VDA QMC Project Group 13
Status and Outlook to Automotive SPICE 4.0

Project Group 13

Agenda

Intro

Experiences and Observations from Assessments

Major Changes in the PAM V4.0

Roadmap

Project Group 13
Introduction – Albrecht Wlokka

- Consultant @ Bosch

- Software process improvement

- Software quality management support and governance

- Automotive SPICE coordination w/w

- Head of VDA PG 13

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Observations and Experiences with the PAM v3.1 and Guidelines v1.0

Despite of great acceptance in worldwide community still some problems and misconceptions need to be addressed

- Reproducibility & comparability of assessment results have not improved

- Assessment duration increased

- Guideline content used as pure checklists

- Growing formalism instead of understanding the context

- Engineers in projects : frustration up – motivation down
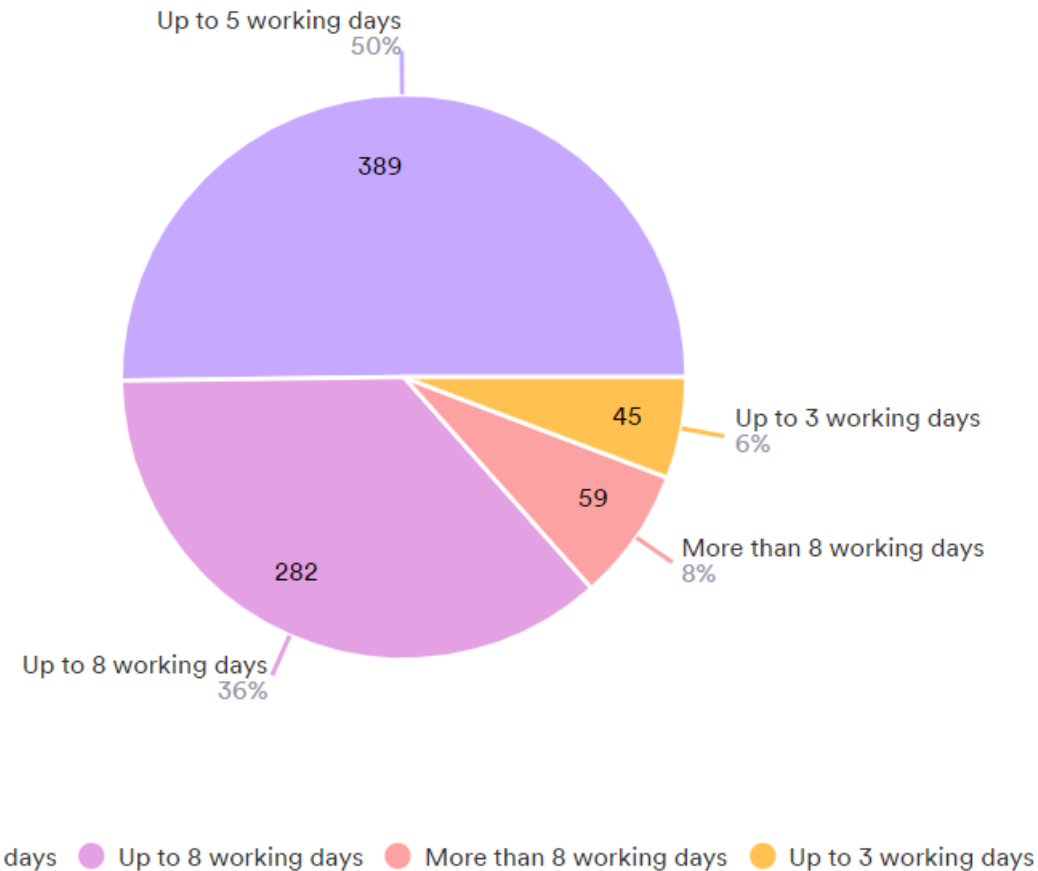
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Feedback from a VDA QMC Survey on Assessment Quality in 2022

How long do assessments usually take in your organization (without travel times)?

775 Responses

44% of assessments take more than 5 working days

8% take more than 8 working days

Up to 5 working days 50% — 389
Up to 3 working days 6% — 45
More than 8 working days 8% — 59
Up to 8 working days 36% — 282

● Up to 5 working days   ● Up to 8 working days   ● More than 8 working days   ● Up to 3 working days
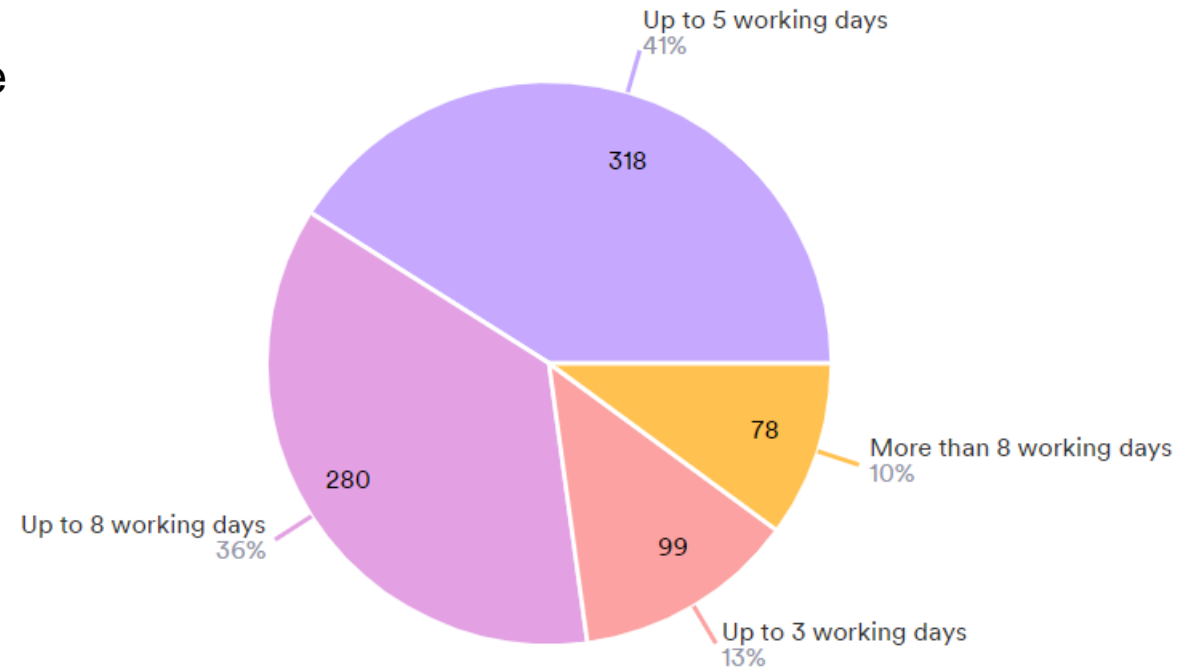
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Feedback from a VDA QMC Survey on Assessment Quality in 2022

What would be an appropriate assessment duration to work out the strengths and weaknesses in the project?

775 Responses

54% say an appropriate assessment duration is less than 5 days

Up to 5 working days
41%
318

More than 8 working days
10%
78

Up to 3 working days
13%
99

Up to 8 working days
36%
280

● Up to 5 working days   ● Up to 8 working days   ● Up to 3 working days   ● More than 8 working days

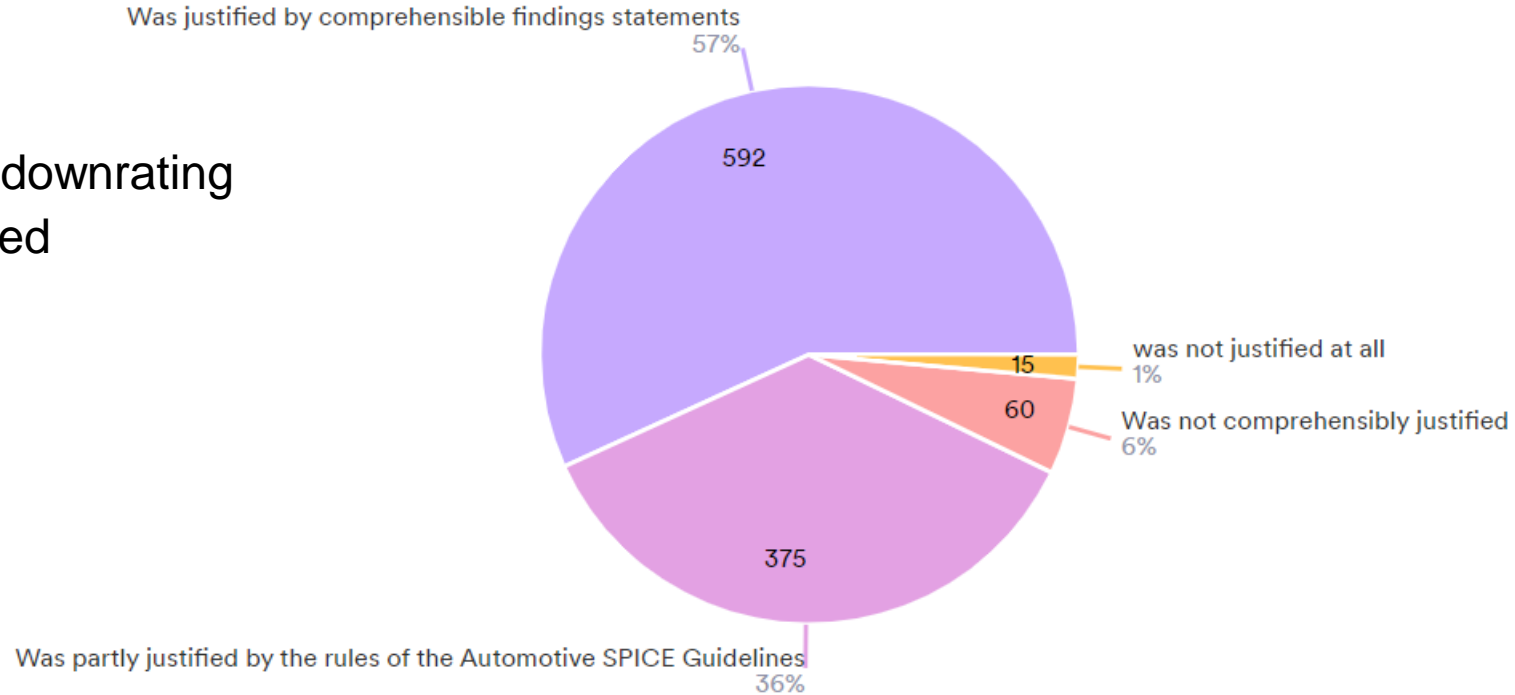# Project Group 13

Feedback from a VDA QMC Survey on Assessment Quality in 2022

Downrating:

1042 Responses

Was justified by comprehensible findings statements
57%

592

43% say that downrating was not justified appropriately

was not justified at all
1%

15

60

Was not comprehensibly justified
6%

375

Was partly justified by the rules of the Automotive SPICE Guidelines
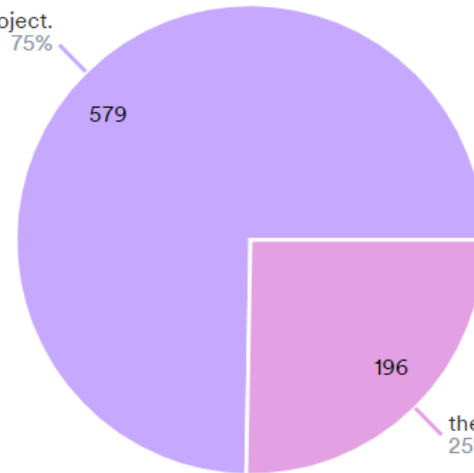36%

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Feedback from a VDA QMC Survey on Assessment Quality in 2022

In the interviews,

775 Responses

uestions were asked in order to capture the working methods in the project.
75%

579

25% say that BP and GP were purely used as formal checklist

196

the BP (base practices) and GP (generic practices) were queried like a checklist
25%

● open questions and closed questions were asked in order to capture the working methods in the project.
● the BP (base practices) and GP (generic practices) were queried like a checklist in order to fully grasp the process attributes.

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Examples that potentially influence assessment result reproducibility

- Are Notes normative or informative?

  NOTE 2: Supporting information typically includes the origin of the problem, how it can be reproduced, environmental information, by whom it has been detected, etc.

  If 'typical', then how can it be wrong to use this as minimum requirements?

- Some assessors

  - may find it appropriate to downrate when an aspect in a Note is missing

  - say: "Notes are informative material only. I check the supporting information for adequateness."

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Examples that potentially influence assessment result reproducibility

- Are Notes normative or informative?

  NOTE 3: A release numbering implementation may include
  - the major release number
  - the feature release number
  - the defect repair number
  - the alpha or beta release
  - the iteration within the alpha or beta release

- Is it not useful to regard this as a checklist? Is this a complete list? What if one of these aspect is more important than others?

- Some assessors

  - may find it appropriate to downrate if one of these aspects is missing

  - say "Notes are informative. I check the numbering scheme for adequateness in the context of the project."

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Examples that potentially influence assessment result reproducibility

Interpretation of terms

Is a '**Risk**'

- a combination of probability and impact, or

- a 'damaging event'?

There is no glossary entry how it shall be used in PAM v3.1

Is **'Risk measure'**

- a metric for evaluating and prioritizing risks, or

- an activity to avoid or mitigate the risk?

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Examples that potentially influence assessment result reproducibility

Interpretation of terms

Is **'Measure'**

- an activity to achieve a result

- a quantitative or qualitative result of a measurement

- a definition of a dimension or size?

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Factors that potentially influence assessment result reproducibility

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Conclusion:

The content of model and guideline definitely influences the assessment result.

Further important factors are:

- The degree of how the assessor understands the assessed context, and assessment purpose.

- The degree of how the assessor is able to objectively judge things, and independently (unbiased)

- Assessors' personal competencies (engineering knowledge, social skills, assessment experience)

To be further discussed in the afternoon workshop.

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Motivation for the PAM v4.0

- Achieve maximum repeatability & reproducibility of assessment results

- Improve assessment efficiency

- Reflect the current engineering state-of-the-art

- Address modern collaboration models

- Eliminate content redundancies

- Avoid misinterpretations

- Restructure the assessment model

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Major Changes in the PAM v4.0

Removed PAM v3.1 processes (11):

- ACQ.3   Contract Agreement
- ACQ.11   Technical Requirements
- ACQ.12   Legal and Administrative Requirements
- ACQ.13   Project Requirements
- ACQ.14   Request for Proposals
- ACQ.15   Supplier Qualification
- SUP.2   Verification
- SUP.4   Joint Review

- SUP.7   Documentation
- REU.2   Reuse Program Management
- SPL.1   Supplier Tendering

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Major Changes in the PAM v4.0

NEW Processes (15)

- HWE.1   Hardware Requirements Analysis*

- HWE.2   Hardware Design*

- HWE.3   Verification against Hardware Design*

- HWE.4   Verification against Hardware Requirements*

- MEE.1 – MEE.x Mechanical Engineering*

- MLE.1   Machine Learning Requirements Analysis

- MLE.2   Machine Learning Architectural Design

- MLE.3   Machine Learning Training

- MLE.4   Machine Learning Model Testing

- SUP.11   Data Management Machine Learning

- VAL.1   Validation

*) Taking the intacs™-developed models as the basis, courtesy of intacs™

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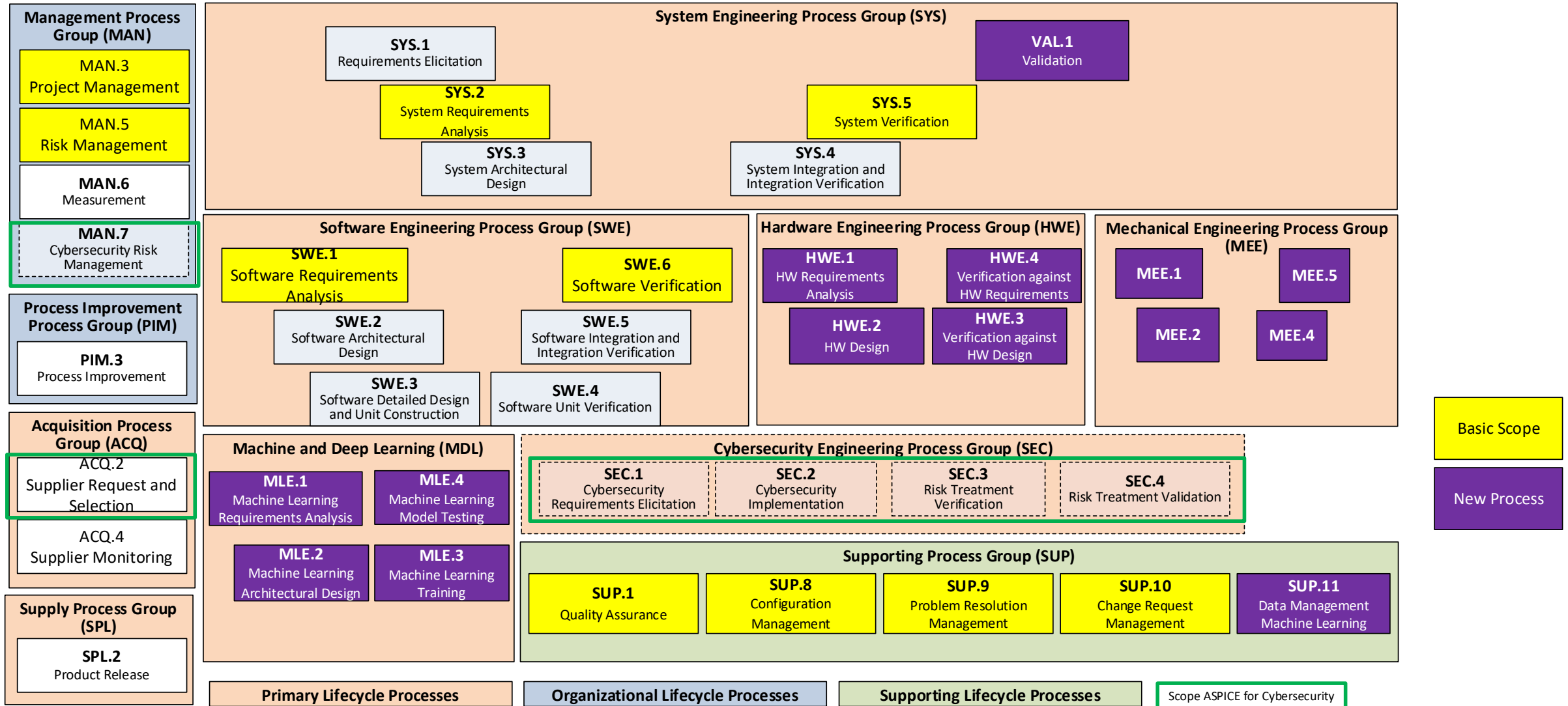Major Changes in the PAM v4.0

Revised Processes:

- SPL.2   Product Release

- MAN.5   Risk Management

- ACQ.4   Supplier Monitoring

- REU.2   Reuse Management

Other processes are adapted according to new concepts and the measurement framework used.

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Process Overview (Draft)

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Management Process Group (MAN)

MAN.3 Project Management

MAN.5 Risk Management

MAN.6 Measurement

MAN.7 Cybersecurity Risk Management

Process Improvement Process Group (PIM)

PIM.3 Process Improvement

Acquisition Process Group (ACQ)

ACQ.2 Supplier Request and Selection

ACQ.4 Supplier Monitoring

Supply Process Group (SPL)

SPL.2 Product Release

System Engineering Process Group (SYS)

SYS.1 Requirements Elicitation

SYS.2 System Requirements Analysis

SYS.3 System Architectural Design

SYS.5 System Verification

SYS.4 System Integration and Integration Verification

VAL.1 Validation

Software Engineering Process Group (SWE)

SWE.1 Software Requirements Analysis

SWE.6 Software Verification

SWE.2 Software Architectural Design

SWE.5 Software Integration and Integration Verification

SWE.3 Software Detailed Design and Unit Construction

SWE.4 Software Unit Verification

Hardware Engineering Process Group (HWE)

HWE.1 HW Requirements Analysis

HWE.4 Verification against HW Requirements

HWE.2 HW Design

HWE.3 Verification against HW Design

Mechanical Engineering Process Group (MEE)

MEE.1

MEE.5

MEE.2

MEE.4

Machine and Deep Learning (MDL)

MLE.1 Machine Learning Requirements Analysis

MLE.4 Machine Learning Model Testing

MLE.2 Machine Learning Architectural Design

MLE.3 Machine Learning Training

Cybersecurity Engineering Process Group (SEC)

SEC.1 Cybersecurity Requirements Elicitation

SEC.2 Cybersecurity Implementation

SEC.3 Risk Treatment Verification

SEC.4 Risk Treatment Validation

Supporting Process Group (SUP)

SUP.1 Quality Assurance

SUP.8 Configuration Management

SUP.9 Problem Resolution Management

SUP.10 Change Request Management

SUP.11 Data Management Machine Learning

Basic Scope

New Process

Primary Lifecycle Processes

Organizational Lifecycle Processes

Supporting Lifecycle Processes

Scope ASPICE for Cybersecurity

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Major Changes in the PAM v4.0

Changed Concepts

- Separate PAM for 'Potential Analysis'

- Notes with implicit requirements or checklist-like enumerations will be revised or rephrased

- Planning-related aspects shifted completely to Level 2

- Restructuring of Level 3 GP (level semantics remain unchanged)

- Work product characteristic replaced with the ISO 33060 concept of 'Information Item Characteristic' (IIC)

- Extra tables for BP and IIC mappings to Process Outcomes

- Traceability BP re-integrated into the consistency BP

- New basic scope

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Motivation - Why "ASPICE Potential analysis"?

With increasing complexity and integration, the automotive domain has to work across the industry with an ever-increasing number of candidate suppliers.

This creates the need for a fast, but trustworthy, assessment method to investigate suppliers' processes before nomination.

In fact, OEMs and Tier 1s have been working for years with 'customized' and proprietary Automotive SPICE model derivatives.

The "ASPICE based Potential analysis" is intended to close this gap by providing a unified and harmonized solution for this assessment use case.

Use cases:

1 - Supplier selection based on an exemplary project

2 - Supplier selection based on a "golden sample"

3 - Systematical gap analysis.

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Characteristics of "ASPICE Potential analysis"

- Risk evaluation instead of process compliance.

- Reduce risk of organizations with low process capability before nomination.

- Reduced assessment depth is reduced to enable shorter assessments.

- A Potential Analysis is *not* replacing an Automotive SPICE assessment

- Potential Analysis rating results not based on NPLF but rather red/yellow/green.

- Several processes are bundled in groups. Processes designed for flexible use .

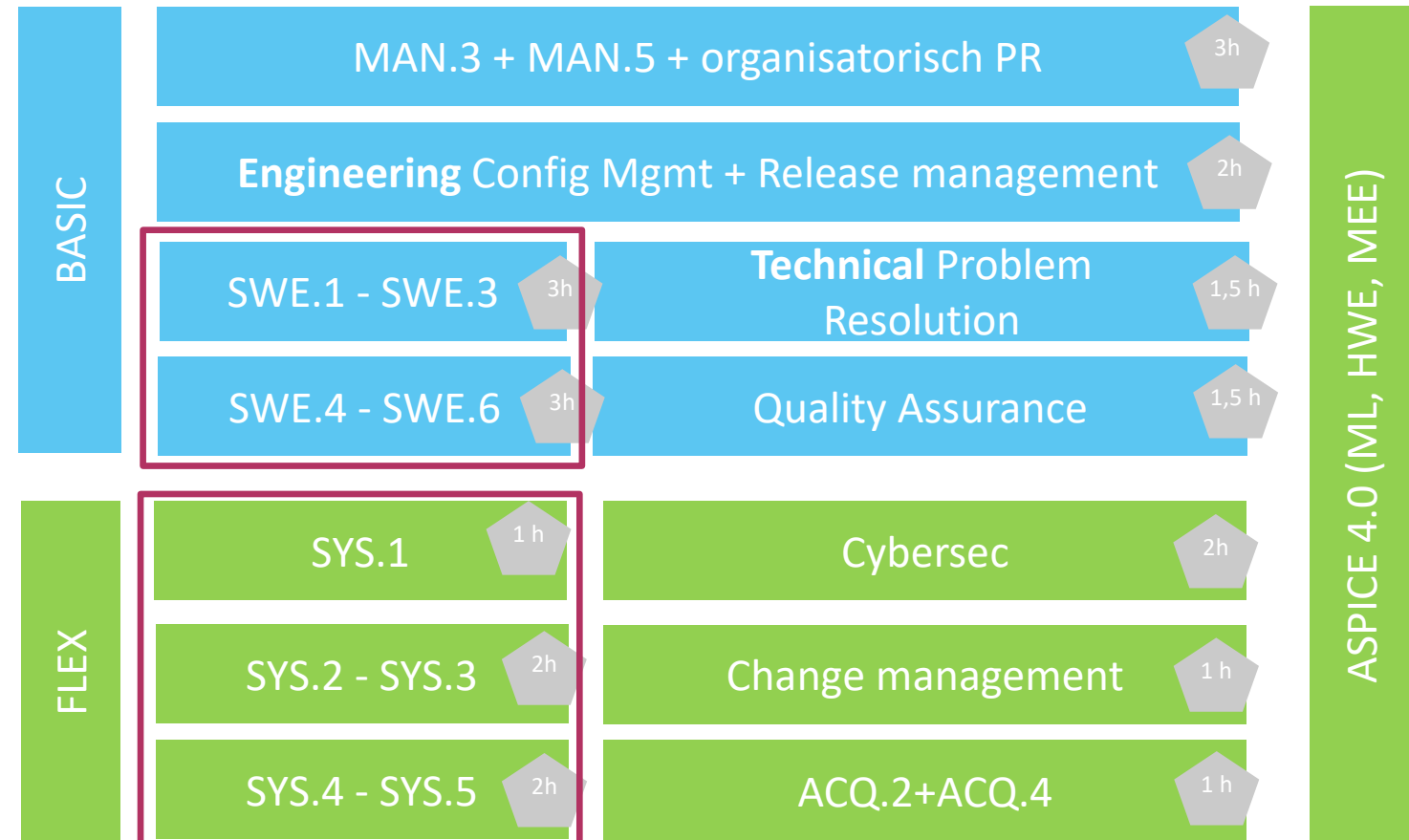- Potential analysis is to be performed by certified ASPICE assessors.

Similar approach as in VDA 6.3 "Potential Analysis" but with a focus on ASPICE Level 1 BPs.

Separate PAM with own rating scale and measurement framework

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Building blocks of "ASPICE Potential analysis" - BASIC and FLEX

- Scope consists of BASIC set with at least one plugin (SW, SYS, HWE..)
- Add FLEX processes as needed.
- Style and content in line with ASPICE 4.0.
- Engineering focus in configuration management and problem resolution
- Duration BASIC ~2 days

BASIC

MAN.3 + MAN.5 + organisatorisch PR	3h
Engineering Config Mgmt + Release management	2h
SWE.1 - SWE.3 (3h)	**Technical** Problem Resolution (1,5 h)
SWE.4 - SWE.6 (3h)	Quality Assurance (1,5 h)

FLEX

SYS.1 (1 h)	Cybersec (2h)
SYS.2 - SYS.3 (2h)	Change management (1 h)
SYS.4 - SYS.5 (2h)	ACQ.2+ACQ.4 (1 h)

ASPICE 4.0 (ML, HWE, MEE)

plugin

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Changed Concepts – Notes

Notes are to provide explanation of terms used in the BP texts or give examples.

However, in the PAM v3.1 they frequently imply mandatory content, or may appear as "checklists".

PAM V4.0:
Less examples to disourage the impression of „checklists".
Motivate the assessors to focus more on the actual assessed context.

PAM 3.1	PAM 4.0
NOTE 3: Project activities typically cover engineering, management and supporting processes.	*NOTE 4: Work packages from engineering, management and supporting processes may be organized in a work breakdown structure.*
NOTE 5: Examples of necessary resources are people, infrastructure (such as tools, test equipment, communication mechanisms...) and hardware/materials.	*NOTE 5: Examples of necessary resources are budget, people or infrastructure*

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The Measurement Framework – Planning aspects at Level 2

PA 2.1	Performance Management Attribute	PA 2.2	Documented Information Management Attribute
GP 2.1.1	Identify the objectives, and define a strategy for the performance of the process.	GP 2.2.1	Define the requirements for the documented information.
GP 2.1.2	Plan the performance of the process to fulfill the identified objectives.	GP 2.2.2	Define the requirements for documentation and control of the documented information.
GP 2.1.3	Monitor and adjust the performance of the process	GP 2.2.3	Identify and control the documented information.
GP 2.1.4	Define responsibilities, authorities and infrastructure needs.	GP 2.2.4	Review and adjust documented information to meet the defined requirements.
GP 2.1.5	Identify and make available personnel and infrastructure resources.		
GP 2.1.6	Manage the interfaces between involved parties.		

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The Measurement Framework – Clear structure at Level 3

PA 3.1	Process Definition Attribute	PA 3.2	Process Deployment Attribute
GP 3.1.1	Establish and maintain the standard process.	GP 3.2.1	Deploy a defined process.
GP 3.1.2	Determine the required competencies.	GP 3.2.2	Ensure required competencies for the defined roles.
GP 3.1.3	Determine the required infrastructure.	GP 3.2.3	Ensure required infrastructure.
GP 3.1.4	Determine suitable methods to monitor the standard/defined process.	GP 3.2.4	Monitor the performance of the (defined/deployed) process.

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Changed Concepts – Information Items

PAM 3.1	PAM 4.0
Work Breakdown Structure	Work Packages
Requirements specification	Requirements
Corrective action register	Corrective action

Focus is now on essential output of processes used directly as indicators – not on a "document".

Changed Concepts – Mapping Tables

- Better overview of BP and OII to outcome mapping

- Perfect basis for pocket guides

- Supports assessors

- Supports tool development

MAN.3 Project Management	Outcome 1	Outcome 2	Outcome 3	Outcome 4	Outcome 5	Outcome 6	Outcome 7	
Output Information item								
08-53 Scope of work	X							
14-xx Work package			X	X	X			
13-04 Communication record		X	X					
13-16 Change request							X	
13-19 Review record		X					X	
14-02 Corrective action register						X	X	
14-06 Schedule			X		X		X	
14-50 Stakeholder groups list				X				
15-06 Project status report				X		X		
Base Practices								
BP1: Define the sope of work	X							
BP2: Define project life cycle	X	X						
BP3: Evaluate feasibility of the project		X						
BP4: Define and monitor work breakdown structure			X	X	X		X	
BP5: Define and monitor project estimates and resources		X	X				X	
BP6: ensure required skills, knowledge, and experience			X				X	
BP7: Identify and monitor project interfaces and agreed commitments			X		X		X	
BP8: Define and monitor project schedule						X	X	
BP9: Ensure consistency			X	X	X		X	
BP10: Review and report progress of the project						X	X	

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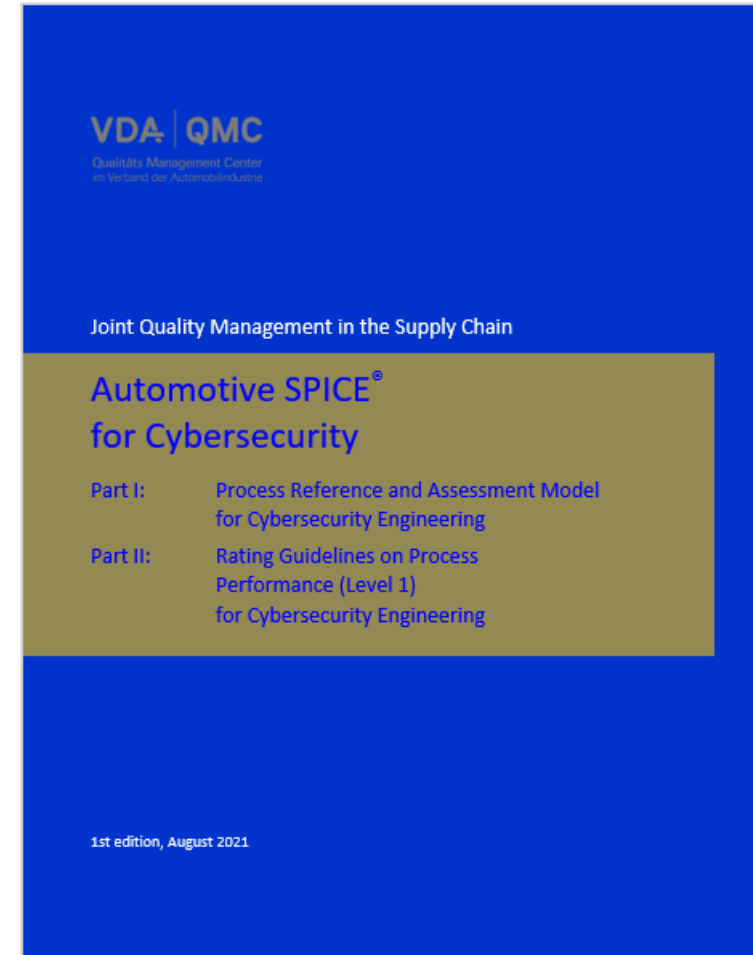Major Changes in the PAM v4.0

Usage of unambiguous terms:

- Metric   Now used wherever 'measure' indicates some measurement

- Measure   Now consequently used for an activity to achieve something

- Risk   Combination of impact and probability for an undesired event
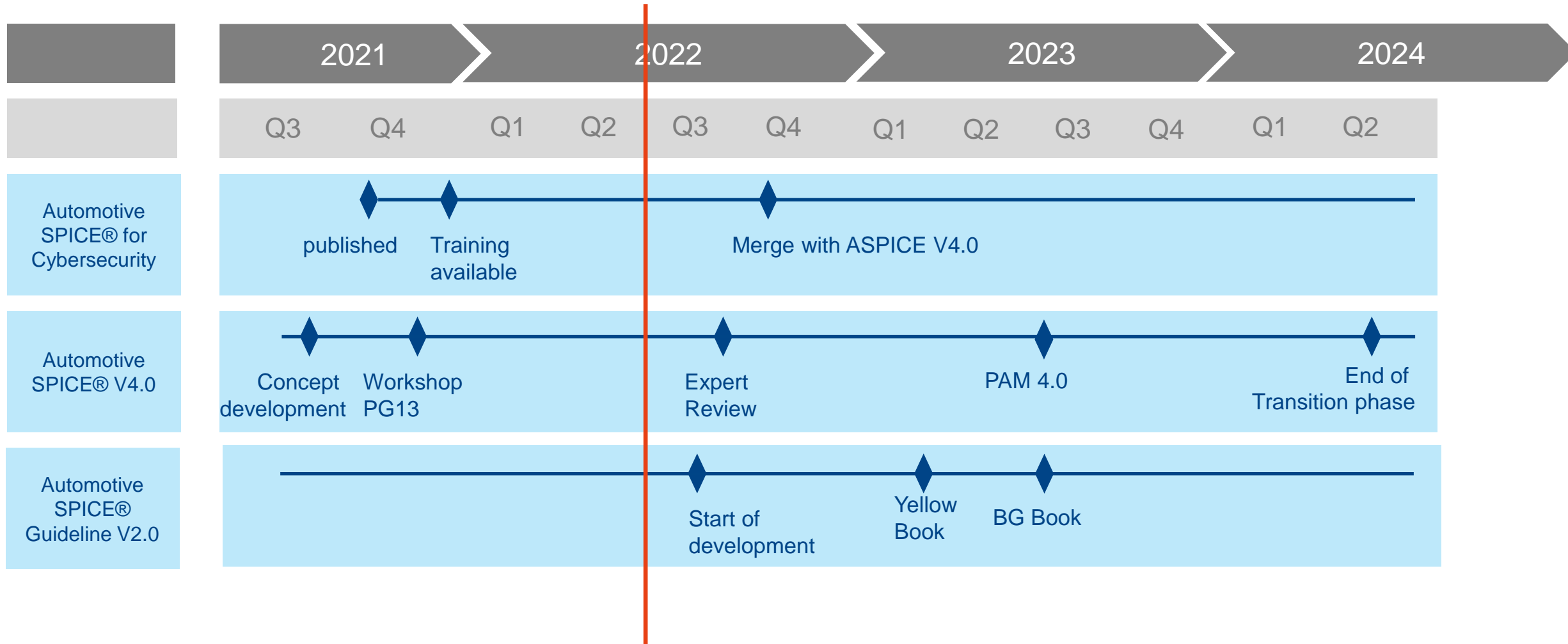
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Automotive SPICE ® for Cybersecurity

07/2021   Blue-Gold Book approved

09/2021   Blue-Gold Book available as Download

10/2021   Blue-Gold Book available as printed version

12/2021   Training material finalized by intacs

02/2022   Start of trainings

VDA | QMC
Qualitäts Management Center
im Verband der Automobilindustrie

Joint Quality Management in the Supply Chain

Automotive SPICE®
for Cybersecurity

Part I: Process Reference and Assessment Model
            for Cybersecurity Engineering
Part II: Rating Guidelines on Process
            Performance (Level 1)
            for Cybersecurity Engineering

1st edition, August 2021

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Roadmap

| | 2021 | | 2022 | | 2023 | | 2024 |

| | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 |

Automotive SPICE® for Cybersecurity

published — Training available — Merge with ASPICE V4.0

Automotive SPICE® V4.0

Concept development — Workshop PG13 — Expert Review — PAM 4.0 — End of Transition phase

Automotive SPICE® Guideline V2.0

Start of development — Yellow Book — BG Book

Thank You!

Questions welcome