WG-114 AI Standards in Aviation

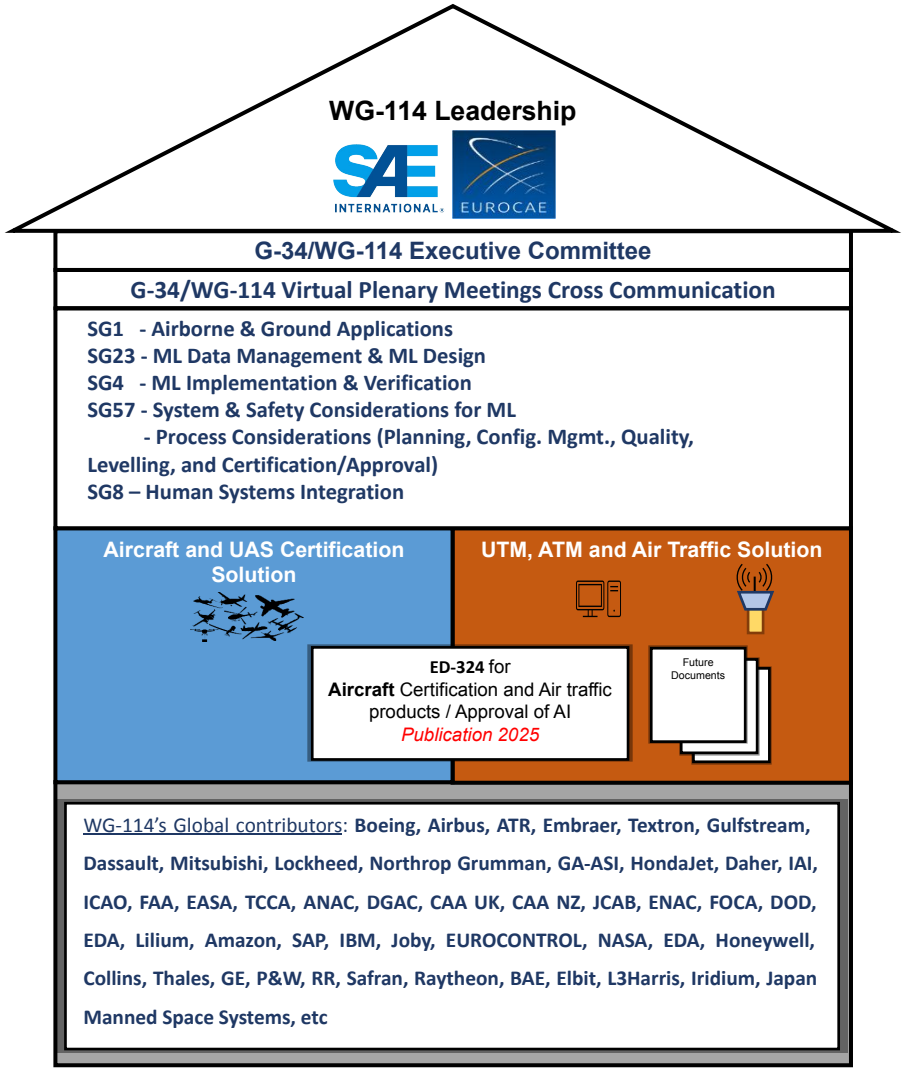
Thuc NGUYEN – Technical Programme Manager

High Integrity Software Conference 2024 - Wales, UK

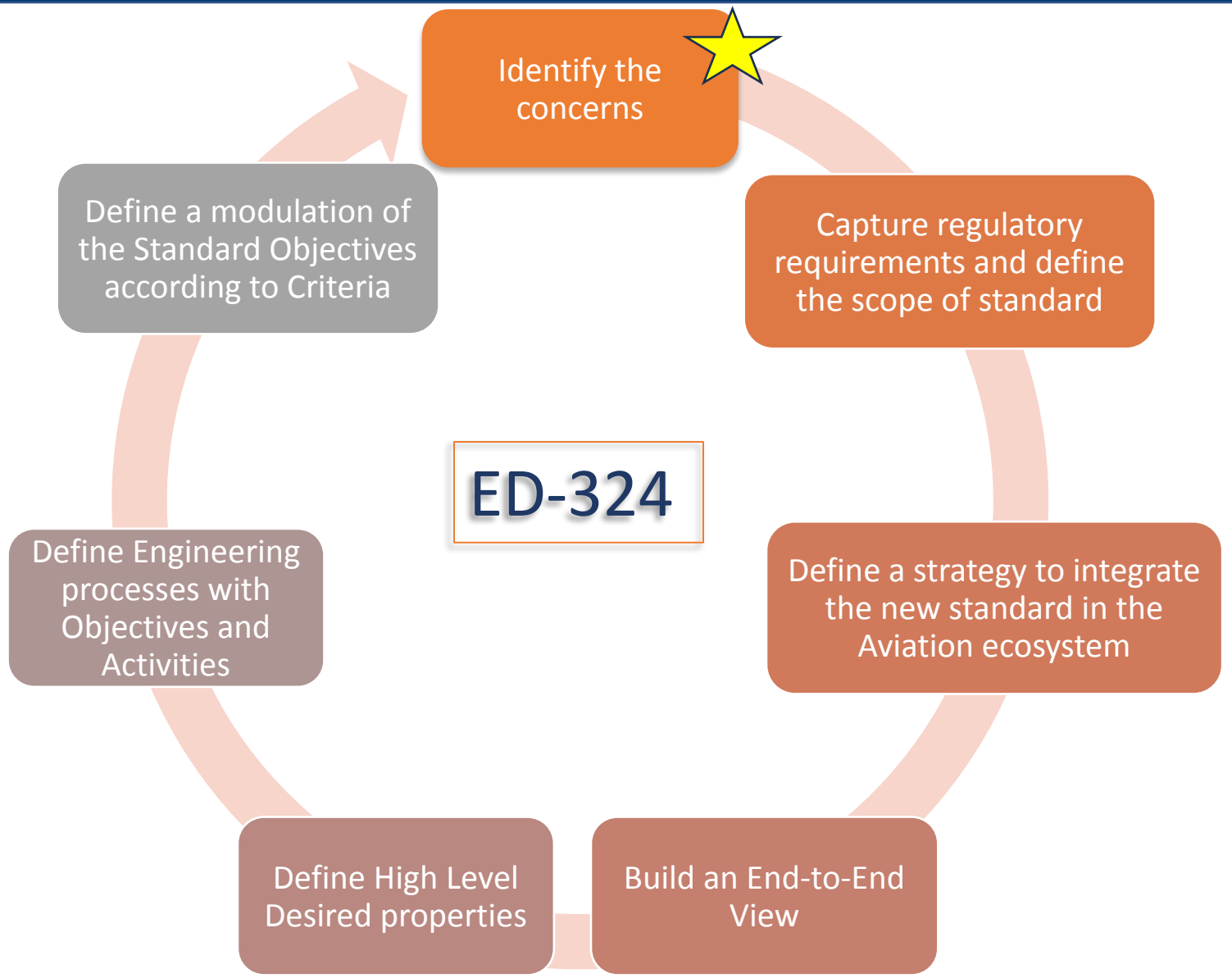
EUROCAE WG-114 / G-34, Artificial Intelligence in Aviation

- WG-114 focuses on the establishment of common standards to support the development and certification/approval of aeronautical products based on AI technology Objective:
  - Scope: Airborne & ATM/ANS domains (crewed & uncrewed Aircraft)
- WG-114/G-34 (comprised of 600+ participants)

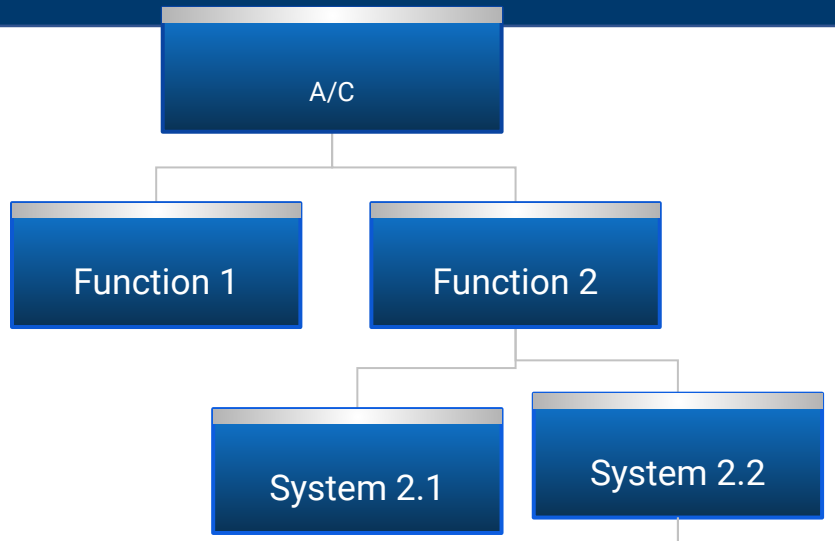
ED/ER	Draft title	Date
ER-022	Statement of concerns	Published in 2021
ER-27	Taxonomy in Artificial Intelligence	Q4 2024
ER-xxx	Use Cases Considerations	Q4 2025
ED-324	Process Standard for Development and Certification/Approval of Aeronautical Products Implementing AI.	Q4 2025



High level methodology to build the standard



Current Certification Approach In Aviation Is Not Sufficient Anymore



Airborne ED-79B, ATM/ANS (EU) 2017/373

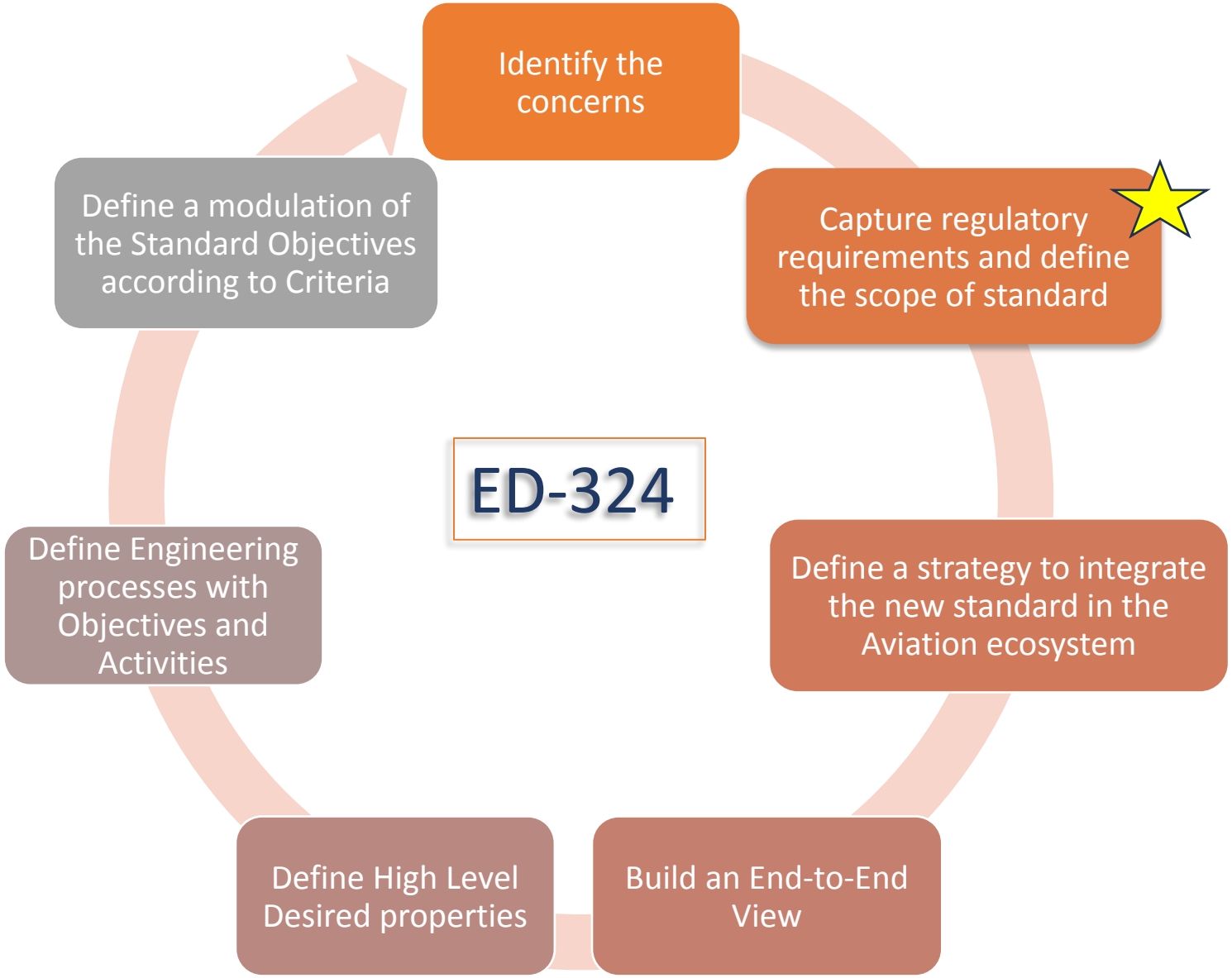
1. Knowledge-based Engineering (requirements, models, etc.) → **Data-Based (driven) engineering**
2. Software/Hardware design done by humans for humans (explainable, auditable, etc.) → **The complex design of a ML model is not directly understandable by humans**
3. Source code traceable to functional requirements → **The low level design developped by the machine is not directly traceable to functional needs**

New Standard WG-114/G-34

- ML Constituent with SW/HW items
  - SW Item, SW Item — Airborne: ED-12x/DO-178x + Suppl. ATM/ANS: ED-109x/DO-278x/ED-153
  - HW Item, HW Item — Airborne & ATM/ANS: ED-80/DO-254
- Traditional SW/HW Items without ML

Industrial Consensus on the ML Challenges in Statement of Concerns (cf ER-022 published in 2021)

High level methodology to build the standard

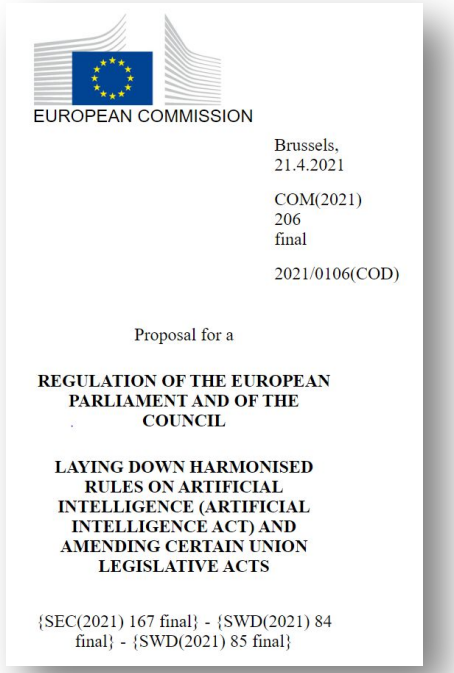


Capture applicable regulatory requirements to the aeronautic industry

EUROCAE

EASA European Aviation Safety Agency

EU AI Act



EUROPEAN COMMISSION

Brussels,
21.4.2021

COM(2021)
206
final

2021/0106(COD)

Proposal for a

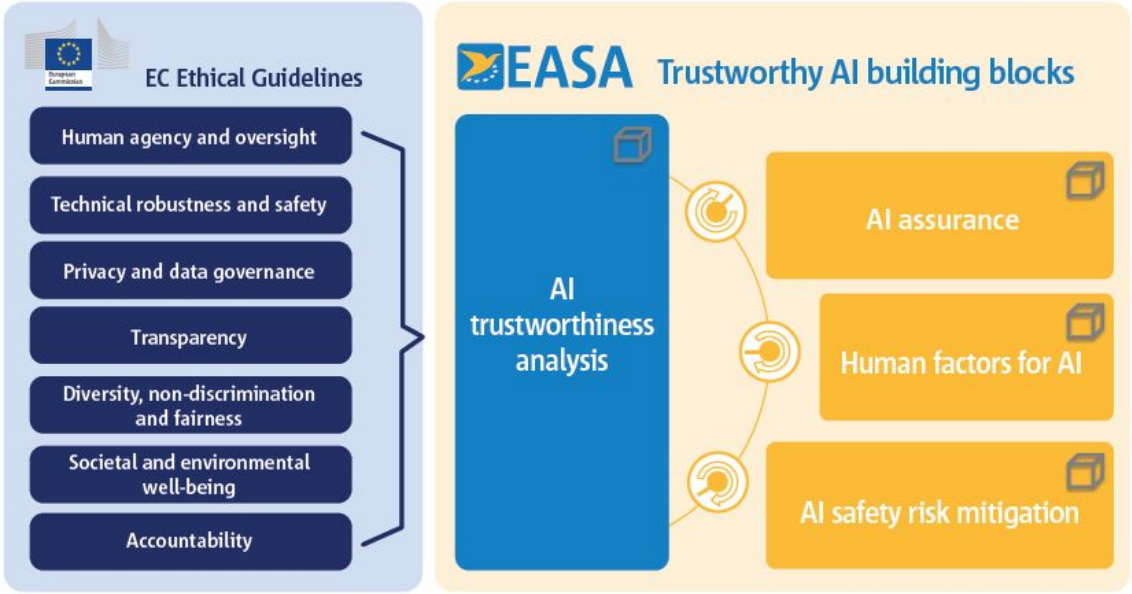
REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

LAYING DOWN HARMONISED RULES ON ARTIFICIAL INTELLIGENCE (ARTIFICIAL INTELLIGENCE ACT) AND AMENDING CERTAIN UNION LEGISLATIVE ACTS

{SEC(2021) 167 final} - {SWD(2021) 84 final} - {SWD(2021) 85 final}

Source:
eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0206

AI Concept Paper



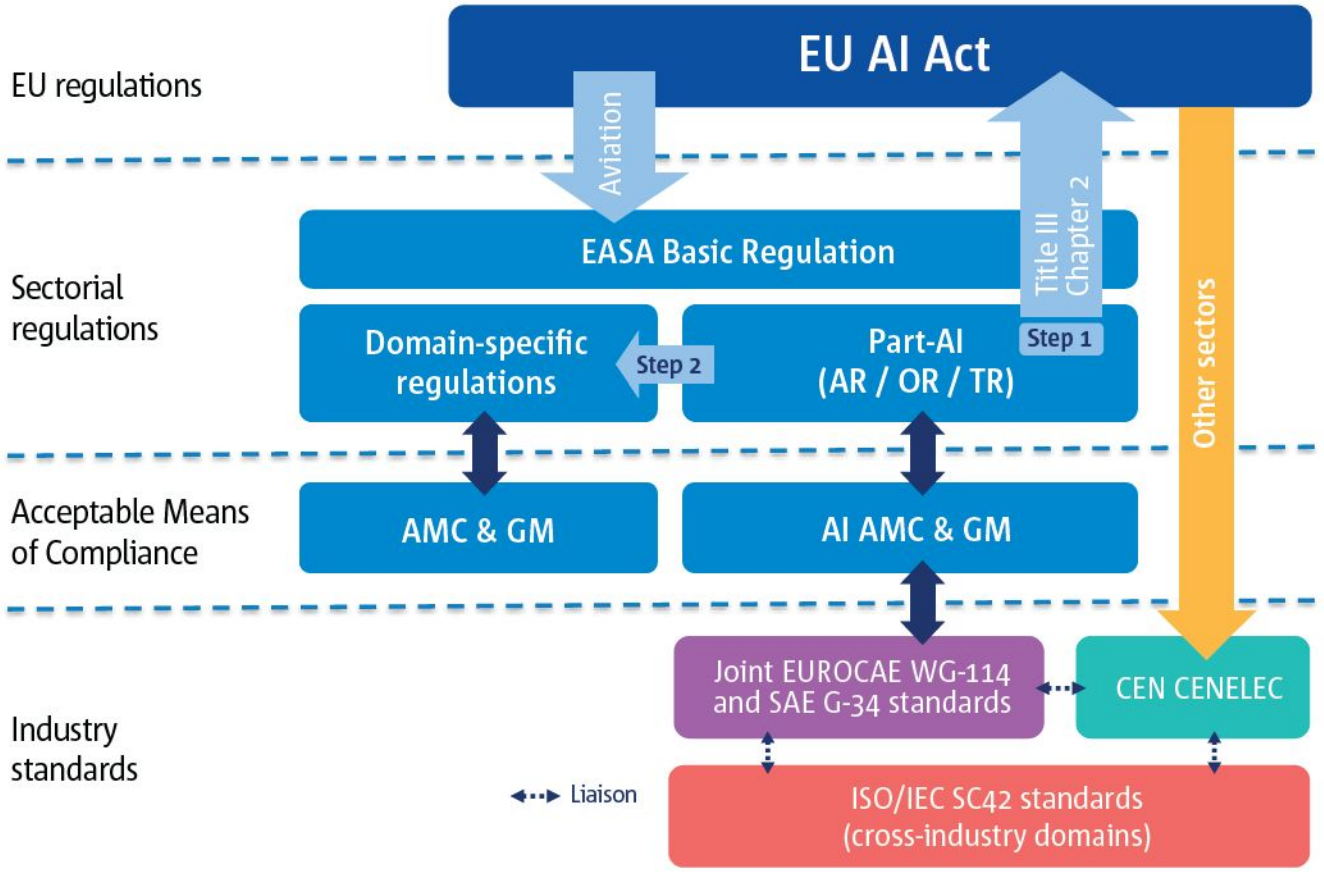
Aeronautic Industry

EUROCAE SAE INTERNATIONAL

New
ED-324
(Machine Learning)

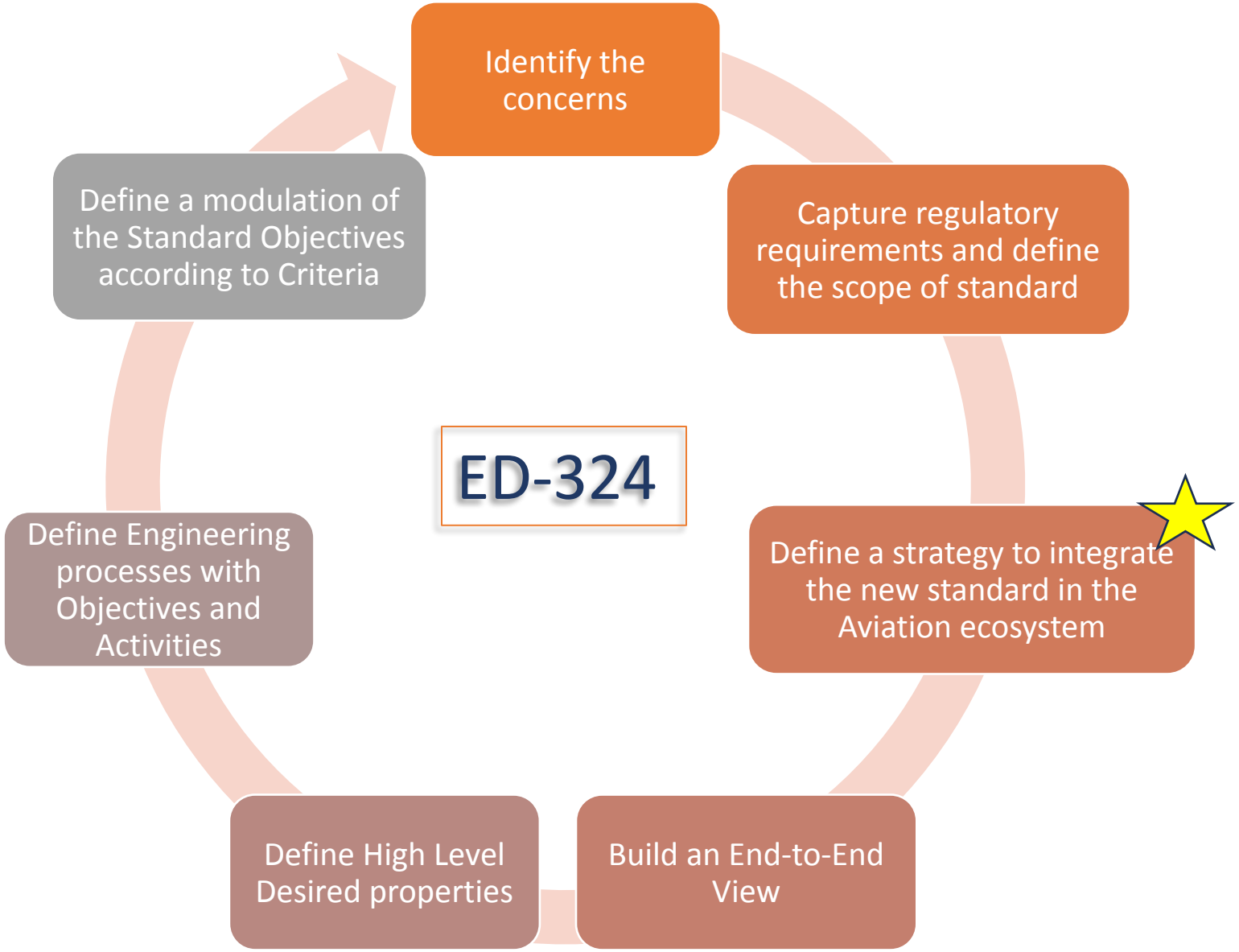
EUROCAE SAE INTERNATIONAL

EASA Roadmap 2.0

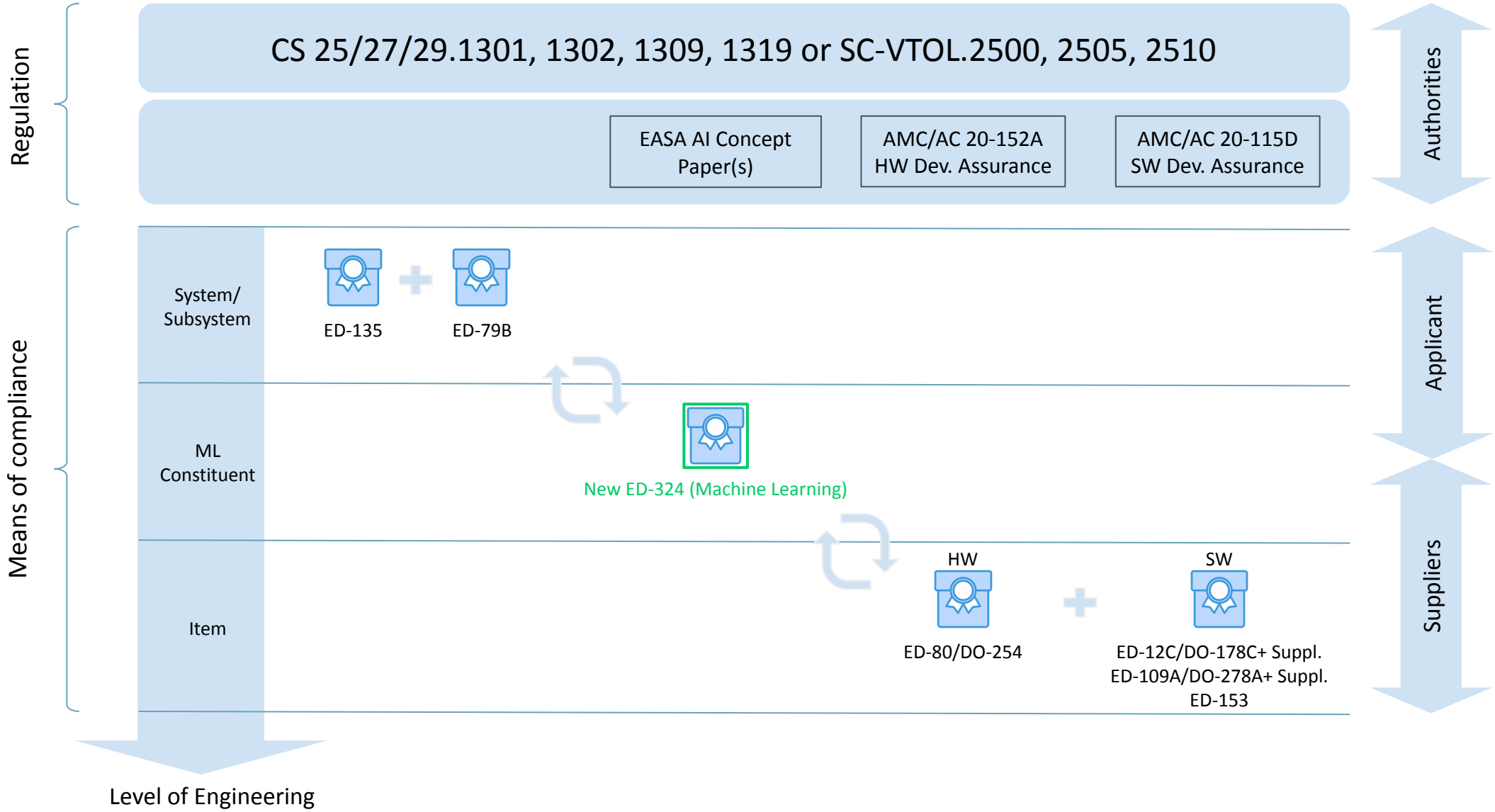


Source: EASA Roadmap 2.0

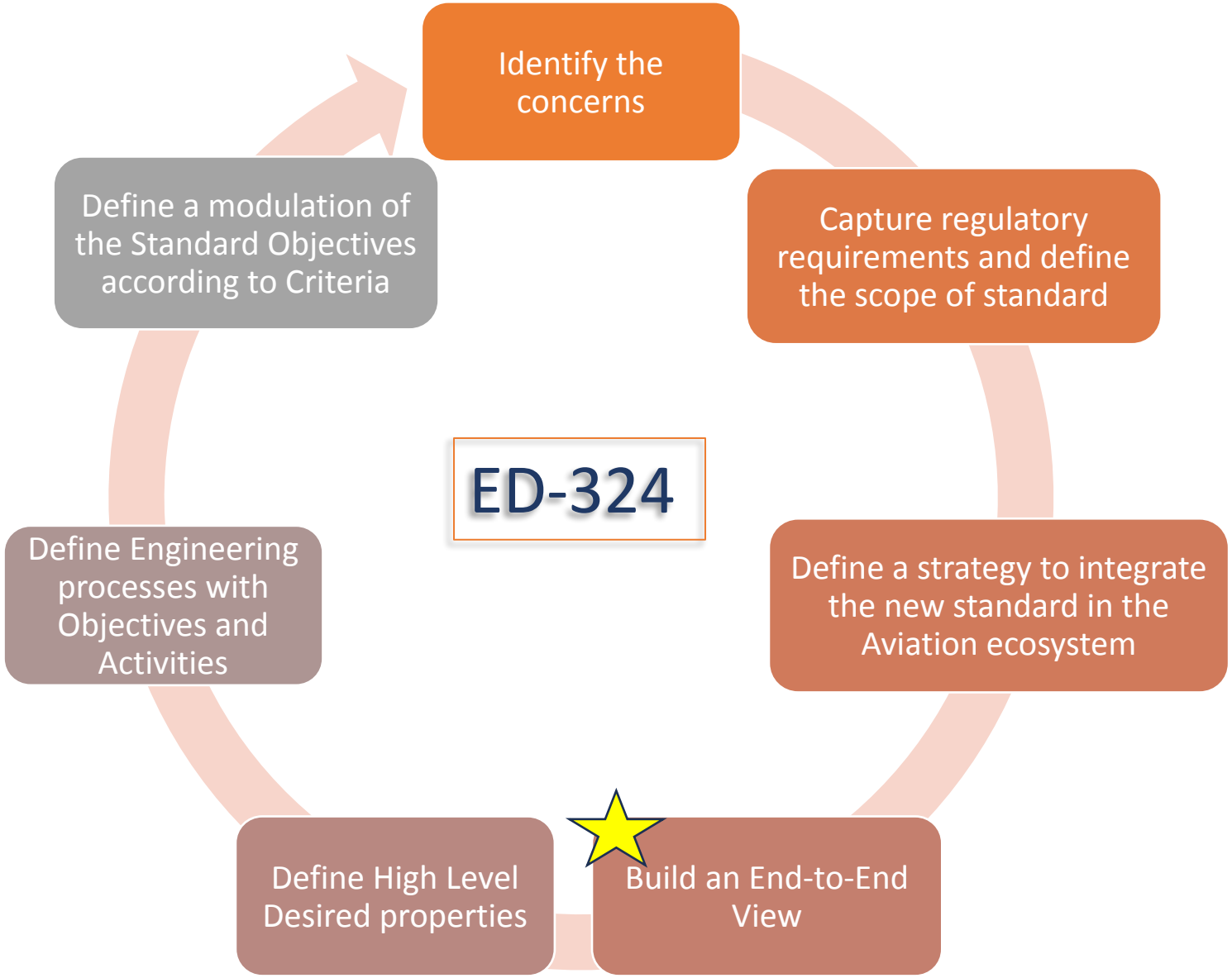
High level methodology to build the standard



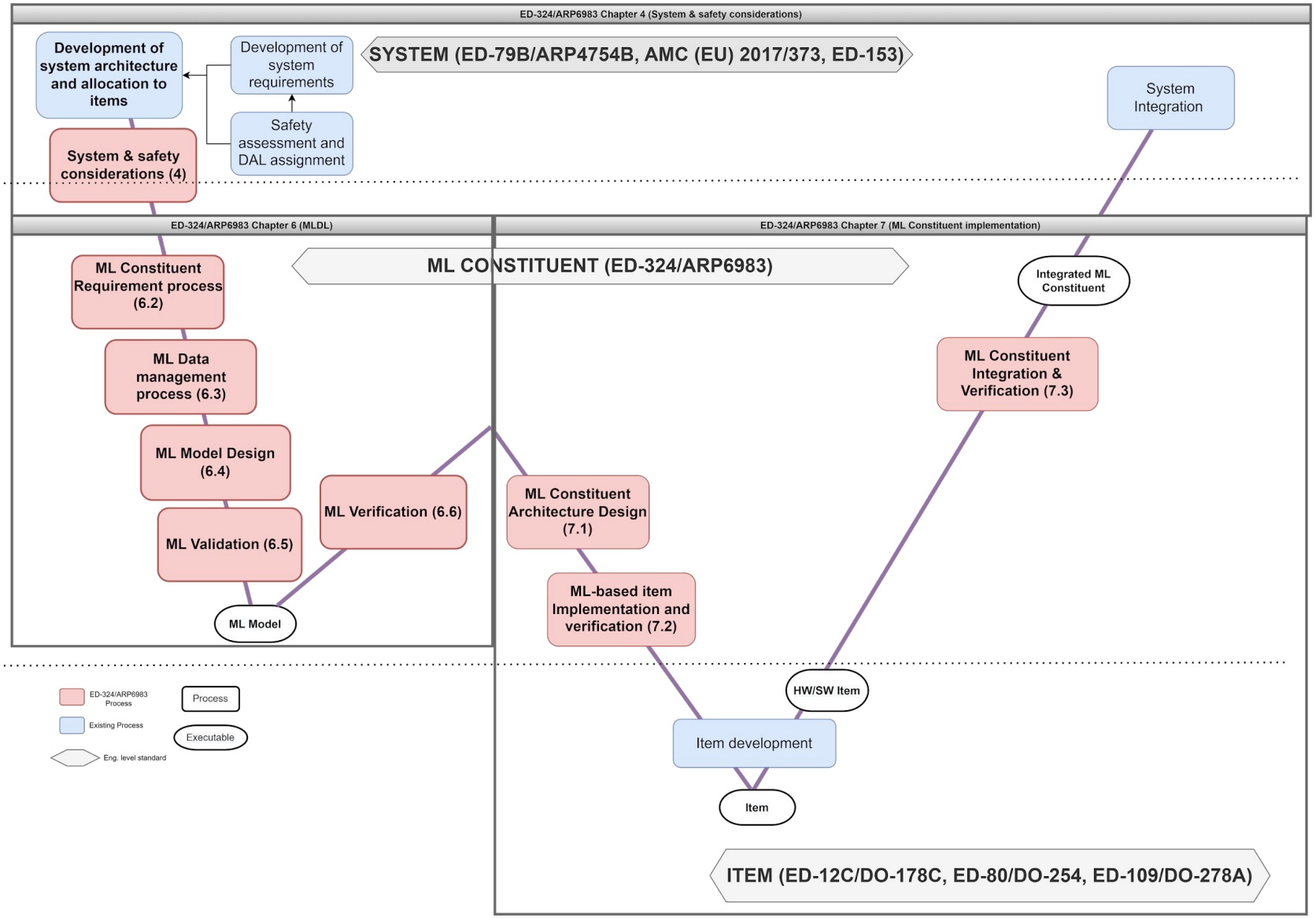
Future certification framework (Airborne view)



High level methodology to build the standard



End-To-End view



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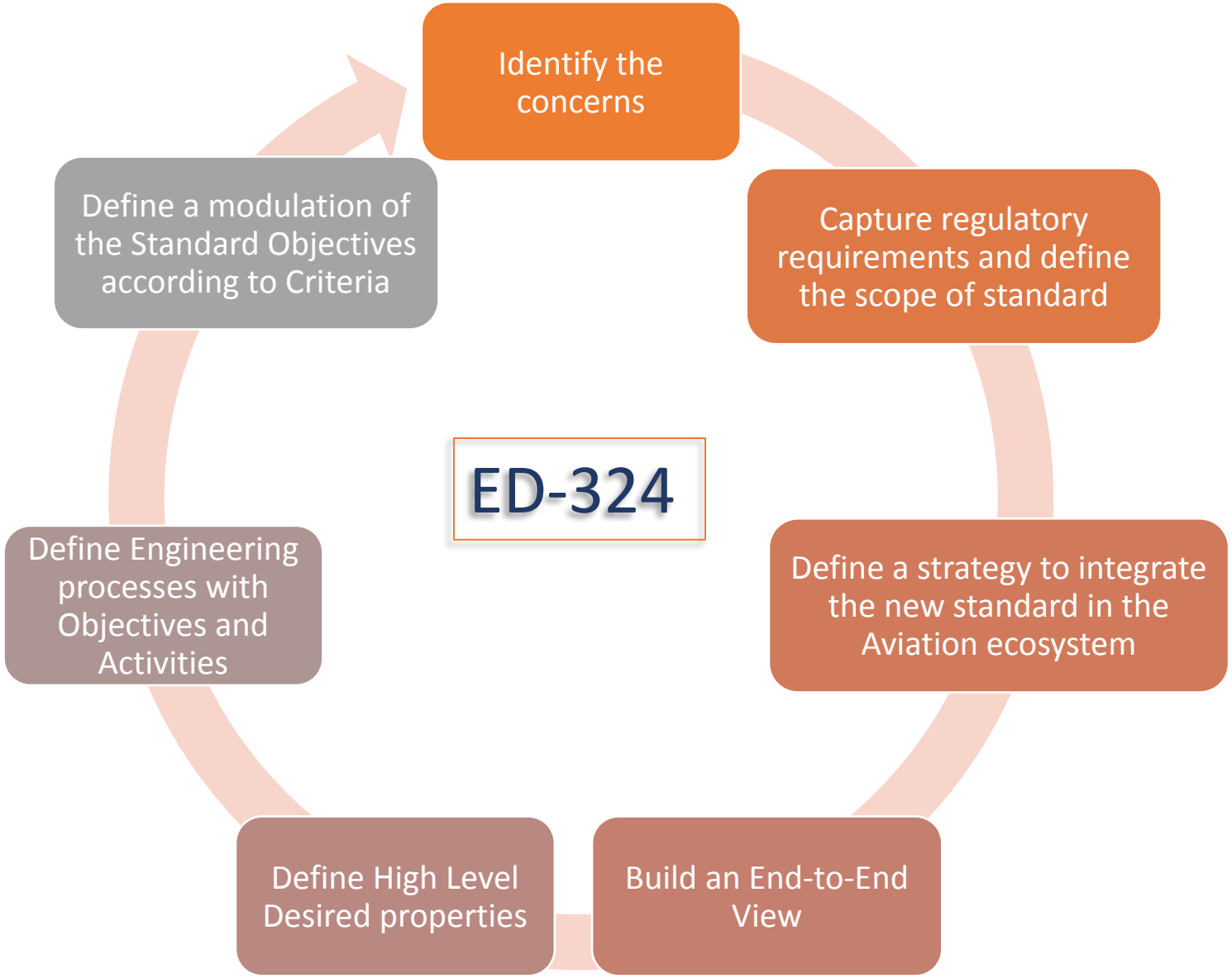
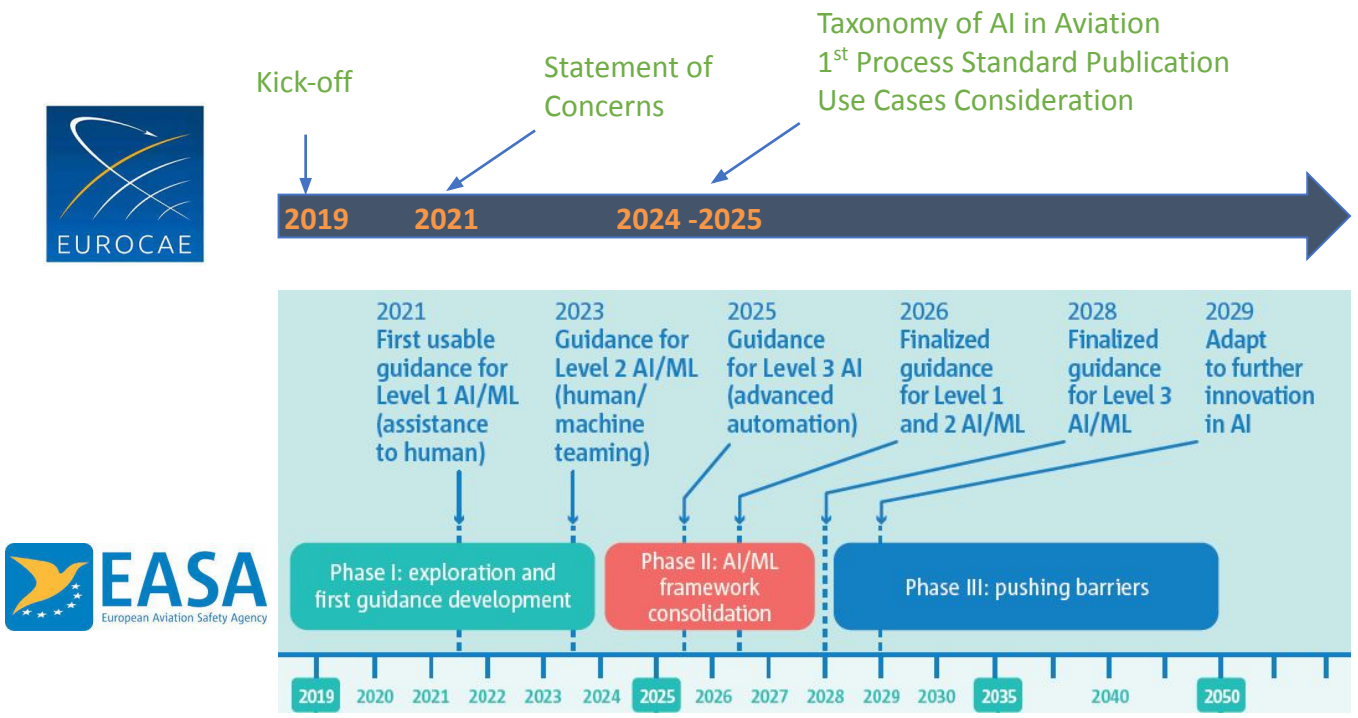


WG-114/G-34 Roadmap



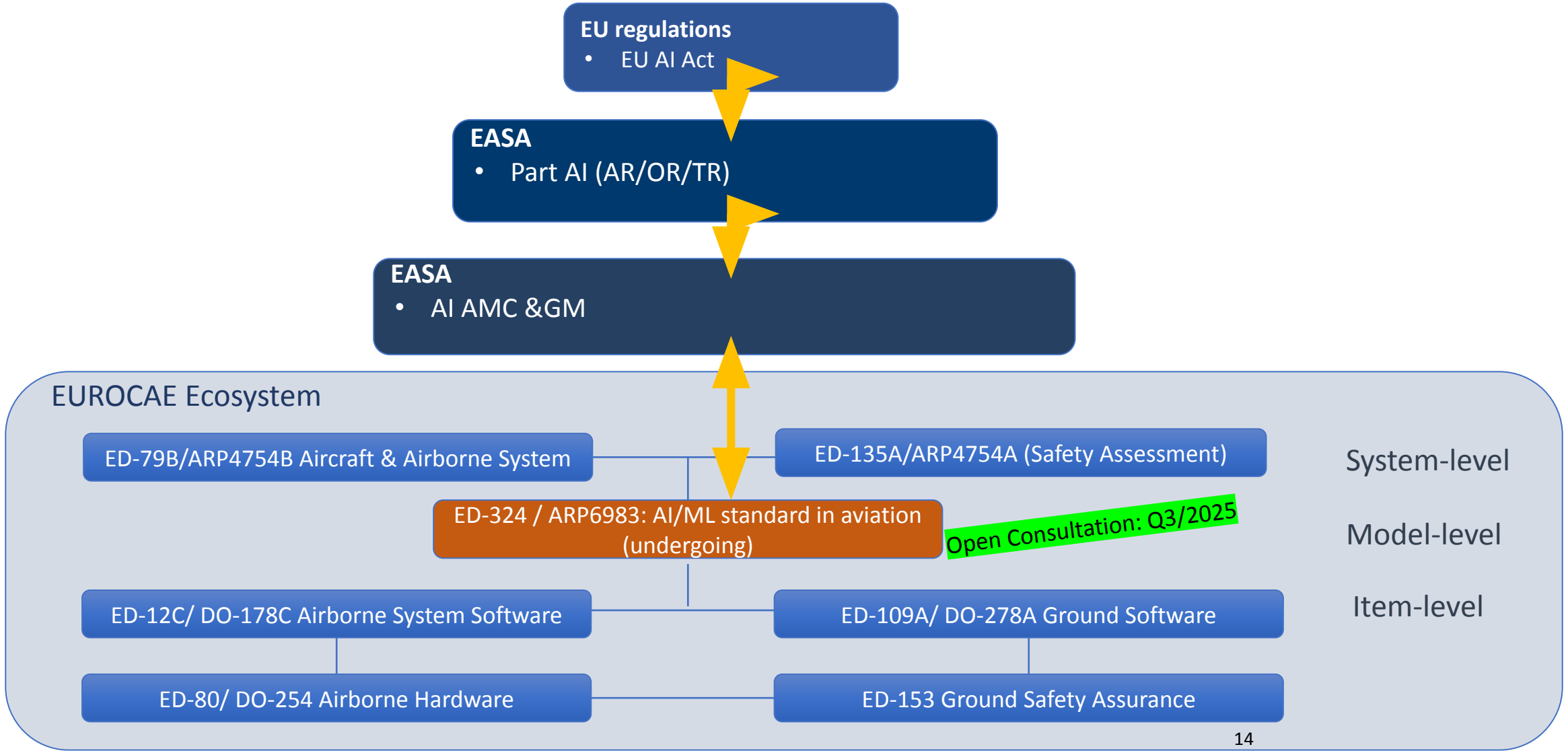
WG-114/G-34 Deliverables

- SOC (Statement of Concerns) – ER-22
- Taxonomy, and Use Cases – ER-27
- Publication 1: ML (Offline Learning) – ED-324
- Publication 2: Other AI Technologies – ED-324A

EASA Roadmap

- EASA released the roadmap 2.0
- EASA concept papers level 1 and 2, issue 02

European Aviation Framework (EUROCAE's view)



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THANK YOU

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