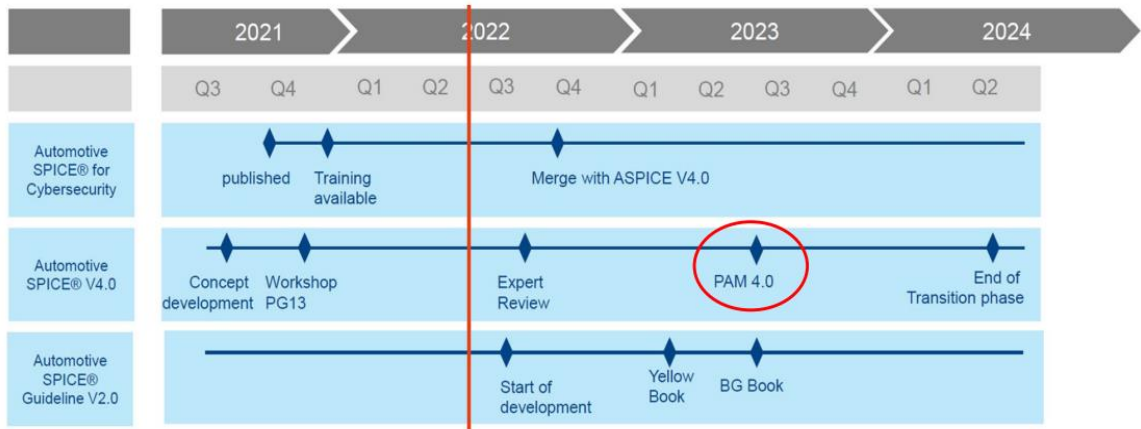# Outlook to Automotive SPICE v4.0

A-SPICE (Automotive Software Process Improvement dEtermination)은 ISO/IEC 15504를 기반으로 개발된 자동차 분야의 SW 개발 프로세스에 적용하고 표준 모델입니다.

현재 v3.1로 개정되어 산업계에서 활용하고 있고, 2023년 3분기에 v4.0 공식 배포가 계획되었습니다.

최근 VDA QMC (2022.11.09)는 HW PAM은 포함하고, ME PAM은 4.0에 포함하지 않는 것으로 결정하였습니다.

- Approval Automotive SPICE 4.0 Yellow Print (Draft) : 2023. 3월
- Approval/Publication Automotive SPICE 4.0 + Guideline : 2023년 9월 (transition to 2024. 6월)
- intacs Hardware Engineering PAM → Integrate in Automotive SPICE 4.0
- intacs Mechanical Engineering PAM → Do NOT Integrate in Automotive SPICE 4.0 yet
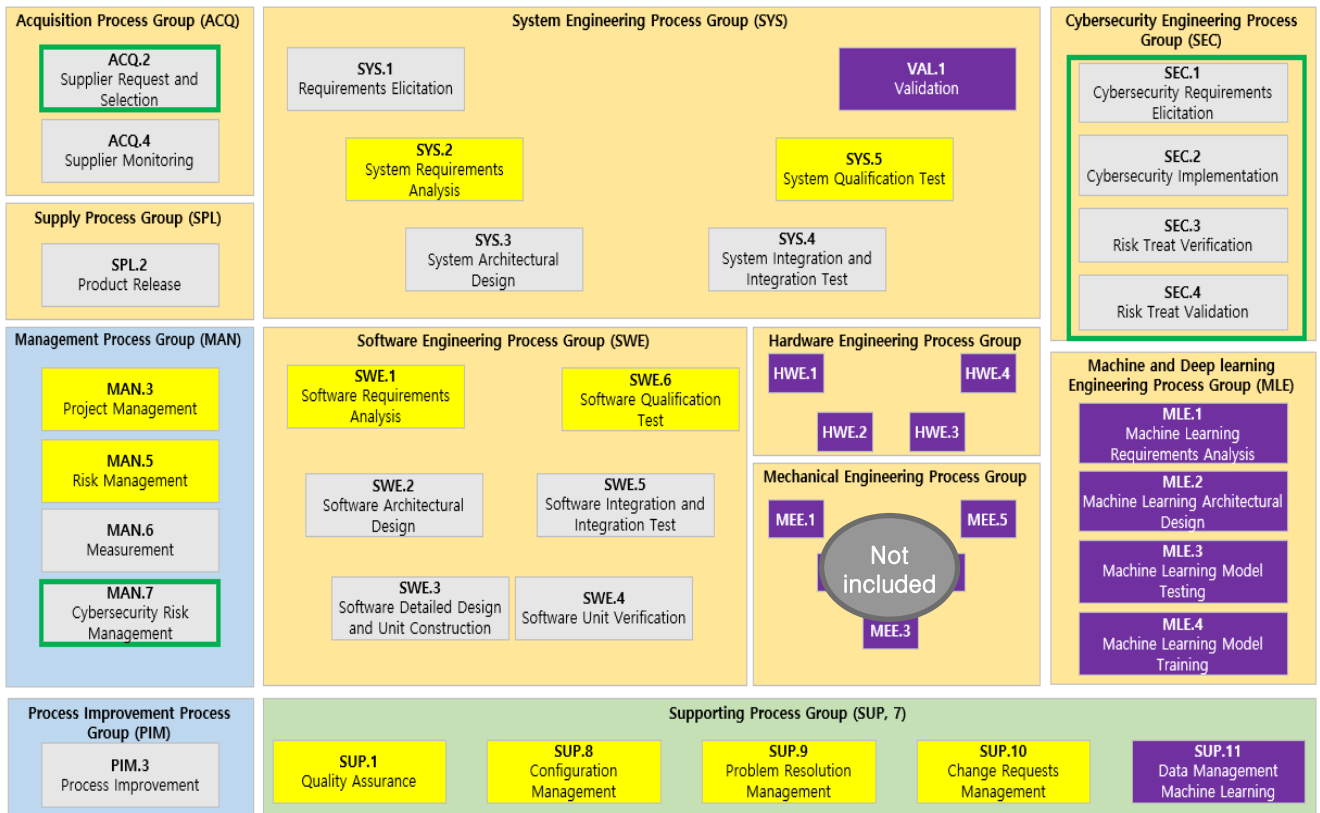- intacs Data Management PAM → Do NOT Integrate in Automotive SPICE 4.0 yet (Maybe 4.1)

Reference : intacs, 2022.10

SOLUTIONLINK
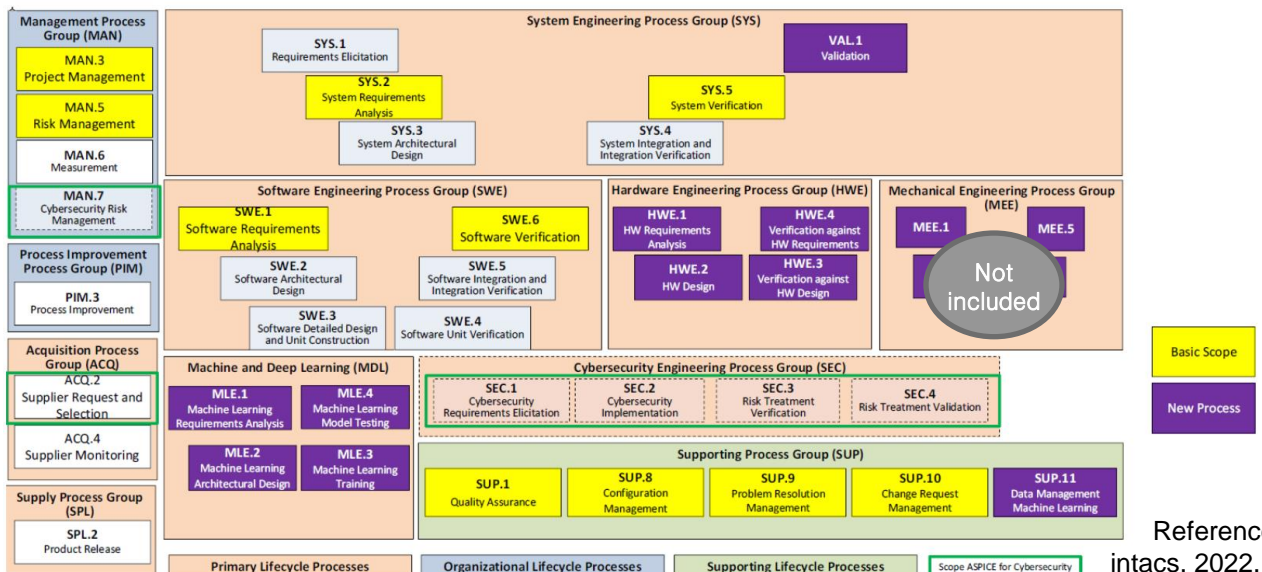
Key concept 1 — **Plan Changes Processes**

- 삭제 (11 processes): ACQ.4, ACQ.11 to 15, SUP.2, SUP.4, SUP.7, REU.2, SPL.1
- 포함 (6 processes): MAN.7, ACQ.2, SEC.1 to 4
  → ASPICE for Cybersecurity PAM의 프로세스가 포함될 예정입니다.
- 신규 (15 processes)
  - Hardware processes: HWE.1 to 4
  - ~~Mechanic processes: MEE.1 to 5~~ : 4.0 미포함으로 최종 결정
  - Machine learning processes: MLE.1 to 4,
  - SUP.11_Data Management Machine Learning
  - VAL.1_Validation
- 개정 (4 process +@)
  - Major changes: SPL.2, MAN.5, ACQ.4, REU.2
  - Small adaptions: all others if needed

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.4 System Integration and Integration Test
- SYS.5 System Qualification Test
- VAL.1 Validation

Cybersecurity Engineering Process Group (SEC)
- SEC.1 Cybersecurity Requirements Elicitation
- SEC.2 Cybersecurity Implementation
- SEC.3 Risk Treat Verification
- SEC.4 Risk Treat Validation

Management Process Group (MAN)
- MAN.3 Project Management
- MAN.5 Risk Management
- MAN.6 Measurement
- MAN.7 Cybersecurity Risk Management

Software Engineering Process Group (SWE)
- SWE.1 Software Requirements Analysis
- SWE.2 Software Architectural Design
- SWE.3 Software Detailed Design and Unit Construction
- SWE.4 Software Unit Verification
- SWE.5 Software Integration and Integration Test
- SWE.6 Software Qualification Test

Hardware Engineering Process Group
- HWE.1
- HWE.2
- HWE.3
- HWE.4

Mechanical Engineering Process Group
- MEE.1
- MEE.3
- MEE.5
- Not included

Machine and Deep learning Engineering Process Group (MLE)
- MLE.1 Machine Learning Requirements Analysis
- MLE.2 Machine Learning Architectural Design
- MLE.3 Machine Learning Model Testing
- MLE.4 Machine Learning Model Training

Process Improvement Process Group (PIM)
- PIM.3 Process Improvement

Supporting Process Group (SUP, 7)
- SUP.1 Quality Assurance
- SUP.8 Configuration Management
- SUP.9 Problem Resolution Management
- SUP.10 Change Requests Management
- SUP.11 Data Management Machine Learning

Legend: Primary Life Cycle Processes | Organizational Life Cycle Processes | Supporting Life Cycle Processes | Basic Scope | New Process | Scope of ASPICE Cybersecurity

출처: intacs information letter(2022.10)

Key concept 2　Plan Changes BPs (Base Practices)

2-1: Mapping tables BP and "Information Item" to process outcome

기존의 "work products"는 "output information item"으로 용어가 변경되었고, ISO 33060 concept 기반으로 BP, output information item과 process outcome의 mapping table이 추가될 예정입니다.

이것은 가이드 개발하는 컨설턴트, 심사원, 도구 개발자들에게 도움을 줄 것으로 예상됩니다.

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	

출처: intacs information letter(2022.10)

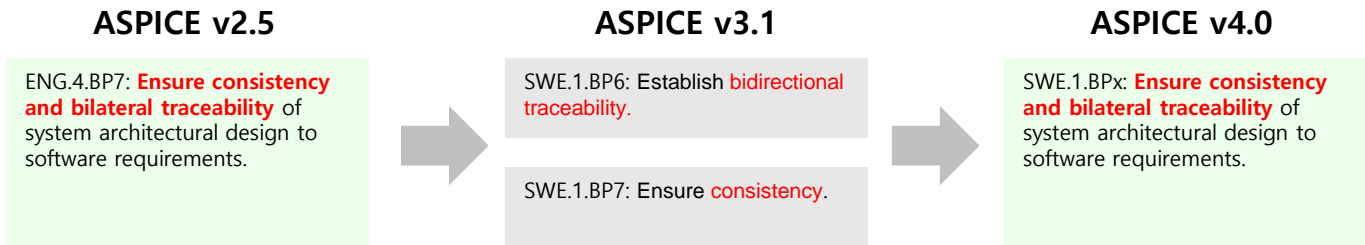SOLUTIONLINK

Key concept 2 — Plan Changes BPs (Base Practices)

2-2: Re-integrated Traceability into Consistency

- Traceability 관련 BP들은 과거 ASPICE v2.5에서 정의한 바와 같이 Consistency와 통합되는 것으로 변경될 예정입니다.

ASPICE v2.5

ENG.4.BP7: **Ensure consistency and bilateral traceability** of system architectural design to software requirements.

ASPICE v3.1

SWE.1.BP6: Establish bidirectional traceability.

SWE.1.BP7: Ensure consistency.

ASPICE v4.0

SWE.1.BPx: **Ensure consistency and bilateral traceability** of system architectural design to software requirements.

2-3: Revision of Notes

- BP에서 기술되는 Note에서 표현하는 내용이 보다 명확히 변경될 예정입니다.

ASPICE v3.1 - MAN3.BP4

NOTE 3: Project activities typically cover engineering, management and supporting processes.

엔지니어링, 관리, 지원 업무가 프로젝트 활동 계획에 포함되어야 한다는 **[체크리스트]** 성격의 내용

ASPICE v3.1 - MAN3.BPx

NOTE x: Work packages form engineering, management and supporting processes may be organized in work breakdown structure.

업무 패키지는 WBS에서 엔지니어링, 관리, 지원 프로세스 업무로 구성될 수 있다는 **[실무를 고려한]** 내용

2-4: Planning-aspect shifted to Level 2

- Level 1 에서 정의하는 전략(Strategy) 관련 내용들은 모두 Level 2 GP에서 정의하는 것으로 변경됨

출처: intacs information letter(2022.10)

Key concept 3 — Plan Changes GPs (General Practices)

PA (Process attributes) 2.1, 2.2

- PA 2.1: 기존 GP 2.1.3과 2.1.4를 APICE 4.0의 2.1.4으로 통합됨
- PA 2.2: 기존 SUP.7(Documentation)를 ASPICE 4.0의 2.2.3으로 대체함

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.		

PA (Process attributes) 3.1, 3.2

- PA 3.1: 기존 GP 3.1.2를 ASPICE 4.0의 GP 3.1.1로 통합됨
- PA 3.2: 기존 6개 GP를 단순화하여 4개의 GP로 통합됨

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.

출처: intacs information letter(2022.10)
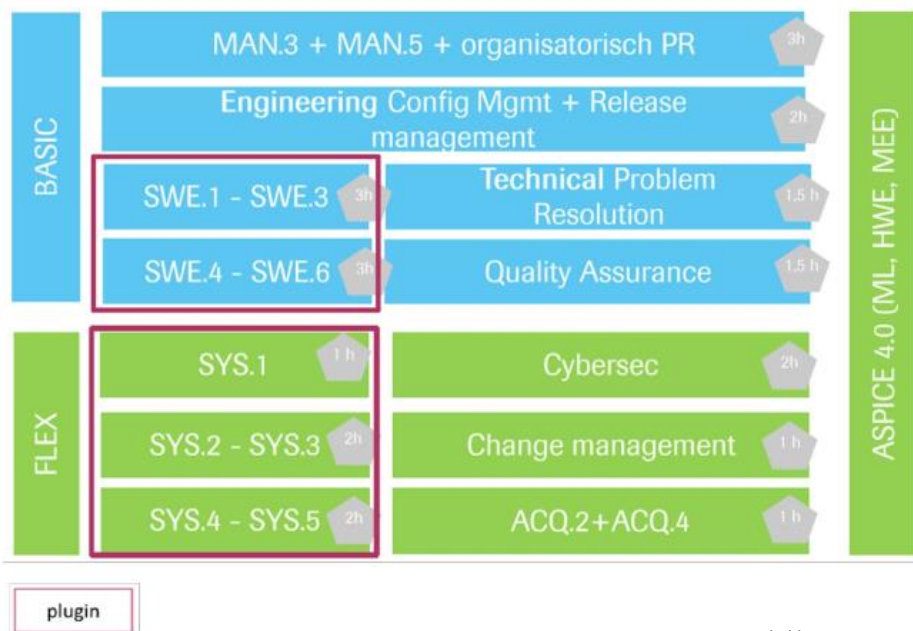
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Key concept 4 — Separate PAM for "Potential Analysis"

기존의 Gap analysis와 같은 활동이 VDA 6.3 "Potential Analysis"와 유사한 접근 방식으로 새롭게 정의되었습니다.

Potential Analysis는 ASPICE PAM과 분리되어 정의되지만, ASPICE 레벨 1 BP에 초점을 맞춰 진행하게 됩니다.

Potential Analysis에서 정의될 주요사항은 다음과 같습니다.

- **Risk evaluation instead of process compliance**
- **Reduce risk of organizations with low process capability before nomination**
- **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 Automotive SPICE® assessors**
- **Scope consists of BASIC set with at least one plugin (SW, HWE, ...). Add FLEX processes as needed.**
- **Style and content in line with Automotive SPICE® 4.0**
- **Engineering focus in configuration management and problem resolution**
- **Duration BASIC ~2 days**

출처: intacs information letter(2022.10)