

ECSS-E-HB-40-02A

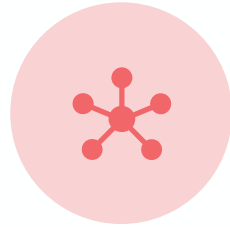
Machine Learning Qualification Handbook

1. Purpose
2. Guidelines Scope
3. Status

Active Member Affiliation
Airbus (Convenor)
ESA
Mathworks
Spacebel
Ariane Group
CNES
DLR



IDENTIFY THE
CURRENT AI
TECHNICAL
LANDSCAPE

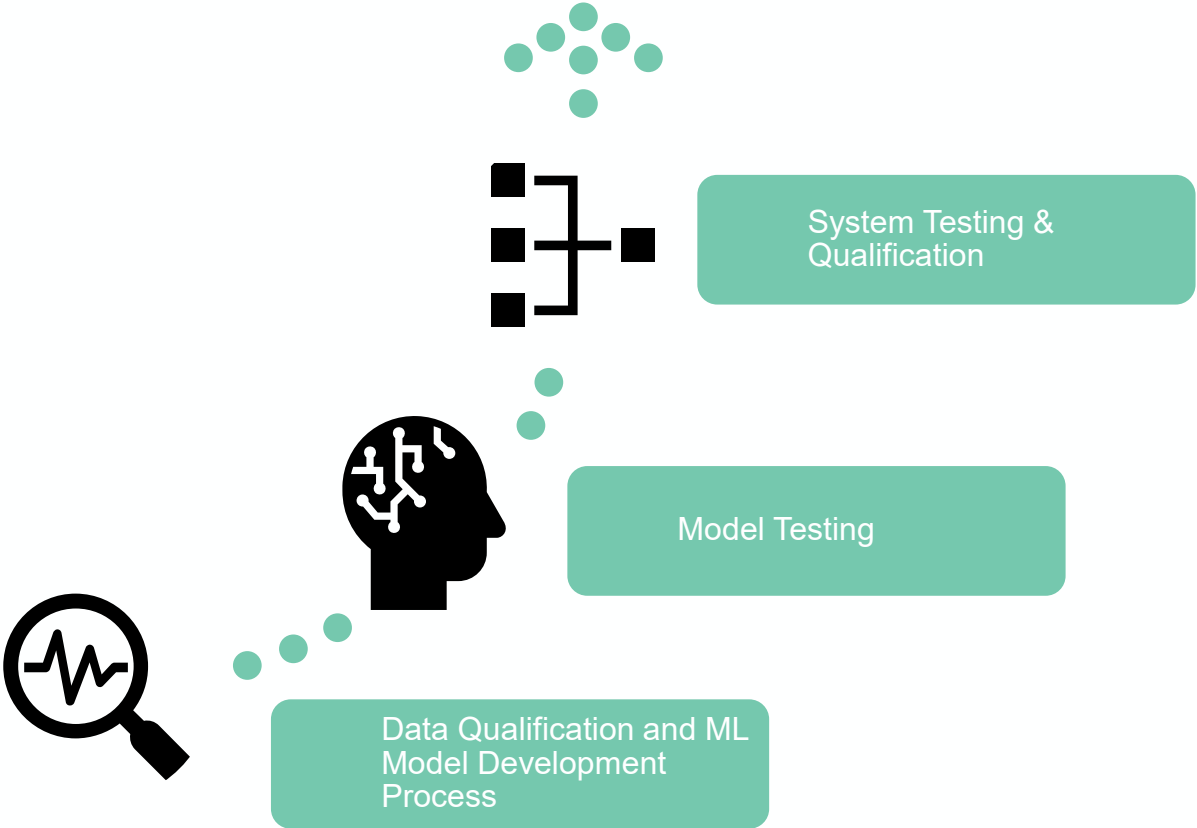


IDENTIFY AI
INITIATIVES IN THE
SPACE DOMAIN



DEFINE A SET OF
APPLICABLE
GUIDELINES

The Machine Learning Qualification Handbook shall provide guidelines on how to create reliable AI functions and perform the V&V taking into account the specifics of AI development practices.



Bottom – Up Approach



Questions



Created by Midjourney text-to-image model.
Seed: ESA, ECSS, ML, Qualification

Thanks!



BACKUP SLIDES

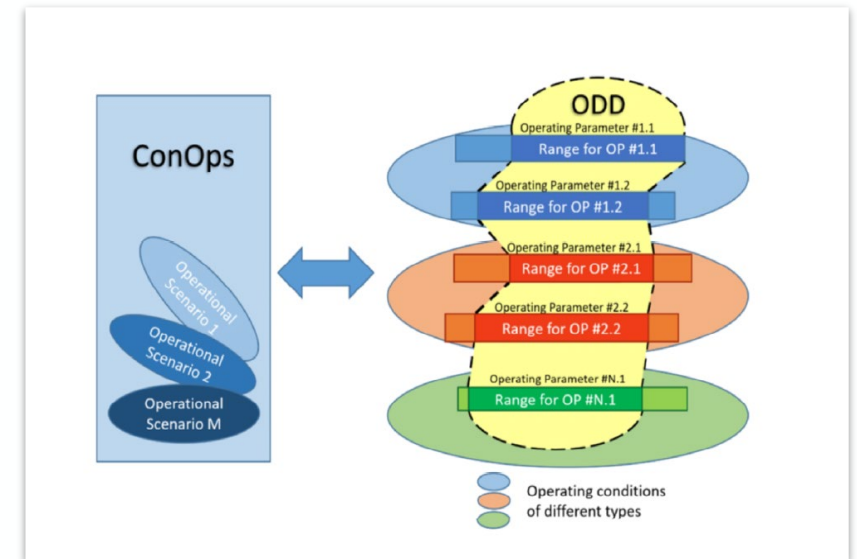




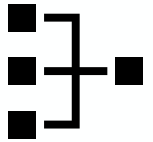
- Define high-level data quality properties
 - Data lifecycle
 - Type of data and associated risk: real, simulation & synthetic data, augmented,...
 - Specific application and data specific needs: supervised, unsupervised, reinforcement learning.
 - Operational scenarios and data relevance
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- ❖ Model quality characteristics
 - ❖ Model selection process
 - ❖ Common pitfall in ML model training



- Operational Scenario and Operational Design Domain
- Testing methods
 - Specific example testing
 - NN coverage testing
 - OOD testing
 - Noise testing
 - Adversarial testing
 - SEU testing
- Machine Learning Interpretability and Explainability



Source: DEEL



- Analysis of the interaction between the ML software and the surrounding system and its compliance with system requirements
- Definition of levels of autonomy [Ref. EASA]
 - Level 1. Human – Assisting function
 - Level 2 Human – Machine collaboration
 - Level 3 Fully autonomy
- Focus on Cat. B, C, D
- FMEA/FMECA
 - Identify potential failures and mitigation