

SAE INTERNATIONAL

## SAE G34 / EUROCAE WG-114

### AI Certification and the Role of Simulation in Verification

Mark Roboff – Chair of SAE G-34  
Co-founder and CEO, SkyThread.aero  
[mark.robhoff@skythread.aero](mailto:mark.robhoff@skythread.aero)

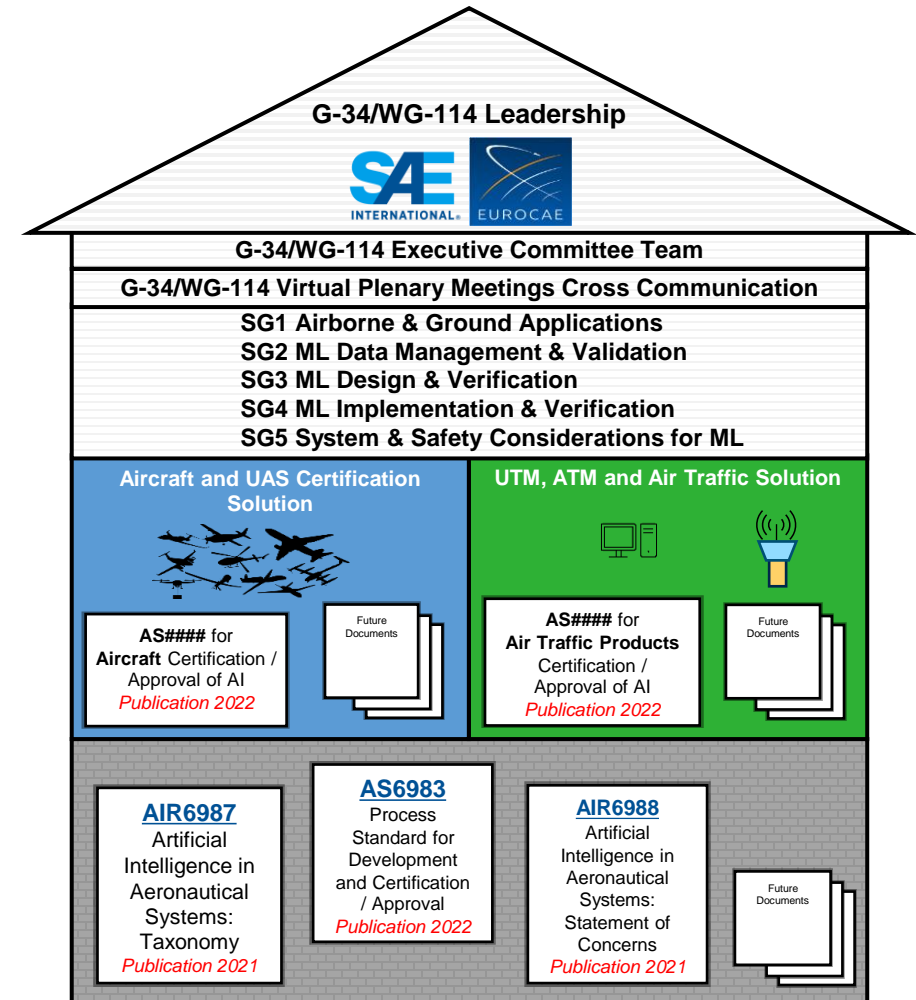
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# SAE G-34 / EUROCAE WG-114

## Joint International Committee for AI Certification

- **G-34/WG-114 focuses on implementation and certification related to AI technologies for the safer operation of aerospace systems and aerospace vehicles.**
- **G-34/WG-114 (comprised of 500+ members) promotes and standardizes Artificial Intelligence in the entire aviation ecosystem (both Airborne and Ground) addressing both manned and UAS.**
- **G-34/WG-114's Global contributors:**
  - Boeing, Airbus, ATR, Embraer, Textron, Gulfstream, Dassault, Mitsubishi, Lockheed, Northrop Grumman, GA-ASI, HondaJet, Daher, IAI, ICAO, FAA, EASA, TCCA, ANAC, DGAC, CAA UK, CAA NZ, JCAB, ENAC, FOCA, DOD, EDA, Lilium, Aerion Supersonic, Amazon, DXC, SAP, IBM, Joby, EUROCONTROL, NASA, EDA, Honeywell, Collins, Thales, GE, P&W, RR, Safran, Raytheon, BAE, Elbit, L3Harris, Iridium, Japan Manned Space Systems, FedEx, UPS, AF-KLM, Nodein, Lufthansa, Audi, Toyota, IATA, Leonardo, Leidos, NVIDIA, Intel, Saab, Volocopter, ANSPs, Skyguide, Searidge, Woodward, Vertical Aerospace, Diehl, ADB Safegate, AVSI, ANSYS, BNAE, Copenhagen Airports, D-Risq, Daedalean AI, KIAST, Infosys, Afuzion, Patmos Engineering, QinetiQ, RelmaTech, Rockdale Systems, DLR, drR2, Federated Safety, MathWorks, SRI, Oak Ridge National Lab, etc.
- **Works In Progress and deliverables:**
  - AS6983 / ED-xxx Process Standard for Development and Certification/Approval of Aeronautical Safety-Related Products Implementing
  - AI AIR6987 / ER-xxx Artificial Intelligence in Aeronautical Systems: Taxonomy
  - AIR6988 / ER-022 Artificial Intelligence in Aeronautical Systems: Statement of Concerns
  - AIR6994 / ER-xxx Artificial Intelligence in Aeronautical Systems: Use Cases Considerations



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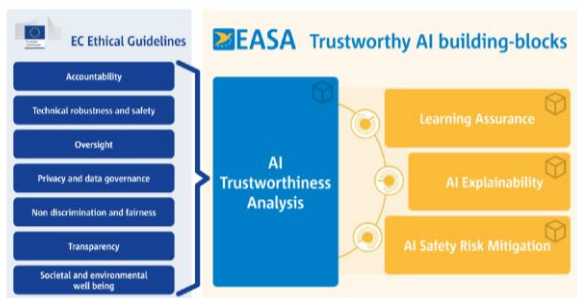
## High Level Overview

### Immediate Concerns

- Gap Analysis with Existing Standards
- Data Assurance
- Methodology Performance Requirements
- Verification and Validation

### References:

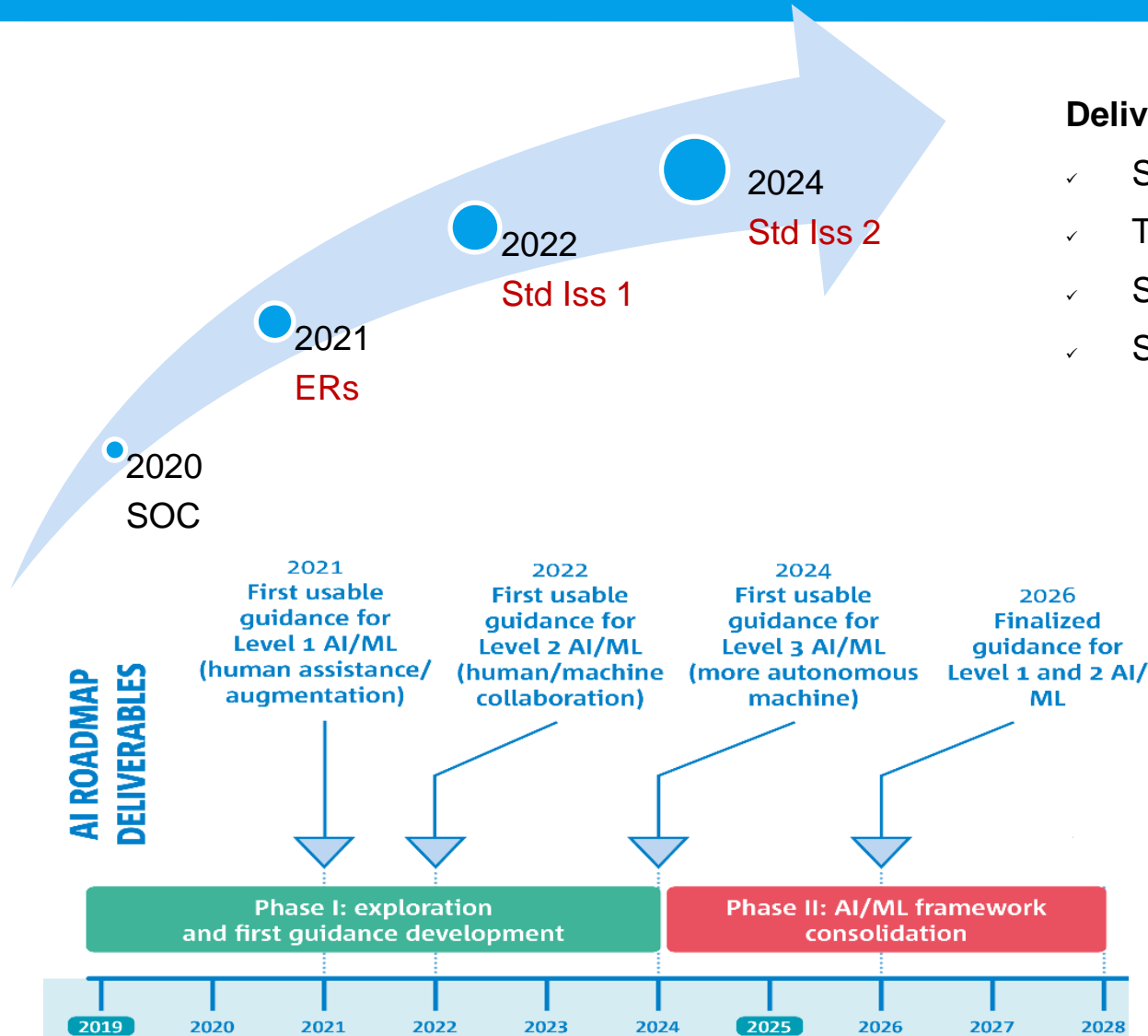
EC / EASA => High level objectives / framework for ML development and approval



G34/ WG114 => detailed technical industry standards for ML development and approval

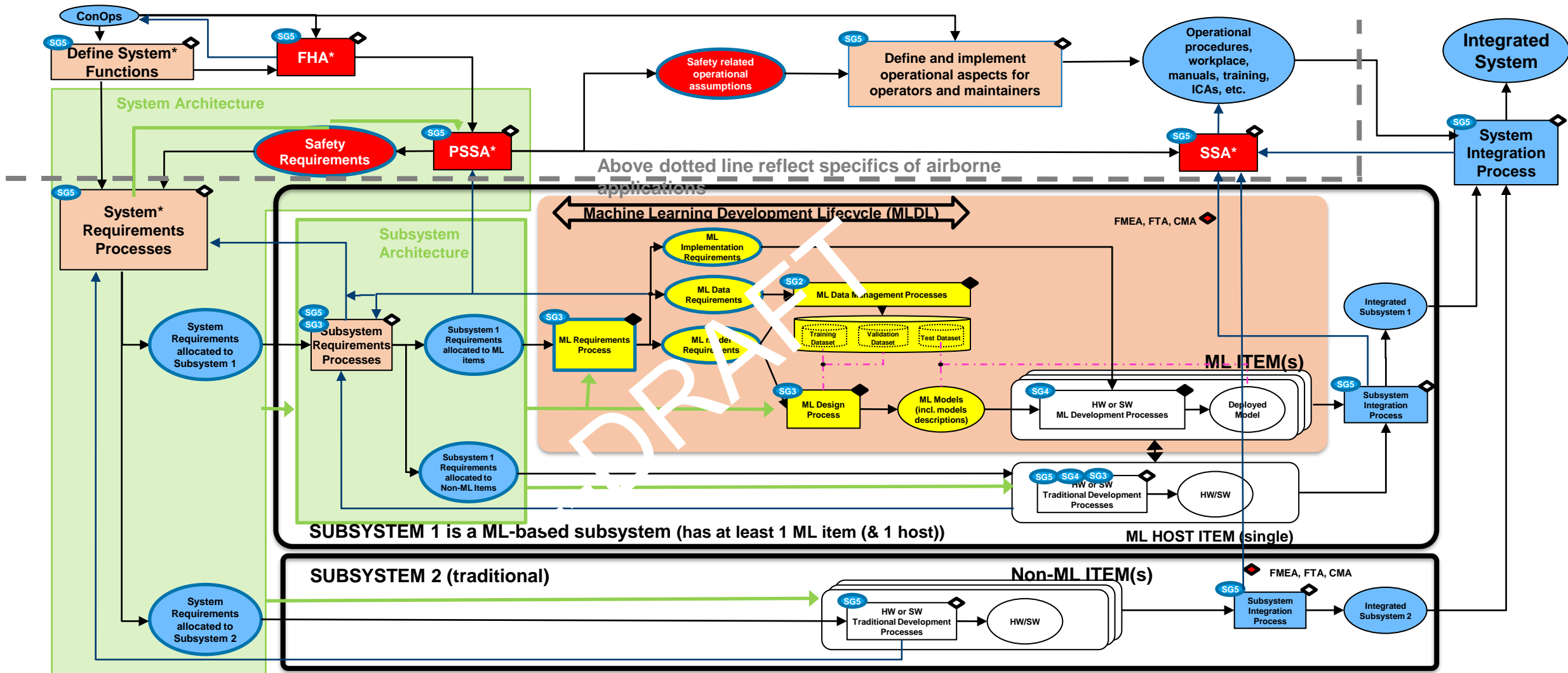


# SAE G-34 /EUROCAE WG-114 Roadmap



## Deliverables

- ✓ SOC (Statement of Concerns) – ER/AIR
- ✓ Taxonomy, Use Cases – ER/AIR
- ✓ Std Issue 1: ML (Offline Learning) – ED/AS
- ✓ Std Issue 2: Other AI Technologies – ED/AS



## Immediate Concerns

- **Gap Analysis with Existing Standards**
- **Data Assurance**
- **Methodology Performance Requirements**
- **Verification and Validation**

## AI Licensing – *How do we certify pilots?*

- **Ground School Curriculum**
- **Flight Instruction**
- **The Check Ride**

***Deconstructed, the tools we use to trust pilots can be used to trust AI***

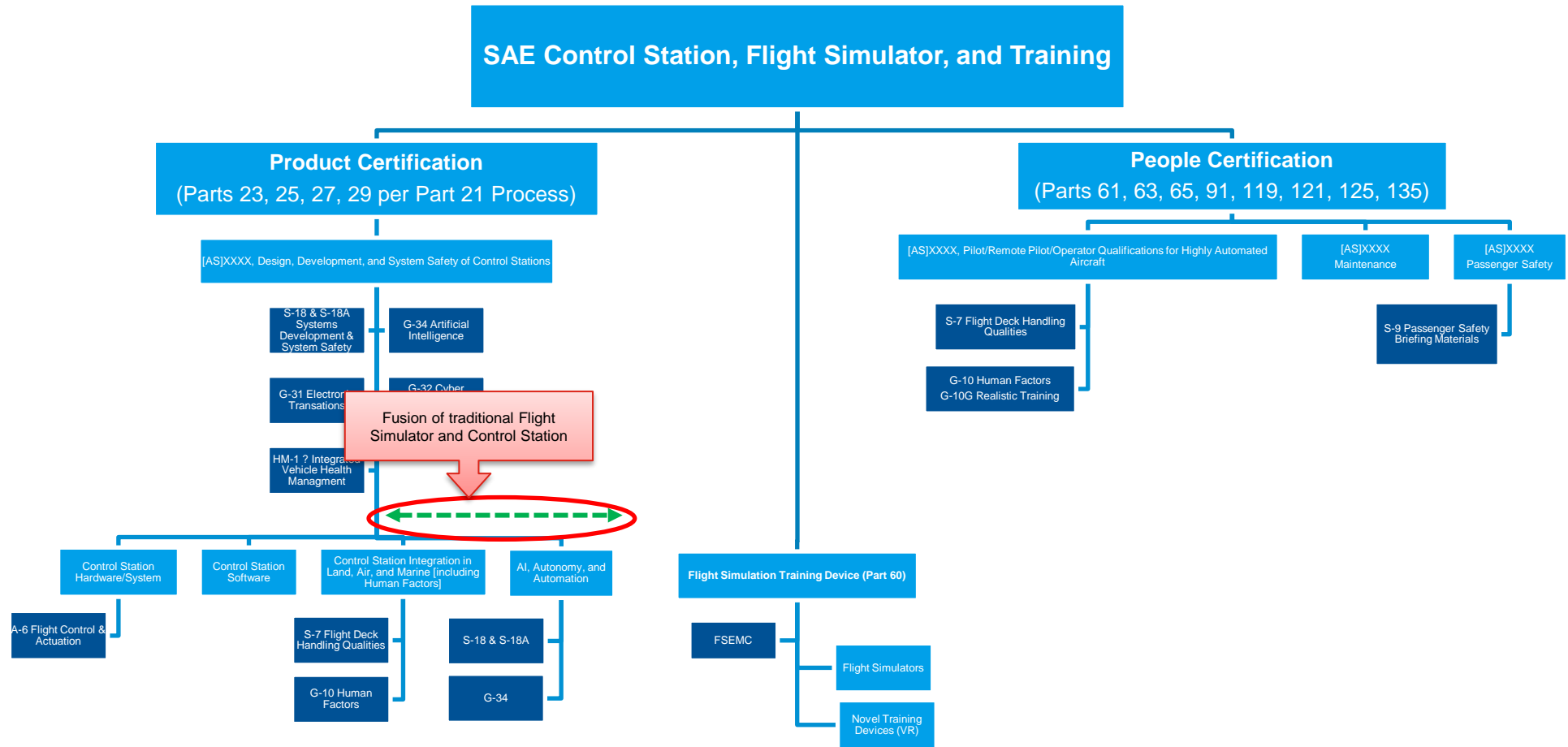


# The Role of Simulation – The Virtual Check-ride

- **Extend Model Based Engineering, AI/ML, and the Digital Twin to its Fullest Extent**
- **Validate performance requirements of the simulation environment**
  - Digital correctness of the environment
  - Digital correctness of the flight model
  - Digital correctness of the aircraft systems
  - Human or AI/ML system overlay
- **How do we know that a system is sufficiently detailed and correct so that it can stand in as facsimile to the real world?**
- **Purpose of design:**
  - Substantially shrink development costs while preserving robustness and safety assurance
- 



# Aviation Certification Architecture and its Planned Evolution



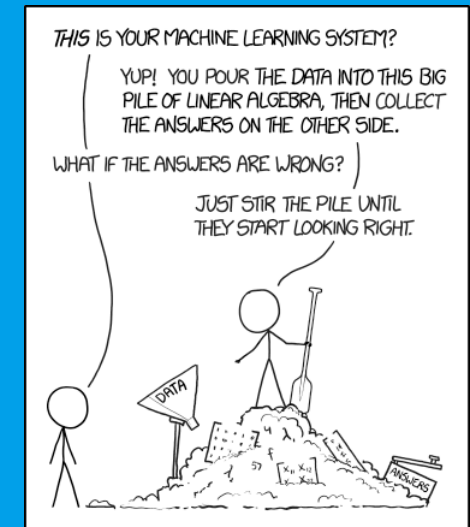


# Necessary Stakeholders for Standards Making



# Thank You

For more information and membership, contact:  
[mark.roboff@skythread.aero](mailto:mark.roboff@skythread.aero)



Source: <https://xkcd.com/>