AUMOVIO
Engineering
Solutions

AI & ASPICE: innovation driver or compliance risk?

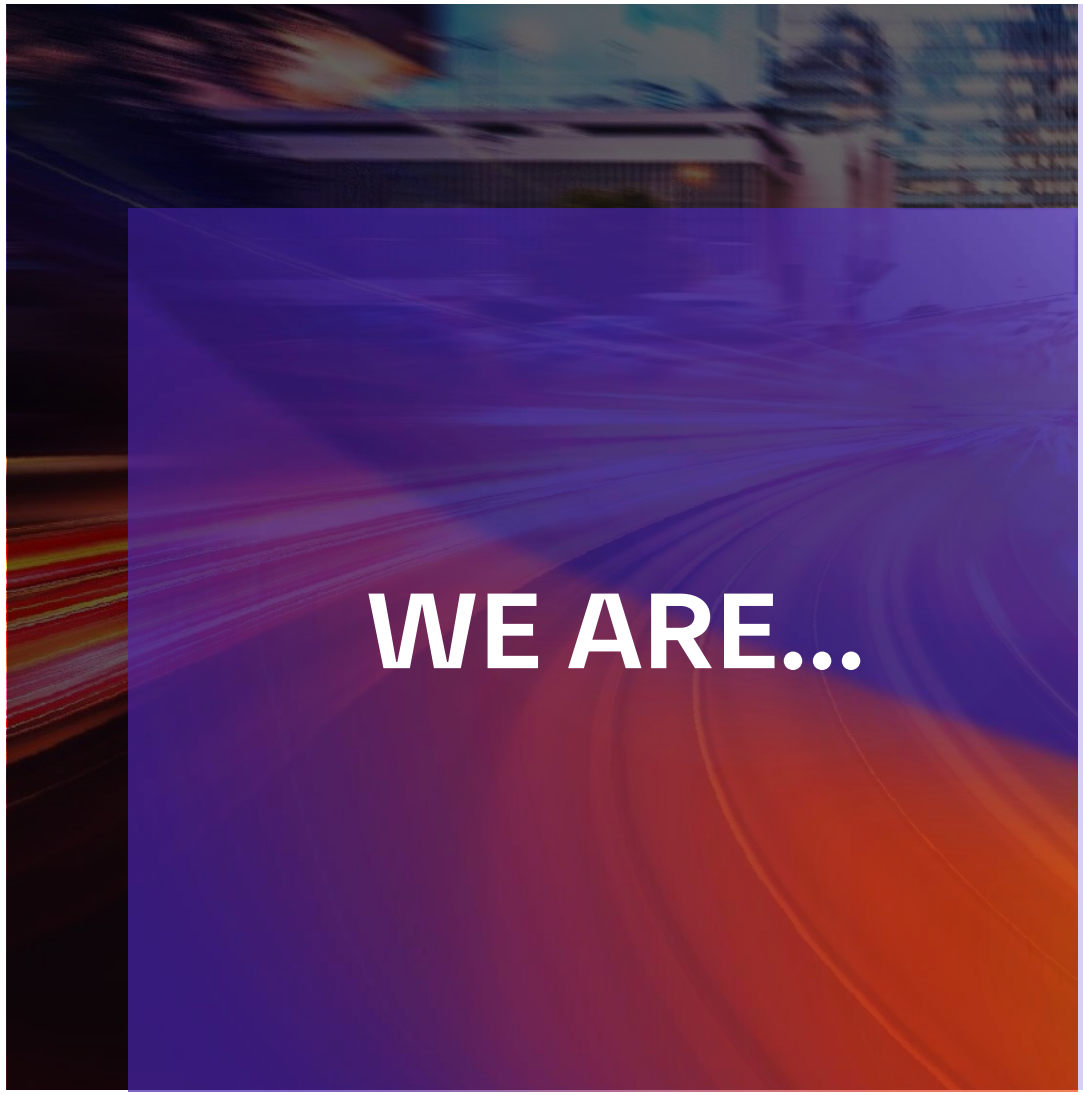
Balancing innovation with traceability, reproducibility, and process integrity

BC Process Management

December 8, 2025

engineering-solutions.aumovio.com

AUMOVIO Engineering Solutions



An engineering and technology provider.

A one stop shop – from the idea to the product.

A gateway to high volume automotive products.

More than 1,600 experienced engineers & specialists.

Developers of technology for future mobility.

AUMOVIO Engineering Solutions

Solutions portfolio

Consulting & specialist support
- Agile development and transformation
- Quality management & process improvement
- Data services
- Simulation engineering
- Security & privacy
- Functional safety management
- Cloud
- Data literacy

Concept creation
- System conception
- Requirement engineering
- E/E architecture
- Innovation engineering

Development
- System engineering
- Software engineering
- Electric machine design
- Hardware & mechanical engineering
- Noise-vibration-harshness

Integration
- System integration
- Virtual integration
- Vehicle integration & workshops
- Software integration

Testing & simulation
- 3D thermal simulation and structure analysis
- Test consulting services
- Driveline performance simulation
- Brake systems test and validation
- Virtual vehicle testing

Manufacturing
- Samples, electronics & mechanics
- Series production
- Build-to-print
- Special projects (automotive & beyond)

Presenters
AES business center Process Management

Rodrigo Freitas

Principal consultant

rodrigo.freitas@aumovio.com

Ashish Pullabhotla

Consultant

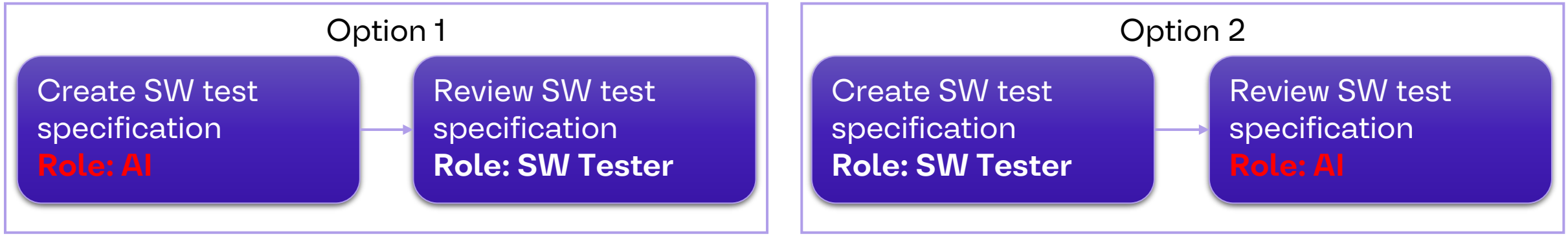
ashish.pullabhotla@aumovio.com

Would you trust AI in an ASPICE assessment?
Exploring the fine line between automation and accountability

“If AI can do requirements, design, coding, and testing – what’s left for engineers?”

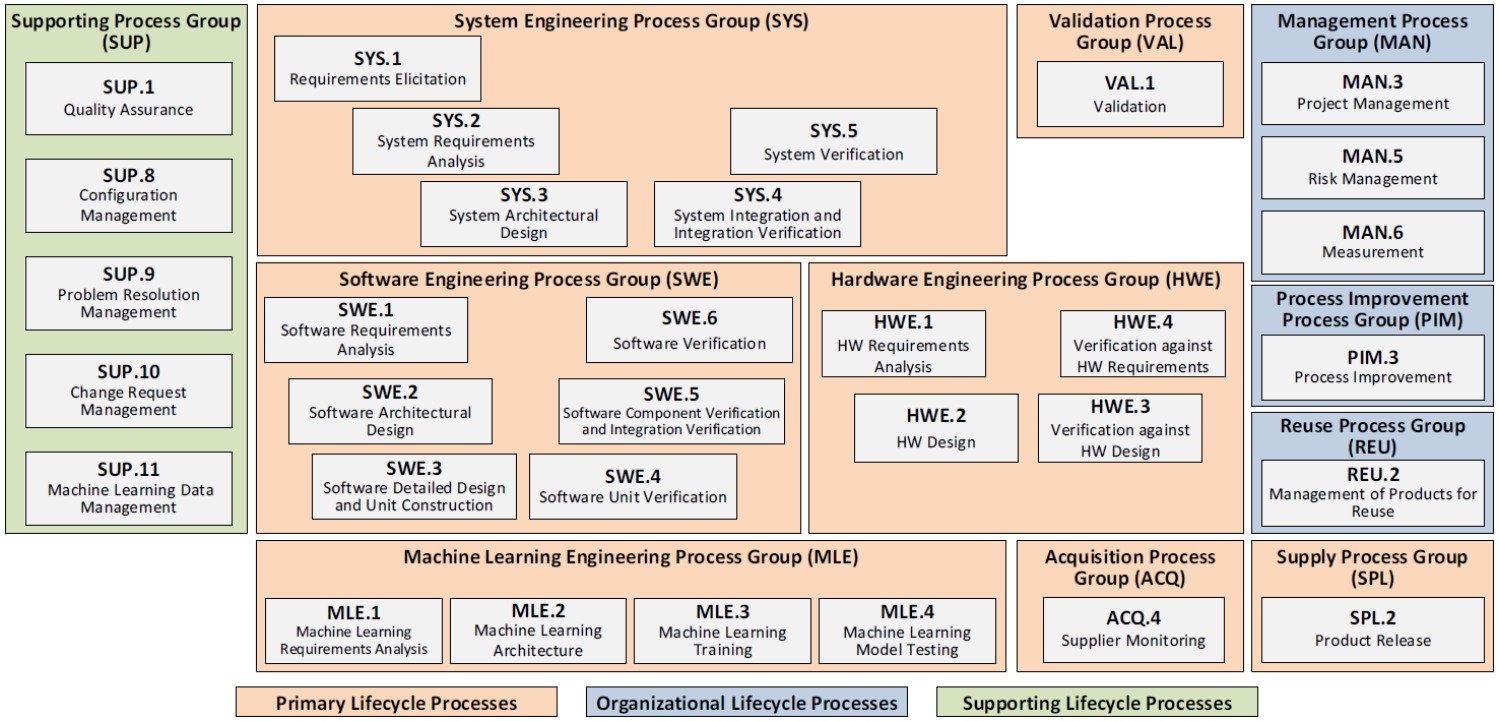
Would you trust AI in an ASPICE assessment?
Exploring the fine line between automation and accountability

The line between automation and accountability is blurring…



– *Would you accept/define "AI" as a role in a process step?*
  + Yes – AI is already reliable and objective
  - No – AI still needs human validation
  ? Maybe – Depends on the context

ASPICE: the gatekeeper of trust
The model behind cap. levels, processes, and evidence



- ASPICE – **A**utomotive **S**ystems **P**rocess **I**mprovement and **C**apability D**E**termination
- Based on V-model
- Structured into process groups e.g., MAN, SUP, SYS, SW, etc.

Goals
- Mitigate project/product risk
- Identify process improvements

Capability Levels
0 Incomplete
1 Performed
2 Managed
3 Established
4/5 …

Traceability
Supports consistency, enables impact analysis, provides coverage, and shows that the product fully cover what was specified

Documentation
Provides transparency, reproducibility, alignment, clarity

Why AI is entering the ASPICE world
AI is becoming a necessity in ASPICE-driven development

- **Software complexity in modern cars**
  - Vehicles are now software-defined platforms
  - Explosion of features → more data, more tests, more traceability
  - Manual processes struggle to keep up with the scale

- **Time-to-market & efficiency pressure**
  - Automotive industry faces **shrinking development cycles**
  - ASPICE compliance adds “overhead” - AI offers **efficiency gains**
  - AI offers acceleration without skipping compliance steps → Cost reduction demands smarter, faster engineering

- **Maturity of AI/ML tooling (AI is already embedded in engineering toolchains)**
  - **Planning**: effort estimation, resource allocation
  - **Requirements**: drafting, refinement, classification
  - **Coding**: generation, review, optimization
  - **Testing**: testcase generation, coverage analysis
  - **Defect analysis**: pattern detection, root cause suggestions
  - **Etc.**

AI acting in Management Processes
Example: MAN.3 project management

Potential AI applications

Predictive scheduling and effort estimation using historical data
Resource allocation optimization across parallel projects
Early warning signals for milestone slippage

Benefits

Improved accuracy in forecasts
Faster re-planning in dynamic contexts
Reduced manual effort in project tracking

Risks

Black-box estimations – team doesn't understand how results are derived
Risk of over-trusting AI predictions without challenge
Potential mismatch between AI forecasts and actual organizational capacity

Assessment concerns

Plans must remain **evidence-based and explainable**
Human accountability: forecasts reviewed & approved by managers
Traceability: records must show what was decided based on AI input
Repeatability: same input + same tool version → same output

AI can be your co-pilot, but never your project manager of record.

AI acting in Support Processes
Example: SUP.1 quality assurance

Potential AI applications

Automated compliance checks on documents, code, and models
Continuous monitoring of process adherence (e.g., monitoring reaction time and process fulfilment)
AI-based anomaly detection in QA metrics (defect rates, coverage gaps)

Benefits

Faster detection of process non-conformities
Reduced manual QA effort, especially in repetitive checks
Improved coverage by analyzing all artifacts, not just samples
Earlier feedback to teams – shift-left QA

Risks

False positives/negatives leading to wasted effort or missed issues
Risk of treating AI findings as “truth” without validation
Over-automation may erode the independence of QA (AI is part of the project and could be biased towards the project)
Lack of explainability if AI flags issues without rationale

Assessment concerns

QA findings must be **objective, evidence-based, and reproducible**
Independence of QA must remain intact (AI cannot sign off on its own output)
Records must show how AI findings were reviewed, confirmed, or rejected
Assessors may ask: “*Who ultimately took responsibility for the QA judgement?*”

AI can scan the evidence but never sign off the assurance.

AI acting in Development Processes
Example: requirements & design activities

Potential AI Applications

Extract, classify, and refine requirements from stakeholder inputs or natural language.
Detect ambiguities and inconsistencies early using NLP models.
Suggest architecture patterns and component decompositions based on functional/non-functional needs.
Perform consistency checks and interface validation.
Generate design models and code stubs aligned with requirements.
Support design-to-code traceability and documentation.

Benefits

Faster creation of requirements, architecture, and design work-products.
Improved traceability and coverage across the V-model.
Reduced manual effort and human error in repetitive tasks.
Early detection of gaps and inconsistencies.

Risks

Ambiguity: AI-generated requirements or designs may lack clarity or intent.
Explainability: Decisions made by AI can be hard to justify during assessments.
Hallucinations: AI may introduce incorrect or non-existent elements.
Verif. Need: Outputs should be validated for correctness and completeness.

Assessment Concerns

ASPICE demands objective, traceable, and reproducible evidence.
AI outputs must be version-controlled and linked to preceding process items.
Human oversight is mandatory for approval and accountability.
Assessors will expect clear documentation of the AI generation pipeline (tool, configuration, prompts, reviewer).

AI can accelerate development processes, but ASPICE reminds us: speed is valuable only when accountability and evidence remain uncompromised.

When is AI evidence acceptable?
Deterministic vs. stochastic outputs in ASPICE assessments

- AI adds an extra wrinkle:
  - If the AI system is **“more” deterministic** (e.g., configured with fixed prompts, data set, parameters) and its outputs are versioned and stored, then the generated work products are more controlled.
  - If the AI output is **stochastic** (e.g., ChatGPT-style free text not saved or not reproducible later), then it is not stable evidence.
- As with the human the AI-generated evidence is only valid if it is **stable**, **traceable**, and **under control**.
- To be acceptable, organizations must treat the AI system + configuration + inputs as part of the work product definition (so outputs can be regenerated).

You’ll find the foundation in **ISO/IEC 33002** (objectivity, repeatability, reproducibility of assessments), operationalized in **ASPICE PAM 4.0 Information Item Characteristics**, and enforced by **VDA Guidelines** that evidence must be *objective, stable, and verifiable*.

Possible AI evidence scenarios

- AI outputs as
  - formal evidence (if they meet objectivity + traceability)
  - support material only, needing human-controlled artifacts

Open question: *how far will standardization go?*

Implications for AI-generated evidence
Practical recommendations

Document your AI generation pipeline

What tool(s) used, versions/configurations, prompt(s), input data, who initiated, who reviewed, timestamps, etc.

Ensure version and traceability

Store generated outputs in a version-controlled repository; link to earlier process items

Stability & reproducibility

Capture information that the generation can be repeated or at least to show that the process is deterministic / controlled

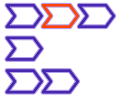
Ownership, status, configuration control

Define owner, status of AI outputs, manage changes

Accessibility of evidence

Stored and retrievable for project members in appropriate formats

Define AI process & criteria



Guidelines for acceptance, review and validation steps

AI limitations in the V-Model lifecycle
Why engineer remains critical

Black-box decisions

AI outputs often lack transparency and explainability

Lack of domain experience

No intuition, no tacit engineering knowledge

Hallucinations

AI can invent requirements, tests, or links that don't exist

Memory & performance constraints

Context limits, execution bottlenecks, and scaling issues

Cascading errors

Small AI mistakes propagate through multiple lifecycle steps

Conversation & context memory

Long discussions lose precision; context can be dropped

Incomplete V-Model coverage

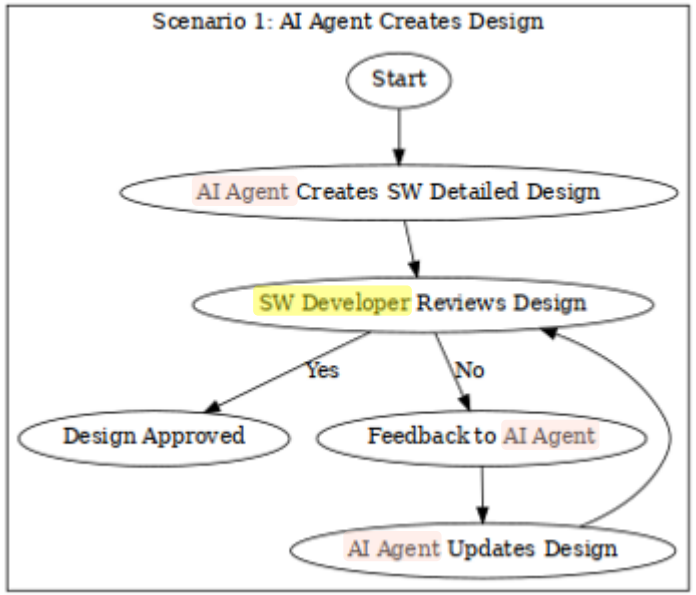
AI can assist in tasks, but cannot replace engineers across the full lifecycle

Accountability

ASPICE and ISO standards demand named, responsible humans

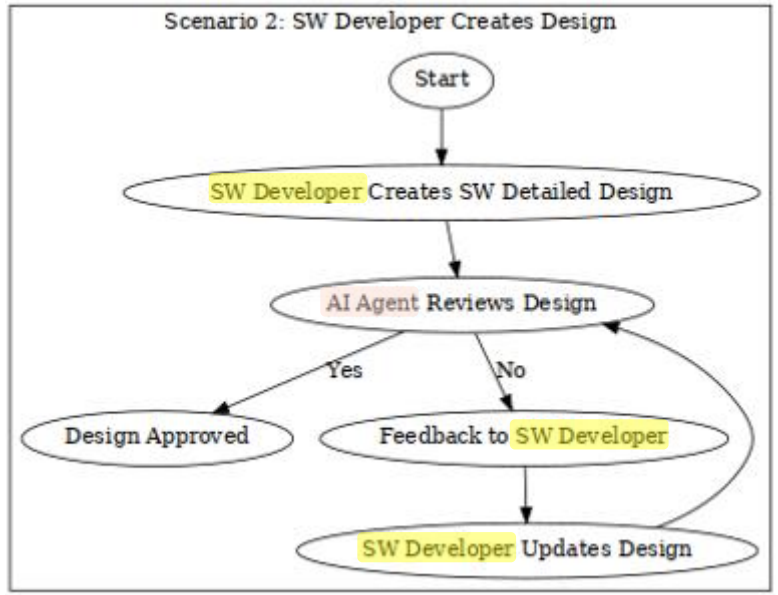
AI in ASPICE: use-case 1
Process SWE.3 software detailed design and unit construction

Process step	Role	Process step	Role
Create SW detailed design	**AI agent**	Create SW detailed design	SW developer
Review SW detailed design	SW Dev. / SW unit tester	Review SW detailed design	**AI agent** / SW unit tester



Is there any risk in this approach?

Independent of the approach selected there will be always an accountable person behind the work-product and its content.



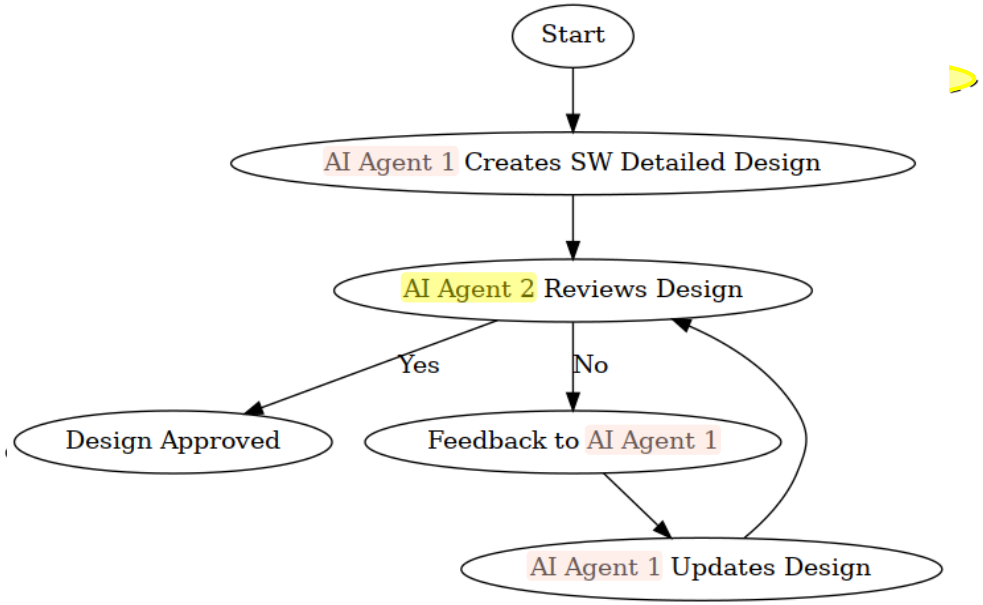
AI in ASPICE: Use-case 2
Process SWE.3 software detailed design and unit construction

Process step	Role
Create SW detailed design	**AI agent 1** with company guidelines
Review SW Detailed Design	**AI agent 2** with requirement, architecture, review criteria

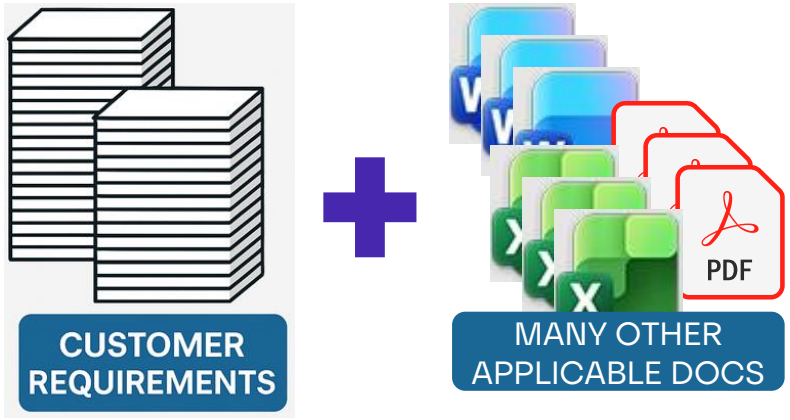
Is there any risk in this approach?

- No human feedback (e.g., functional safety manager, SW developer, SW unit tester).
- Is the risk mitigated by including SW developer accountability?
- What does “observes” really mean?
- How did AI get feedback from Functional Safety and/or SW unit tester?

Accountability: SW Developer (monitoring)?



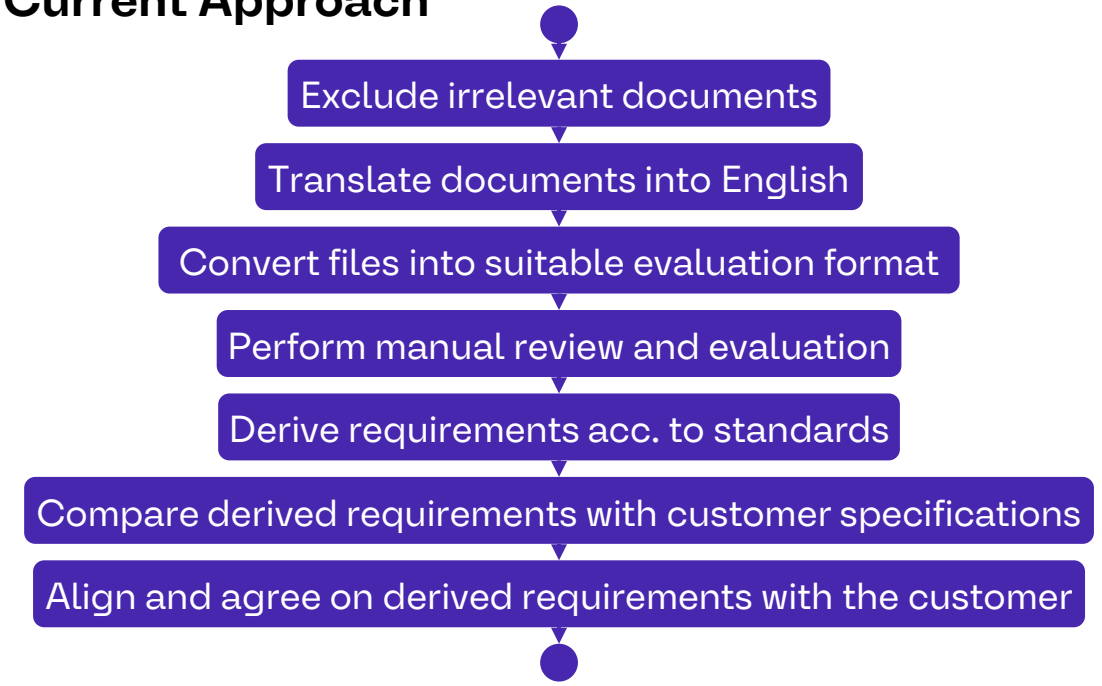
AI in ASPICE: Use-case 3
Process SYS.1 requirements elicitation



Challenges

- Extremely large volume of documents.
- Multiple file formats complicating traceability.
- Natural language content, including tables with implicit or “hidden” requirements.
- Multilingual documents.
- Complex version control (e.g., legal norms, standards).
- Poorly structured or inconsistent documents.

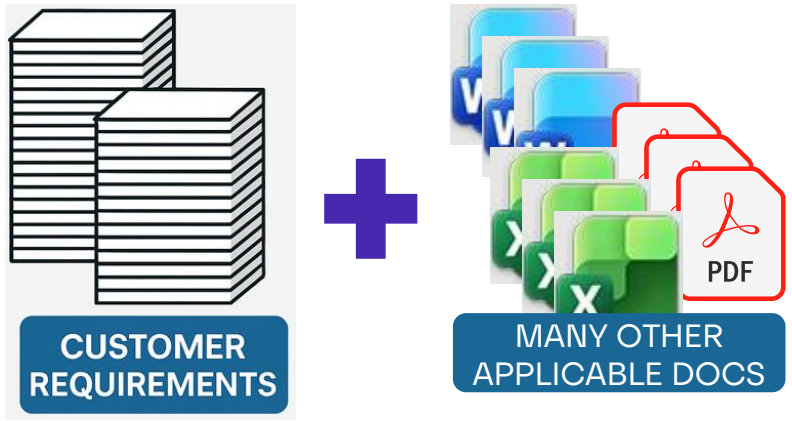
Current Approach



Remaining Issue

- Quality of requirements still needs improvement.
- Multiple error-prone steps in the process.
- Overall activity is highly time-consuming and sometimes not feasible.

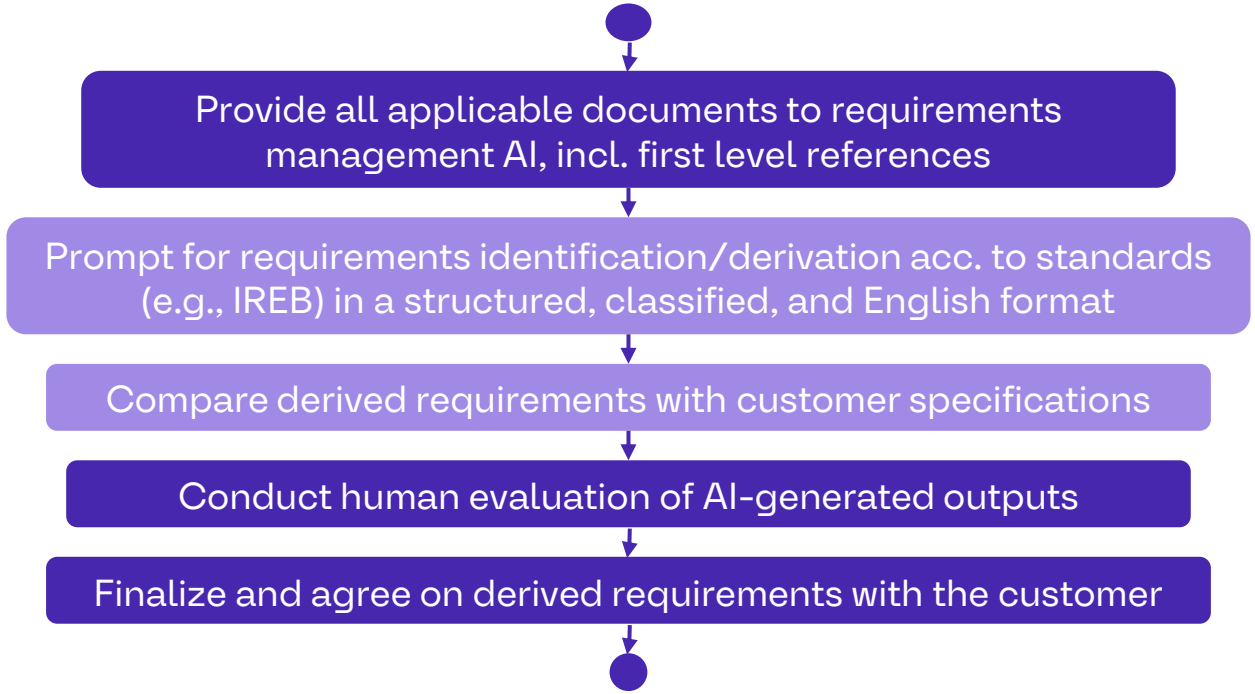
AI in ASPICE: Use-case 3
Process SYS.1 requirements elicitation



Challenges

- Extremely large volume of documents.
- Multiple file formats complicating traceability.
- Natural language content, including tables with implicit or “hidden” requirements.
- Multilingual documents.
- Complex version control (e.g., legal norms, standards).
- Poorly structured or inconsistent documents.

Current AI approach



Key Takeaways

- Significant improvement in requirements quality.
- Enhanced traceability across documents.
- AI reduces requirements elicitation effort by **more than 50%**.

AI in ASPICE: the road ahead
From opportunity to accountability

Outlook

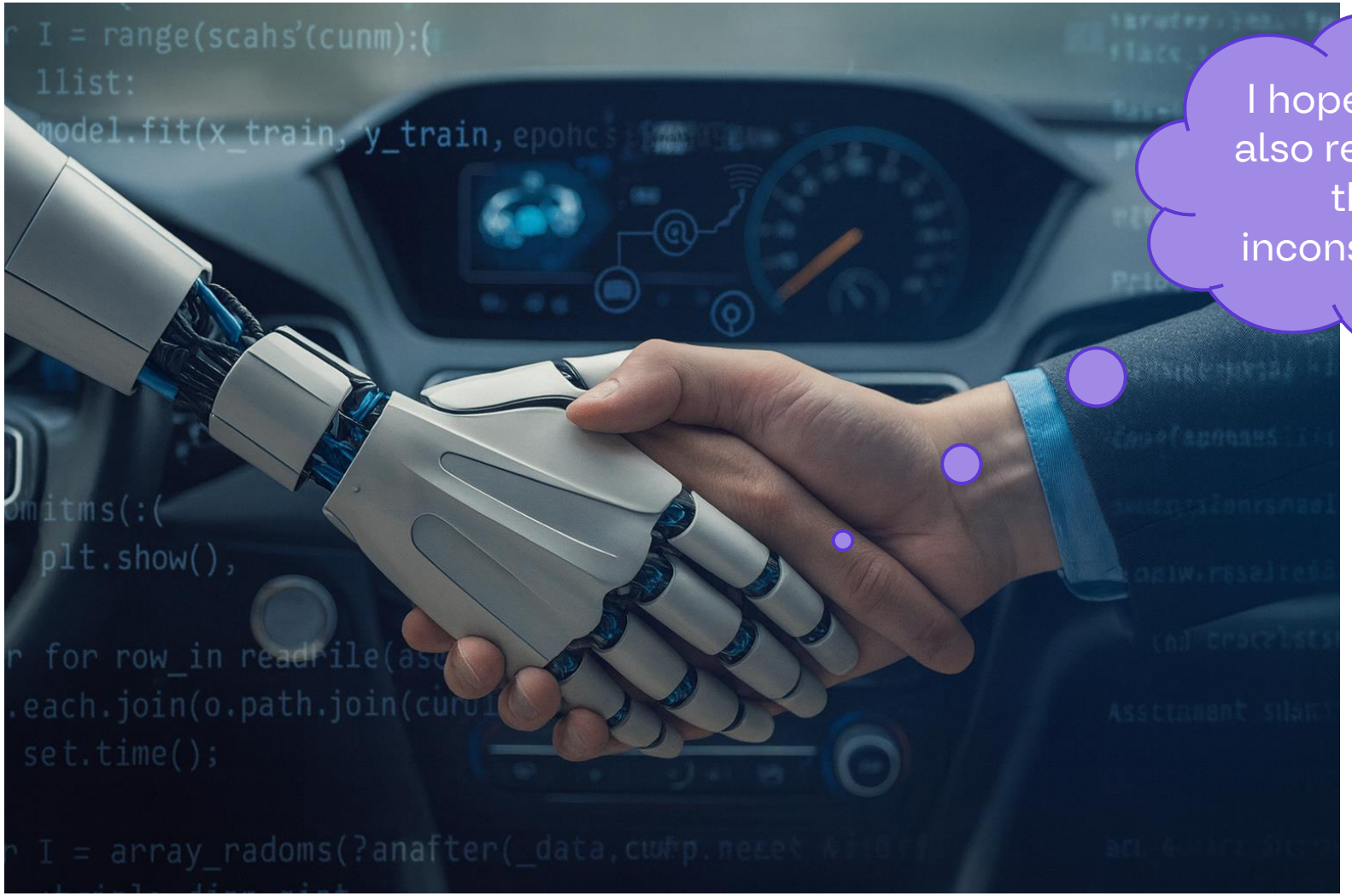
- **Regulatory push** → ASPICE PAM, and VDA may publish guidelines/suggestions
- **Tool qualification pressure** → AI tools could require qualification like safety-related development tools (ISO 26262).
- **Assessment evolution** → Assessors will demand transparency of AI pipelines (inputs, prompts, tool versions, reviewers).
- **New roles emerging** → New AI roles might emerge and become common in engineering organizations.
- **Industry divergence** → Some OEMs may embrace AI faster, while others adopt a wait-and-see approach, leading to inconsistent expectations.
- **Shift from pilots to practice** → AI in ASPICE is moving from experimentation toward operational integration.
- **Cross-standard alignment** → Expect interaction with other frameworks (e.g., ISO/SAE 21434 Cybersecurity, EU AI Act, ISO/IEC 42001 AI Management Systems).

Key Takeaways

- **AI is touching every ASPICE process - opportunity + compliance risk**
- **Evidence** → Only controlled AI outputs can count as valid assessment evidence.
- **Governance is key** → AI use must be embedded in process definition, policies, and configuration management.
- **AI maturity gap** → Many tools are ahead of standards; organizations must bridge that gap responsibly.
- **Assessor perspective** → Different assessors may interpret AI evidence differently until guidelines stabilize.
- **Cultural shift** → Teams must develop mindset, if “AI helps me” then “I am accountable for AI-supported work.”
- **Competitive edge** → Early adopters that master AI governance will have faster time to market.

The future of ASPICE is not AI versus compliance – it is about making AI evidence trustworthy.

Closing & Q&A
From insight to action



Thank you

Rodrigo Freitas

Principal consultant

rodrigo.freitas@aumovio.com

Ashish Pullabhotla

Consultant

ashish.pullabhotla@aumovio.com

AUMOVIO
Engineering
Solutions