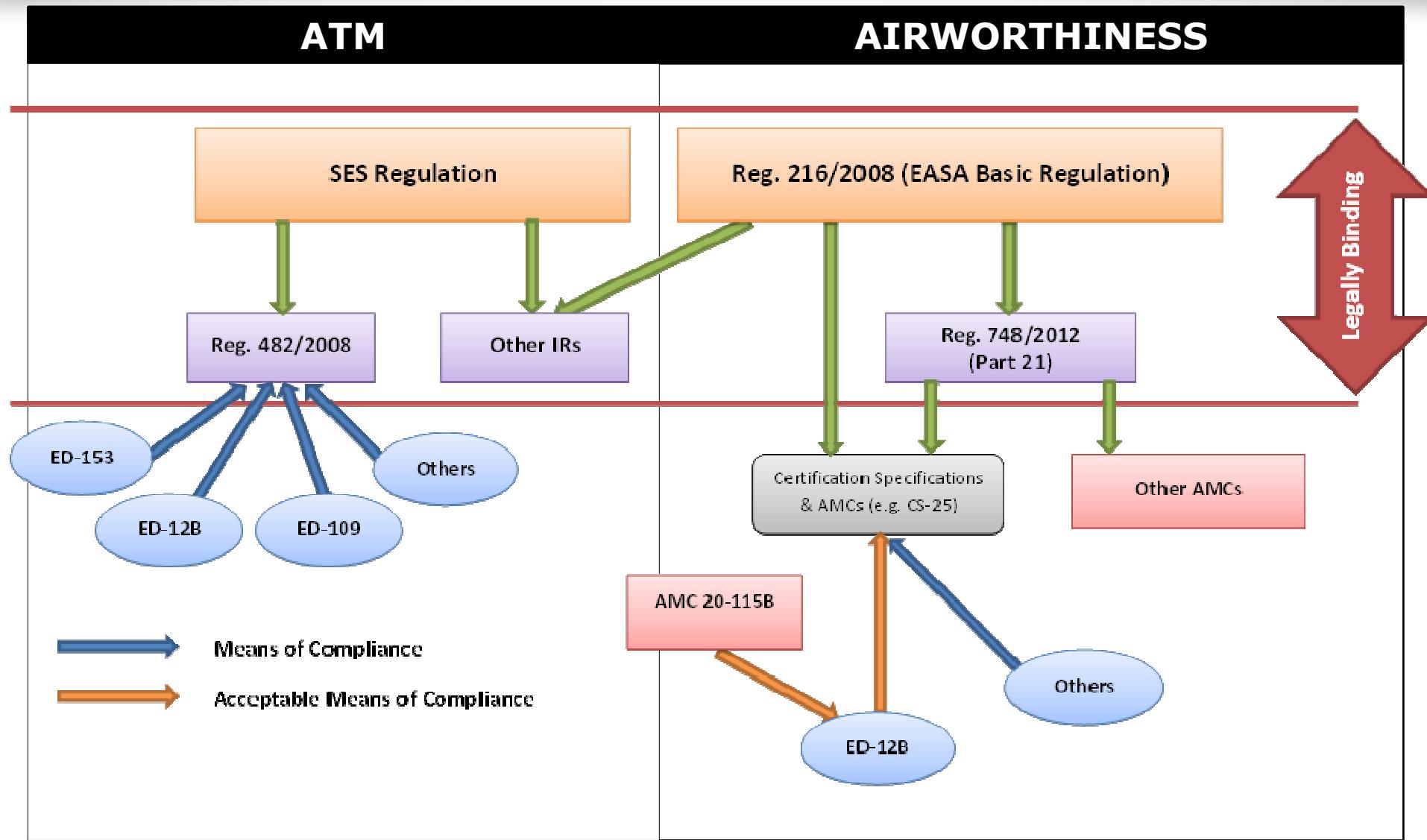


EASA Safety Oversight in ATM (II)

- Software Assurance related aspects are covered by Reg. 482/2008 for systems supporting the following types of services:
 - Air Traffic Services (ATS)
 - Air Traffic Flow Management (ATFM)
 - Air Space Management (ASM)
 - Communication, Navigation and Surveillance services (CNS)
- Software Safety Assurance System (SSAS) shall be part of the Safety Management System.
- The SSAS is subject of assessment by EASA for the organisations for which EASA is the Competent Authority.



ATM-Airworthiness software regulatory outline





Software Assessment in Airworthiness (I)

➤ **Means of Compliance:**

- EUROCAE ED12B/RTCA DO178B as Acceptable Means of Compliance (AMC 20-115B)
- Certification Review Items (CRI) for some particular issues/techniques (e.g., model based development, object oriented techniques), complementing it.

➤ **Key Principles:**

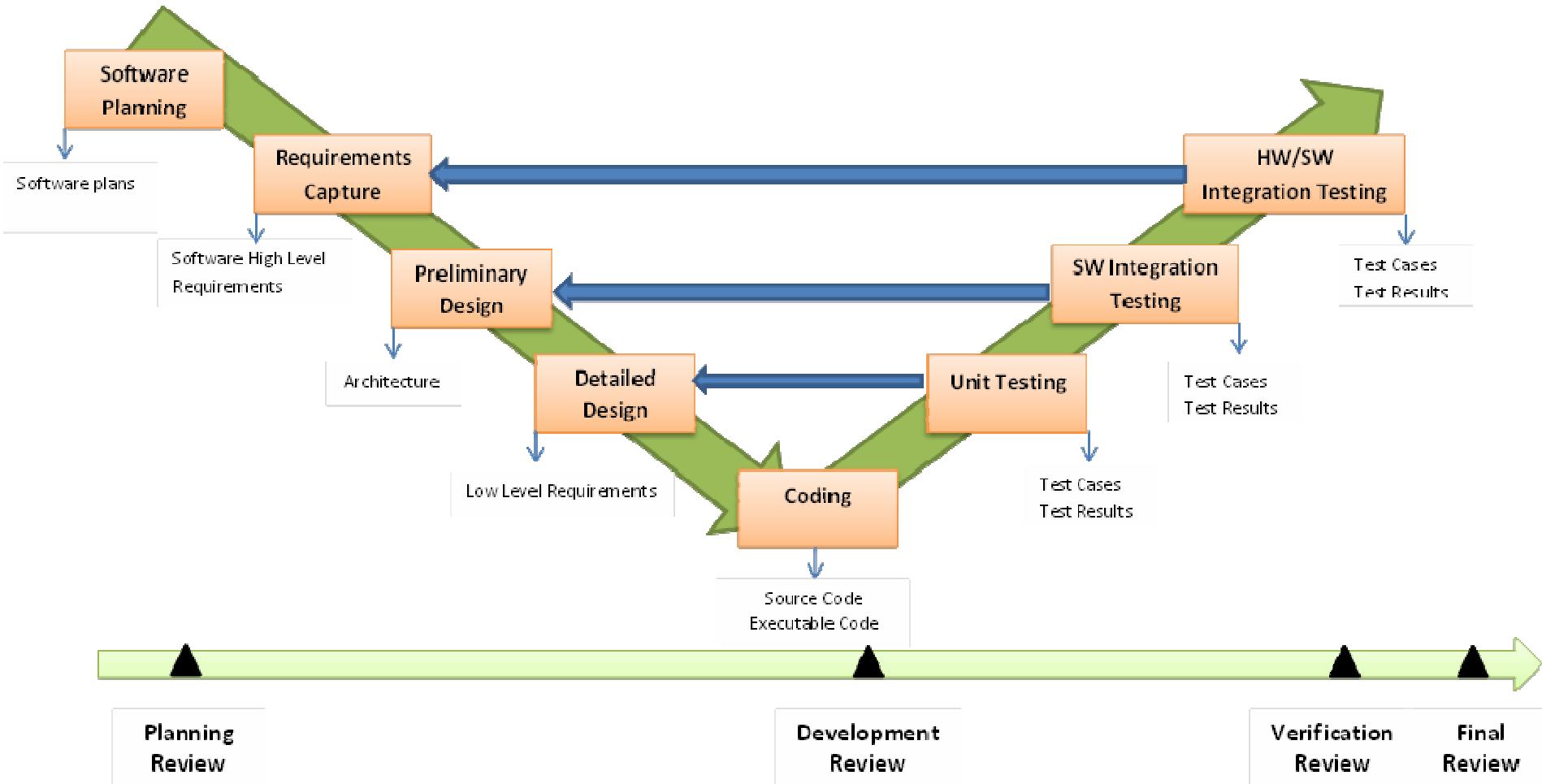
- Organisation capability by holding a Design Organisation Approval.
- Compliance demonstration responsibility of the organisation.
- Authority verifies, by sampling, this compliance demonstration.

➤ **Methodology** is based on four main milestones, performed as desktop reviews or as on-site audits (sampling):

- **Planning Review**, to confirm the compliance of the software plans (e.g., PSAC) w.r.t. ED12B/DO178B and agreed CRIs.
- **Development Review**, to assess the compliance of the software life cycle data, regarding development aspects (up to source code prod.).
- **Verification Review**, to assess the compliance of the software life cycle data, regarding verification aspects.
- **Final Certification Review**, to confirm the final compliance of the selected software item(s).



Software Assessment in Airworthiness (II)





Software Assessment in Airworthiness (III)

- Approach **also** applied by other Authorities (e.g., FAA-US, TCCA-Canada, ENAC-Brazil).
- A **risk-based approach** is used to identify the software item(s) and the depth of the assessment:
 - Depending on several criteria (e.g., assurance level, novelties, supplier's experience, level of changes), EASA defines the **Level Of Involvement (LOI)** for each of the software items:
 - » **NONE**: no EASA assessment
 - » **LOW**: only two desktop reviews (typically, Planning Review and Final Review)
 - » **MEDIUM**: two desktop reviews plus one on-site audit (typically, combined Development/Verification Review)
 - » **HIGH**: two desktop reviews plus two on-site audits (typically, Development and Verification Reviews)



Assessment of software aspects in ATM (I)

- When defining the assessment process for software aspects, the following aspects have been taken into account:
 - Particular aspects of the Reg. 482/2008
 - Particularities of the ATM software (e.g., legacy software, COTS)
 - Software errors contribution to failure conditions (this effect is accounted through the assurance level allocation)
- And also considering:
 - Risk based approach for the oversight
 - Relevance of the on-site audits (sampling) for assessment of the software compliance and associated processes (e.g., inspection of life cycle data)
 - Relevance of the software planning documentation



Assessment of software aspects in ATM (II)

- Several cases:
 - **Internal development** (all software is developed in-house by the Service Provider)
 - SSAS is only based on internal procedures.
 - **External development/procurement** (no software is developed by the Service Provider),
 - SSAS is set up by the Service Provider (as part of its SMS) but relies partially or completely on plans and procedures from the equipment/software manufacturers.
 - **Combined situation**
- When to assess the software aspects:
 - As part of the **review of notified changes** (for changes where software is impacted)
 - As part of the **SMS oversight**, regarding the changes notified/introduced by the Service Provider.
 - Case by case decision, depending on the development approach and the particular Service Provider set-up for the software activities.



Assessment of software aspects in ATM (III)

- Two types of activities:
 - Desktop reviews:
 - Review of procedures/software planning documentation
 - Review of final certification software documents (e.g., SAS, SSF)
 - On-site audits (sampling):
 - For selected software items (risk based approach)
 - EASA Involvement to be agreed with the Service Provider
 - Participation of the Service Provider in the on-site audits at supplier premises
- Service Provider is informed about the selected approach (including a detailed identification of the activities) through a specific document named **Level Of Involvement**, delivered by EASA for each notified change to be reviewed.



Assessment of software aspects in ATM (IV)

- References for this assessment:
 - Regulation 482/2008
 - Means of Compliance agreed (ED12B/DO178B, ED109/DO278, ED-153, ...)
 - Service Provider procedures
 - Software suppliers planning documentation
- Comments/findings (if any) resulting from the desktop reviews/on-site audits (sampling) will be managed through the action plans (CAPs).



Conclusions

- In order to exercise its responsibilities as Competent Authority, EASA has defined a software assessment approach for the compliance with Reg. 1035/2011 and Reg. 482/2008.
- Relevance of the **on-site audits (sampling)** as instrument for compliance verification.
- Sampling allows direct access to software life cycle data:
 - Direct verification of compliance with Reg. 482/2008 (e.g., traceability, requirements validation)
 - Confirmation that the plans/procedures are followed
 - Assessment of the organisation quality assurance activities
- Involvement to be defined and agreed with the service provider on a **risk-based approach**, taking into account:
 - Software criticality (assurance level, SWAL)
 - Software complexity
 - Novelties (methods or technologies)
 - Software development/organisation processes maturity



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Thank you for your attention

Questions ?

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