intacs™ SPICE Assessors today and tomorrow – Skills and training requirements for new topics such as Cybersecurity

Bernhard Sechser

30. November 2021

Agenda

- The “new” Challenge in Automotive Industry – Cybersecurity
- But there is more – Further Assessment Models
- Are we able to deal with all that stuff? –
  Assessor Skills and Certification Levels
- Like in real projects – intacs™ Training Architecture
- What comes next? – intacs™ Roadmap

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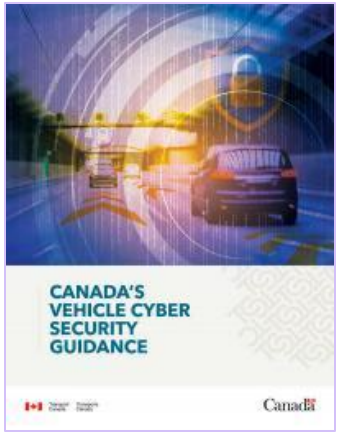
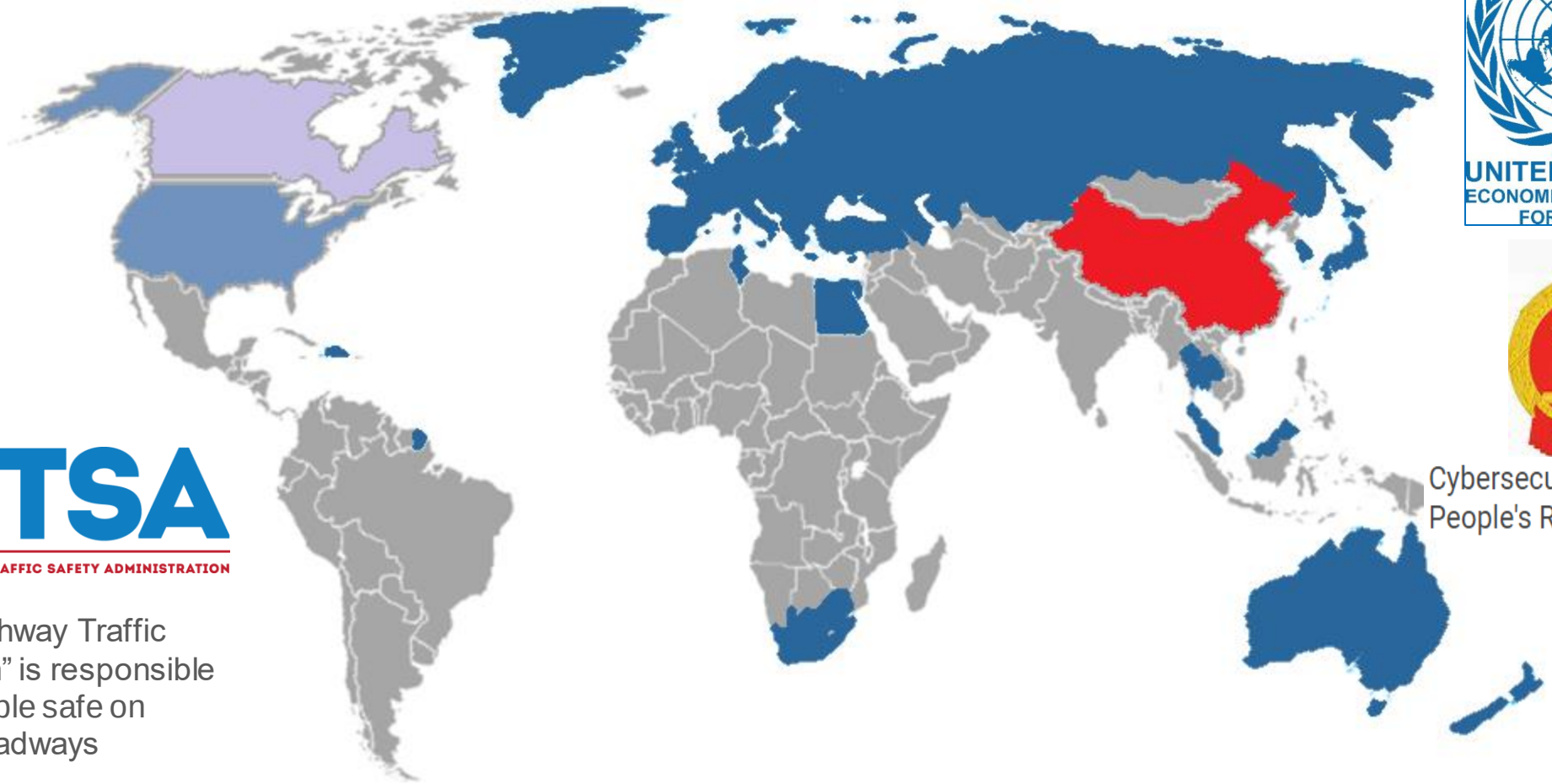
Some selected markets and regulations





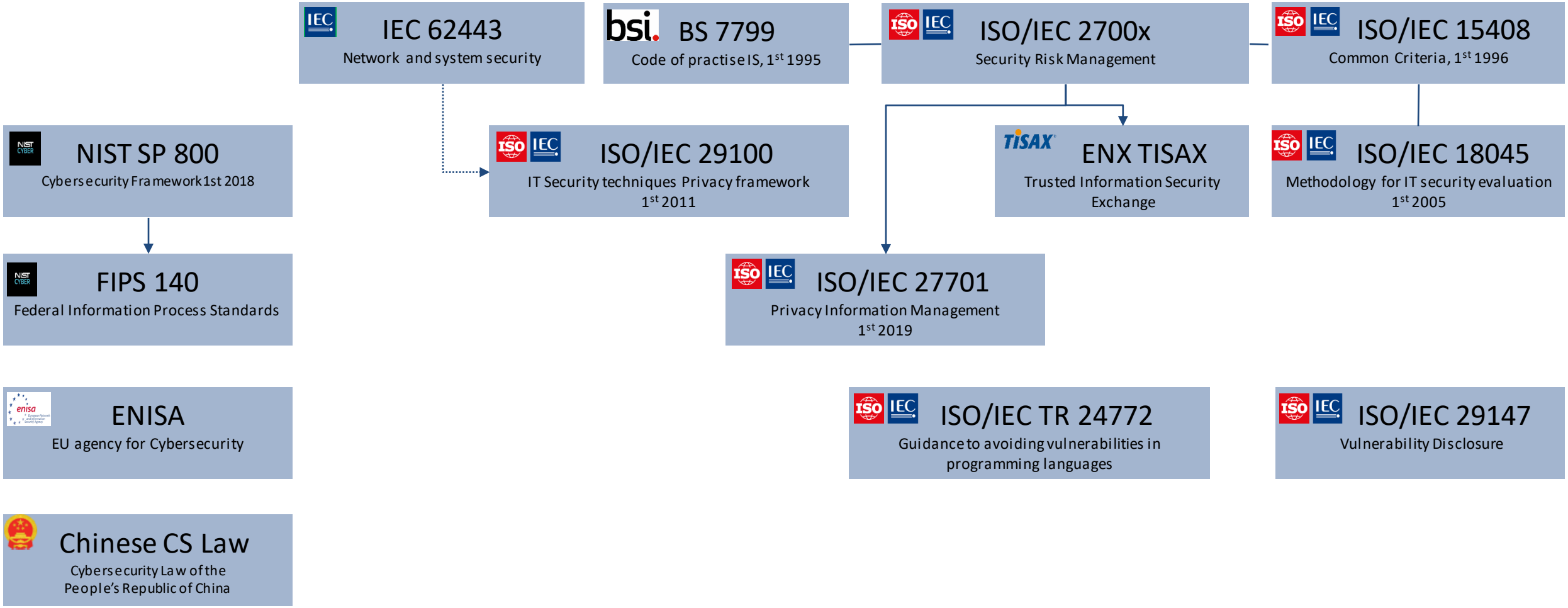
UNITED NATIONS
ECONOMIC COMMISSION
FOR EUROPE

Cybersecurity Law of the
People's Republic of China

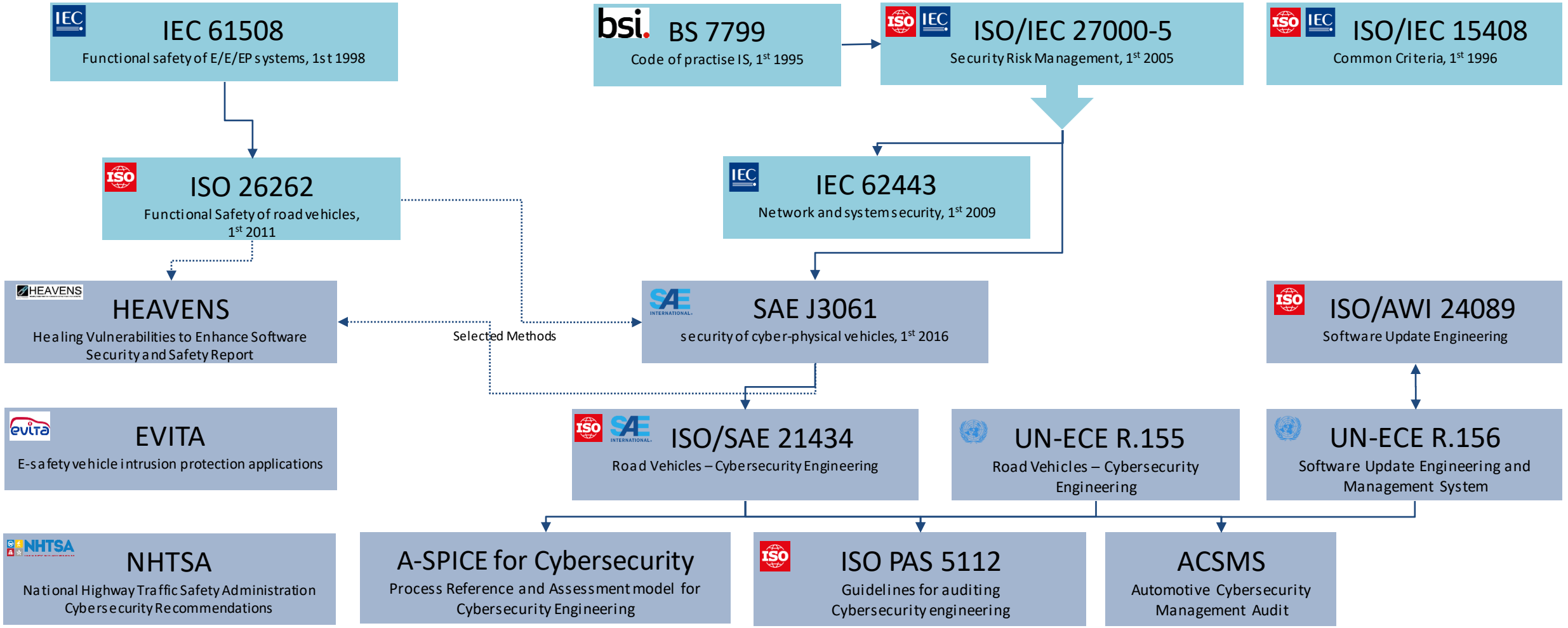
NHTSA
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

The “National Highway Traffic Safety Administration” is responsible for keeping people safe on America’s roadways

Security Standards in general



Security Standards in Automotive



UN Regulations to become Legal Requirements

UN Regulation No. 155:

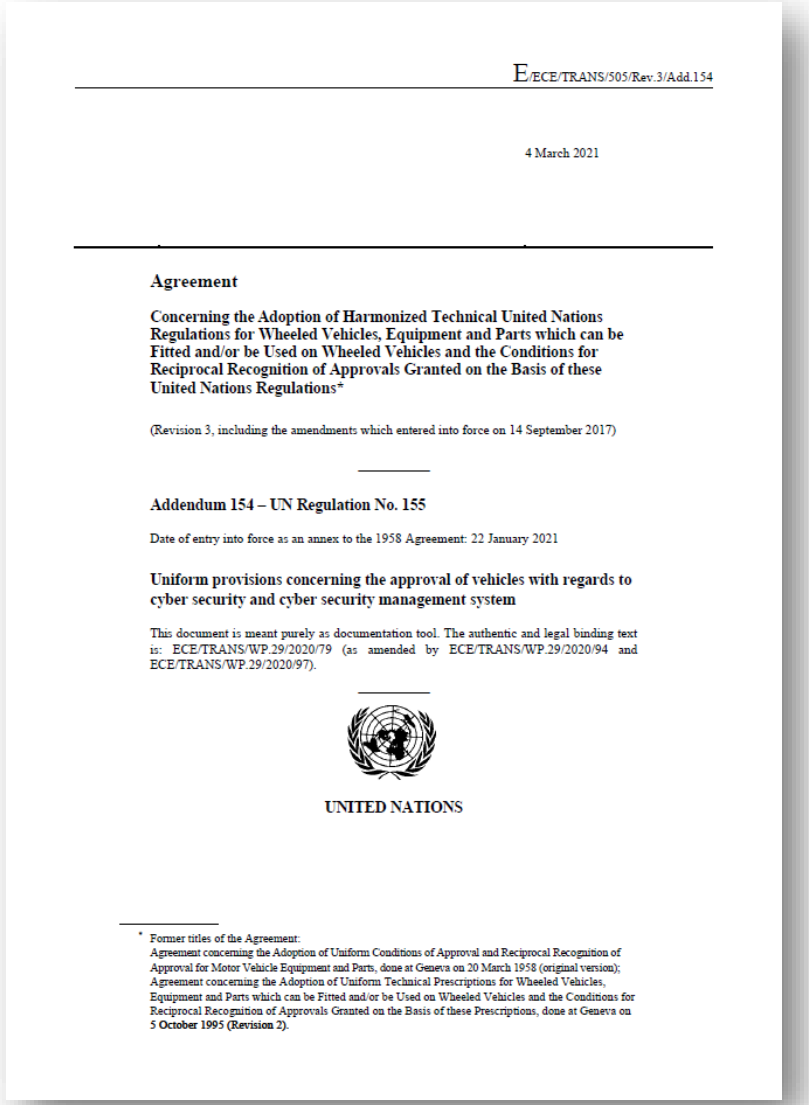
Uniform provisions concerning the approval of vehicles with regards to cyber security and cyber security management system

7.3. Requirements for vehicle types

7.3.1. The manufacturer shall have a valid Certificate of Compliance for the Cyber Security Management System relevant to the vehicle type being approved.

However, for type approvals prior to 1 July 2024, if the vehicle manufacturer can demonstrate that the vehicle type could not be developed in compliance with the CSMS, then the vehicle manufacturer shall demonstrate that cyber security was adequately considered during the development phase of the vehicle type concerned.

Source: UNECE No. 155



E/ECE/TRANS/505/Rev.3/Add.154

4 March 2021

Agreement

Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations*

(Revision 3, including the amendments which entered into force on 14 September 2017)

Addendum 154 – UN Regulation No. 155

Date of entry into force as an annex to the 1958 Agreement: 22 January 2021

Uniform provisions concerning the approval of vehicles with regards to cyber security and cyber security management system

This document is meant purely as documentation tool. The authentic and legal binding text is: ECE/TRANS/WP.29/2020/79 (as amended by ECE/TRANS/WP.29/2020/94 and ECE/TRANS/WP.29/2020/97).

UNITED NATIONS

* Former titles of the Agreement:
Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958 (original version);
Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, done at Geneva on 5 October 1995 (Revision 2).

UN Regulations to become Legal Requirements

UN Regulation No. 155:

Uniform provisions concerning the approval of vehicles with regards to cyber security and cyber security management system

7.3.4. The vehicle manufacturer shall protect the vehicle type against risks identified in the vehicle manufacturer's risk assessment. Proportionate mitigations shall be implemented to protect the vehicle type. The mitigations implemented shall include all mitigations referred to in Annex 5, Part B and C which are relevant for the risks identified. However, if a mitigation referred to in Annex 5, Part B or C, is not relevant or not sufficient for the risk identified, the vehicle manufacturer shall ensure that another appropriate mitigation is implemented.

In particular, for type approvals prior to 1 July 2024, the vehicle manufacturer shall ensure that another appropriate mitigation is implemented if a mitigation measure referred to in Annex 5, Part B or C is technically not feasible. The respective assessment of the technical feasibility shall be provided by the manufacturer to the approval authority.

Source: UNECE No. 155

Annex 5

List of threats and corresponding mitigations

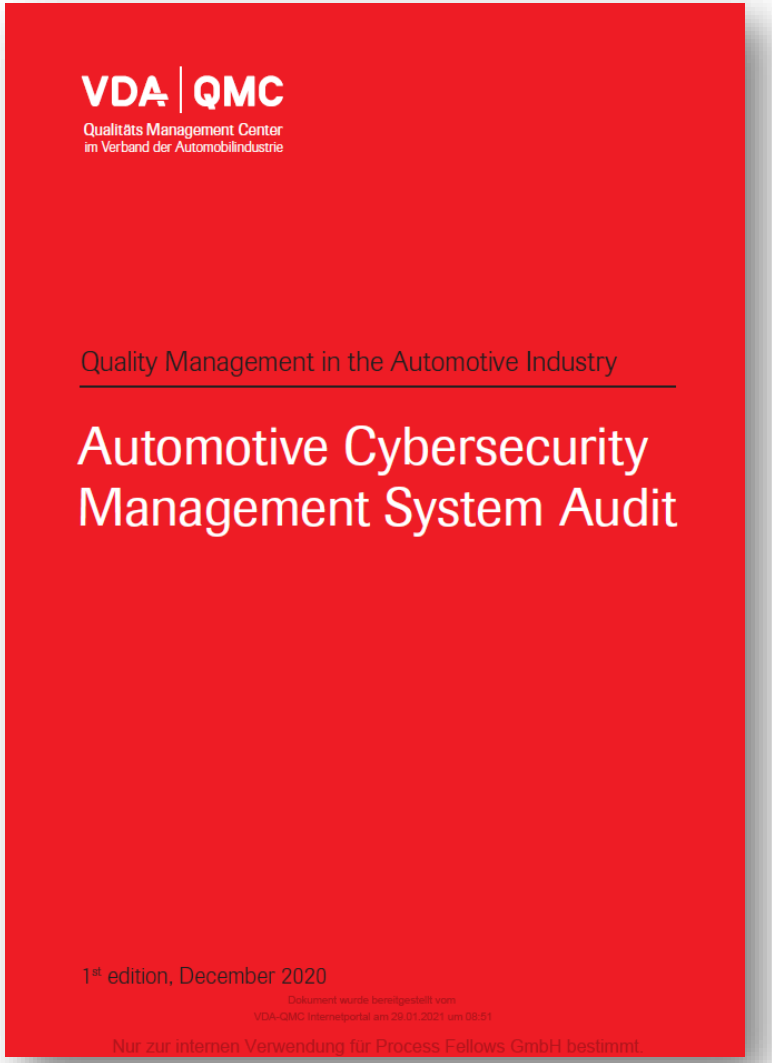
1. This annex consists of three parts. Part A of this annex describes the baseline for threats, vulnerabilities and attack methods. Part B of this annex describes mitigations to the threats which are intended for vehicle types. Part C describes mitigations to the threats which are intended for areas outside of vehicles, e.g. on IT backends.
2. Part A, Part B, and Part C shall be considered for risk assessment and mitigations to be implemented by vehicle manufacturers.
3. The high-level vulnerability and its corresponding examples have been indexed in Part A. The same indexing has been referenced in the tables in Parts B and C to link each of the attack/vulnerability with a list of corresponding mitigation measures.
4. The threat analysis shall also consider possible attack impacts. These may help ascertain the severity of a risk and identify additional risks. Possible attack impacts may include:
   (a) Safe operation of vehicle affected;
   (b) Vehicle functions stop working;
   (c) Software modified, performance altered;
   (d) Software altered but no operational effects;
   (e) Data integrity breach;
   (f) Data confidentiality breach;
   (g) Loss of data availability;
   (h) Other, including criminality.

VDA QMC Answer – Part 1

1 Introduction

The United Nations Economic Commission for Europe (UNECE) has formulated requirements for cybersecurity management systems of OEMs[1]. The European Union will transpose the requirements defined by the UNECE (UN Regulation No. 155) into EU law. According to the current status, this law will be applied as of July 2022, within the approval of new vehicles types.

The UN regulation No. 155 formulates requirements but does not define rating criteria or a rating scheme for CSMS audit. Such criteria and rating scheme are proposed in this *VDA Automotive Cybersecurity Management System Audit* volume.

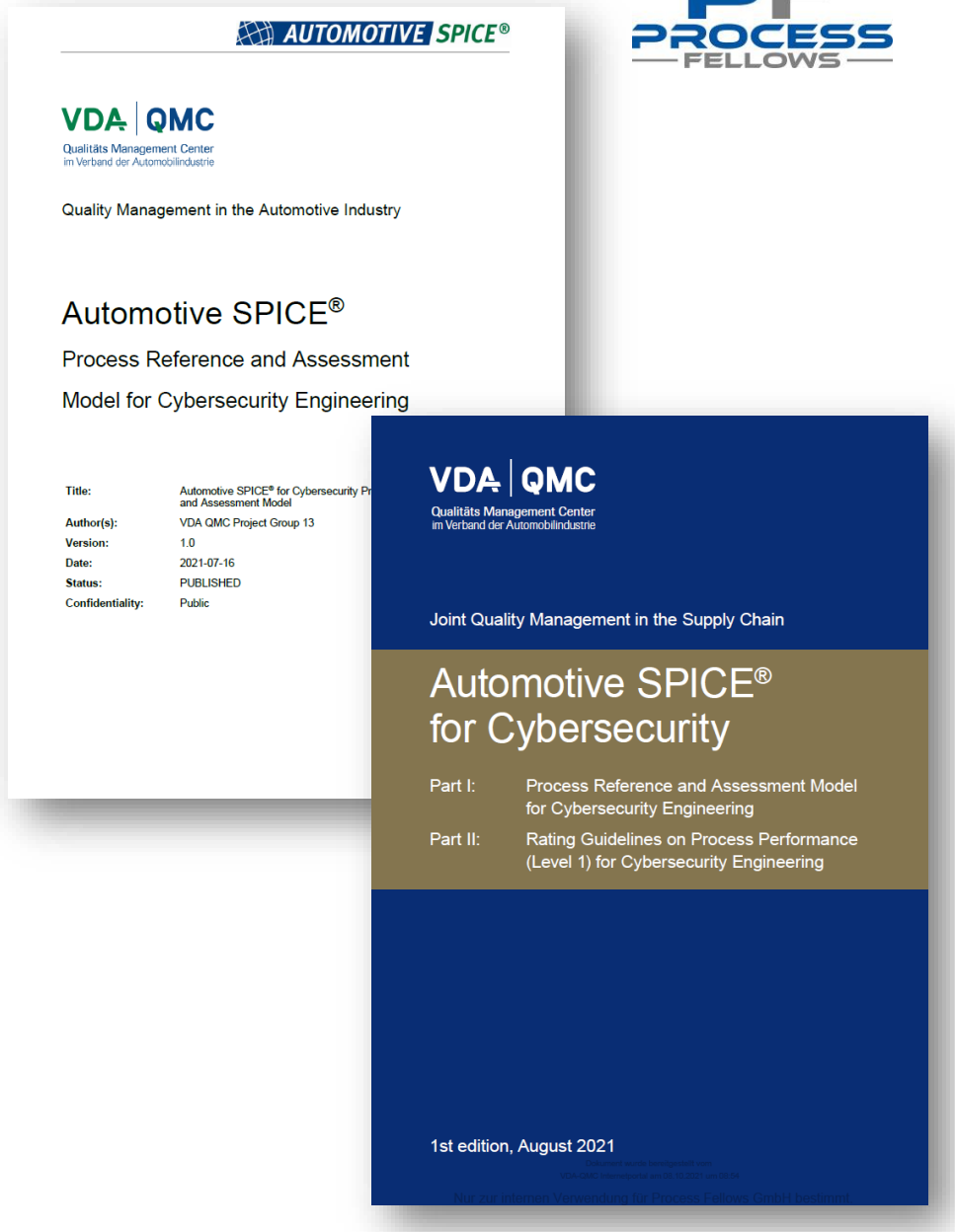


Source: VDA QMC Automotive Cybersecurity Management System Audit

VDA QMC Answer – Part 2

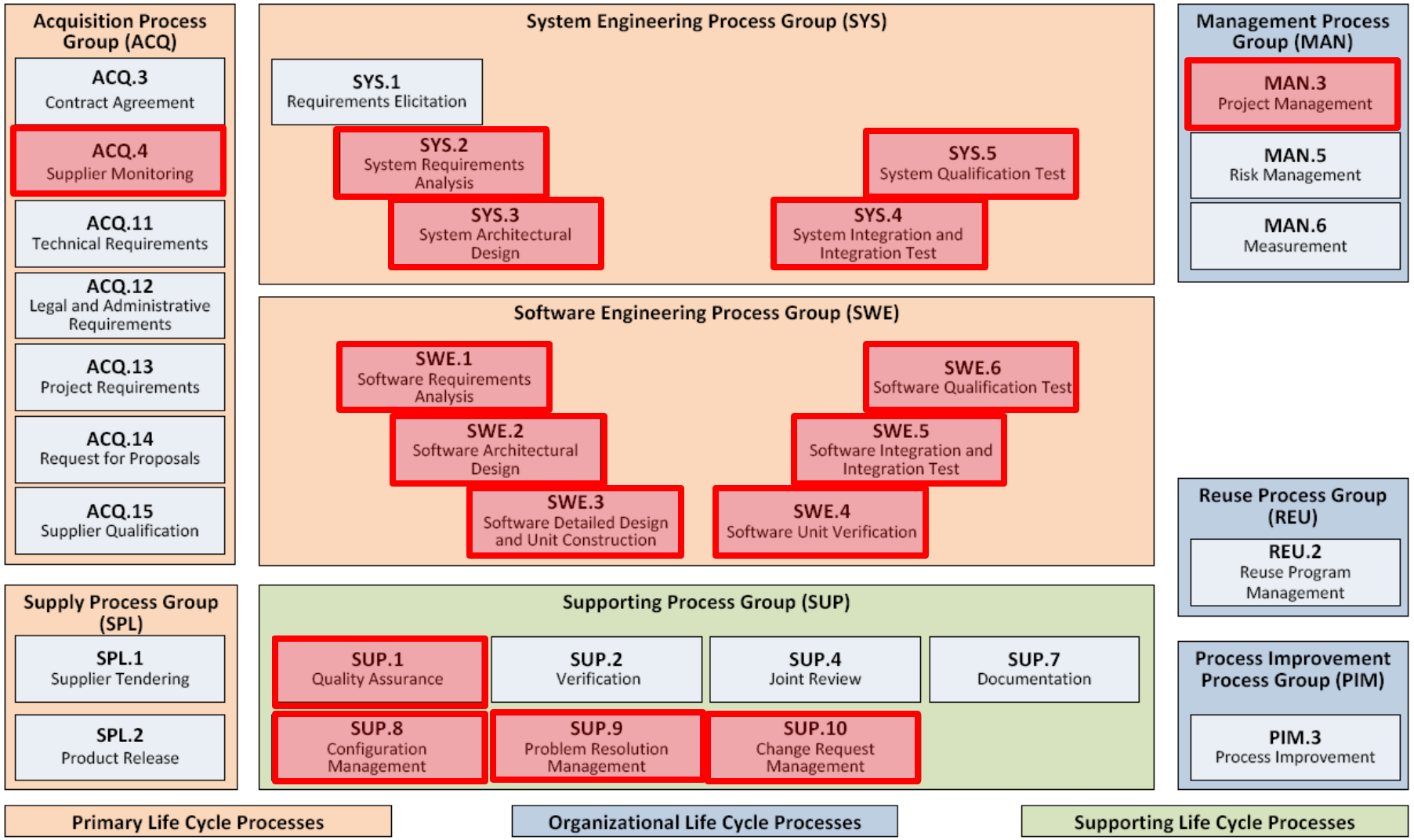
Scope

The UNECE regulation R155 requires, among others, that the vehicle manufacturer identify and manage cybersecurity risks in the supply chain. Automotive SPICE is a process assessment model, when used with an appropriate assessment method, which helps to identify process-related product risks. To incorporate cybersecurity-related processes into the proven scope of Automotive SPICE, additional processes have been defined in a Process Reference and Assessment Model for Cybersecurity Engineering (Cybersecurity PAM).



Source: VDA QMC Automotive SPICE® for Cybersecurity

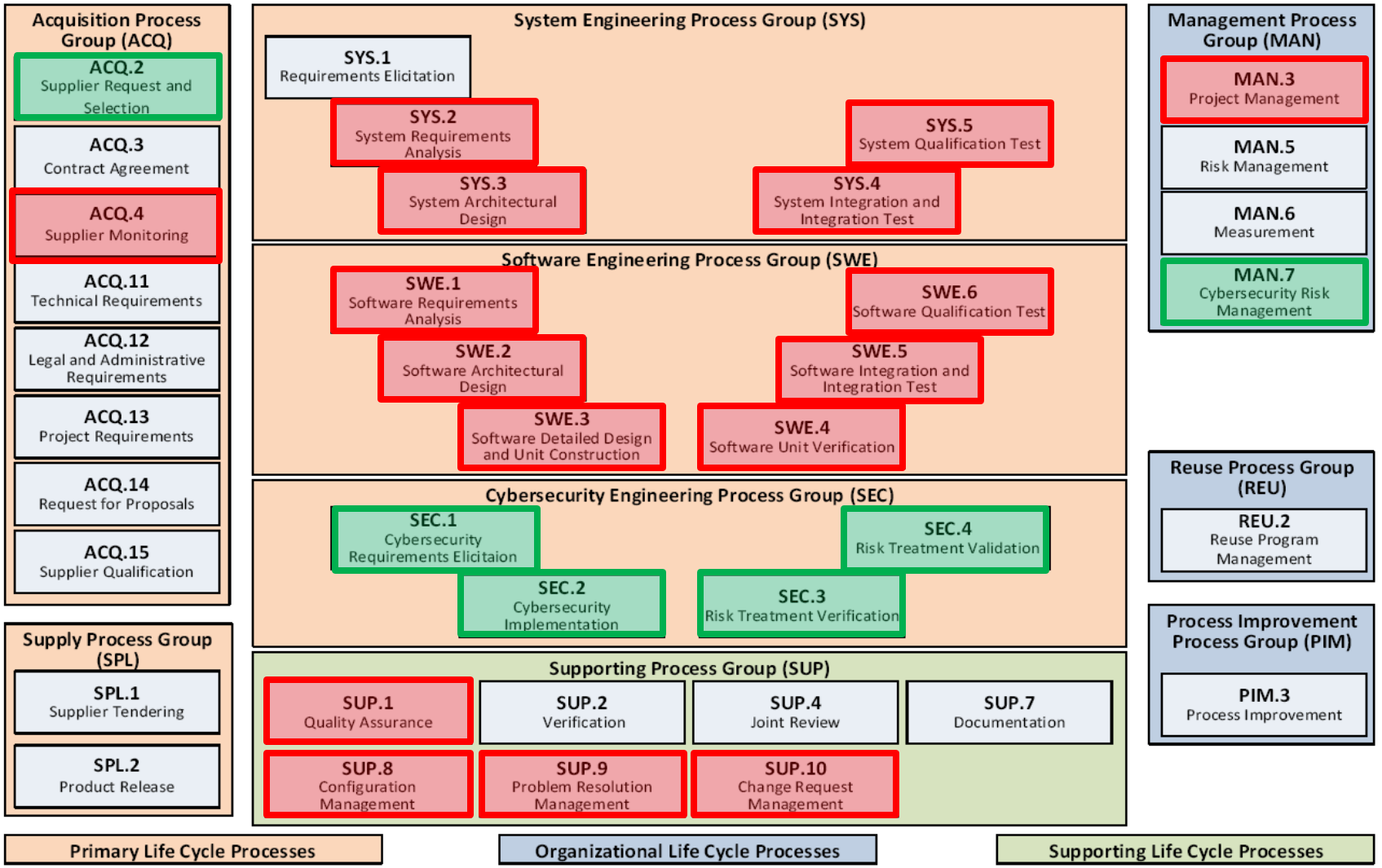
Automotive SPICE® 3.1 Process Reference Model



Source: VDA QMC Automotive SPICE® v3.1

VDA Scope

Integrated Automotive SPICE® 3.1 and Automotive SPICE® for Cybersecurity Process Reference Model



Source: VDA QMC Automotive SPICE® for Cybersecurity

VDA Scope

Cybersecurity Scope

Automotive SPICE® Compliance – Now „really“ important !

Target Profile for **PASSED**

Automotive SPICE VDA Scope

Process	PA 1.1
ACQ.4 Supplier Monitoring	F
SYS.2 System Requirements Analysis	F
SYS.3 System Architectural Design	F
SYS.4 System Integration and Integration Test	F
SYS.5 System Qualification Test	F
SWE.1 Software Requirements Analysis	F
SWE.2 Software Architectural Design	F
SWE.3 Software Detailed Design and Unit Construction	F
SWE.4 Software Unit Verification	F
SWE.5 Software Integration and Integration Test	F
SWE.6 Software Qualification Test	F
SUP.1 Quality Assurance	L
SUP.8 Configuration Management	L
SUP.9 Problem Resolution Management	F
SUP.10 Change Request Management	F
MAN.3 Project Management	L

Automotive SPICE for Cybersecurity

Process	PA 1.1
ACQ.2 Supplier request and selection	F
ACQ.4 Supplier Monitoring*	F
SEC.1 Cybersecurity Requirements Elicitation	F
SEC.2 Cybersecurity Implementation	F
SEC.3 Risk Treatment Verification	F
SEC.4 Risk Treatment Validation	F
MAN.7 Project Management *	F
SUP.1 Quality Assurance**	F
SUP.8 Configuration Management**	F

Target Profile for **PASSED WITH CONDITIONS**

Automotive SPICE VDA Scope

Process	PA 1.1
ACQ.4 Supplier Monitoring	L
SYS.2 System Requirements Analysis	L
SYS.3 System Architectural Design	L
SYS.4 System Integration and Integration Test	L
SYS.5 System Qualification Test	L
SWE.1 Software Requirements Analysis	L
SWE.2 Software Architectural Design	L
SWE.3 Software Detailed Design and Unit Construction	L
SWE.4 Software Unit Verification	L
SWE.5 Software Integration and Integration Test	L
SWE.6 Software Qualification Test	L
SUP.1 Quality Assurance	L
SUP.8 Configuration Management	L
SUP.9 Problem Resolution Management	L
SUP.10 Change Request Management	L
MAN.3 Project Management	L

Automotive SPICE for Cybersecurity

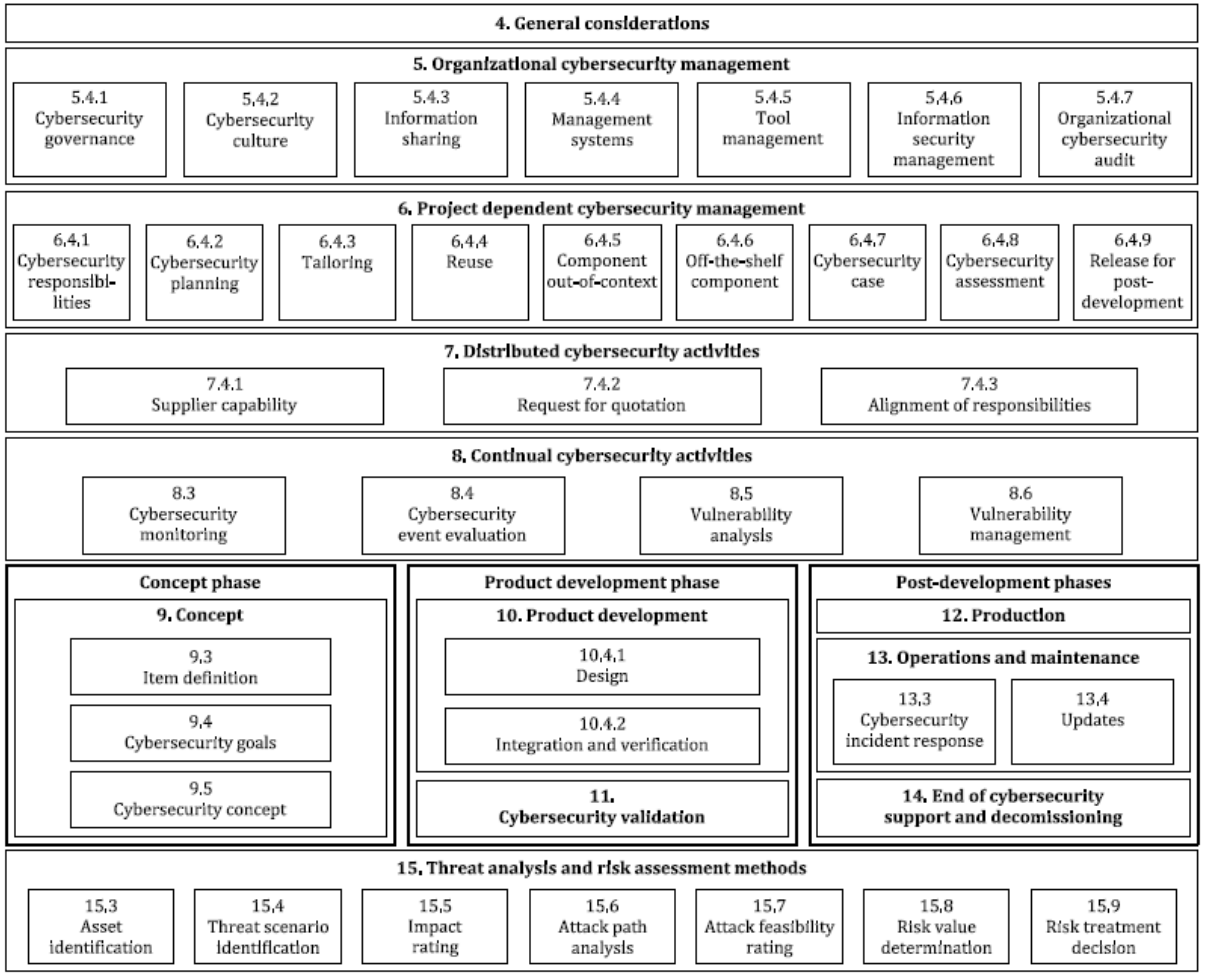
Process	PA 1.1
ACQ.2 Supplier Request and Selection	L
ACQ.4 Supplier Monitoring*	L
SEC.1 Cybersecurity Requirements Elicitation	L
SEC.2 Cybersecurity Implementation	L
SEC.3 Risk Treatment Verification	L
SEC.4 Risk Treatment Validation	L
MAN.7 Project Management *	L
SUP.1 Quality Assurance**	L
SUP.8 Configuration Management**	L

Type Approval (homologation) recommendation

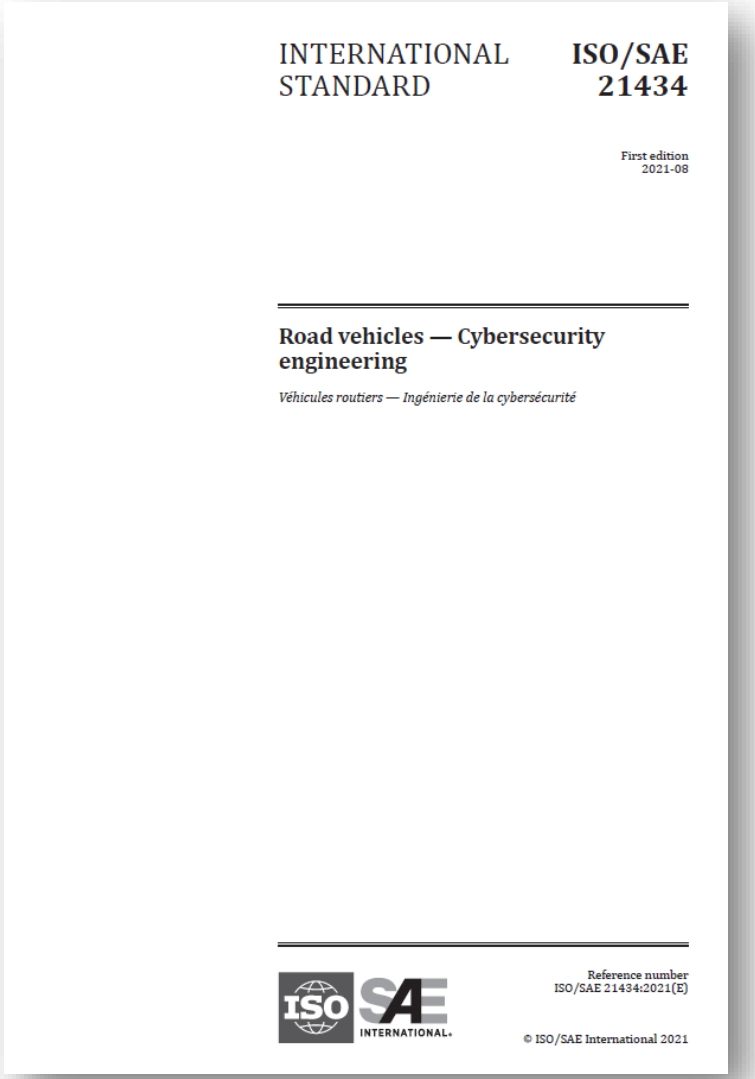
Source: VDA QMC Automotive SPICE® for Cybersecurity

* Should be
MAN.3 Project Management
MAN.7 Cybersecurity Risk Management

ISO/SAE 21434 – Road Vehicles – Cybersecurity Engineering



Source: ISO/SAE 21434:2021



VDA QMC Answer – Part 3

Relation to ISO/SAE 21434

The purpose of an Automotive SPICE assessment is to identify systematic weaknesses in the primary lifecycle processes, management processes, and support processes.

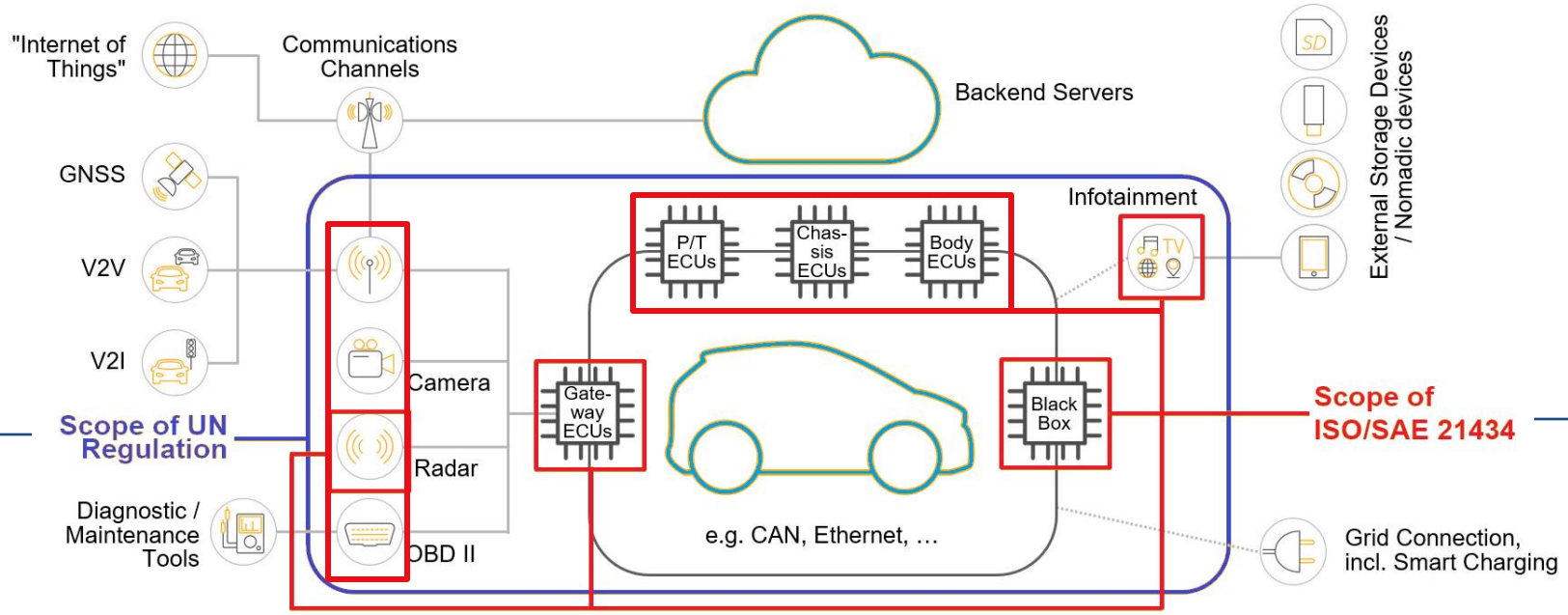
Automotive SPICE PAM3.1 and Automotive SPICE for Cybersecurity are covering system engineering and software engineering. Indicators for mechanical engineering and hardware engineering are not part of the current Automotive SPICE PAMs.

Certain aspects of the ISO/SAE 21434 are not in the scope of this document, as they are not performed in a development project context. They are addressed by the Automotive Cybersecurity Management System (ACSMS). These aspects, such as cybersecurity management, continuous cybersecurity activities, and post-development phases are subject to an audit of the cybersecurity management system.

The capability determination of processes for distributed cybersecurity activities, concept development, product development, cybersecurity validation, and threat analysis and risk assessment is supported by this document.

Source: VDA QMC Automotive SPICE® for Cybersecurity

Direct Automotive Scope



Remark:
ISO/SAE 21434 applies to series production road vehicle E/E systems. This includes their components and interfaces. It is applicable to all components whose development or modification began after the publication of the standard.

UN Regulation no.155

approval of vehicles with regards to cybersecurity and cybersecurity management system

ISO/SAE 21434

Road Vehicles – Cybersecurity Engineering Applicable to OEMs and Suppliers

VDA | QMC
Qualitäts Management Center
im Verband der Automobilindustrie

VDA ACSMS / (ISO PAS 5112)

Automotive Cybersecurity System Audit (IATF Auditor & Experts)

Scope: **Cybersecurity Management System** of OEMs and the dependencies to contractual partners (value chain).

ASPICE for Cybersecurity

Process Reference and Assessment Model for **Cybersecurity Engineering**
(A-Spice Assessor)

Scope: Individual Development Project

Company Certificate

Assessment report

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  Assessor Skills and Certification Levels
- Like in real projects – intacs™ Training Architecture
- What comes next? – intacs™ Roadmap

Further Process Reference/Assessment Models

intacs.info
International Assessor Certification Scheme™

Process Assessment Model
SPICE
for Mechanical Engineering

ISO-20000-PAM V3.0

Process Assessment Model for ISO 20000

Hardware SPICE

PRM/PAM

Test·SPICE

AGILE SPICE™

VEREIN DEUTSCHER INGENIEURE	Medizinprodukte-Software Medical SPICE Prozessassessmentmodell Medical device software Medical SPICE Process assessment model	VDI 5702 Blatt 1 / Part 1 Ausg. deutsch/englisch Issue German/English

… but no further assessor qualification required today !

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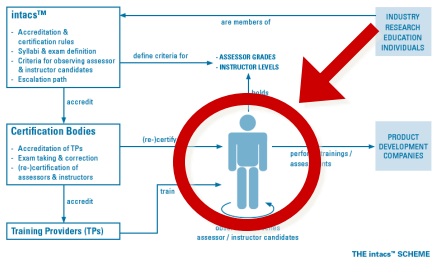
Current intacs™ Certification Levels



- Proven teaching skills
- Approval by an accredited instructor (observation process)
- No training course or exam

“intacs™ certified Instructor Competent Level“
(qualified for all PAMs; domain specific qualifications may apply)*

“intacs™ certified Instructor Provisional Level“
(qualified for all PAMs; domain specific qualifications may apply)*

- Continuously and actively contributes to the international ISO/IEC 15504 community‘s knowledge & best practices
- No training course or exam

“intacs™ certified Principal Assessor“
(qualified for all PAMs; domain specific qualifications may apply)*

- Assessment experience
- Approval by an accredited assessor (observation process)
- Passed training course & exam
- Capable of leading assessments

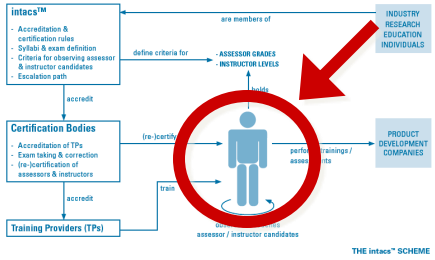
“intacs™ certified Competent Assessor“
(ISO/IEC 15504-5, ISO/IEC 330xx, Automotive SPICE®, TestSPICE)

- Little or no assessment experience
- Passed training course & exam
- Capable of acting as a co-assessor

“intacs™ certified Provisional Assessor“
(ISO/IEC 15504-5, ISO/IEC 330xx, Automotive SPICE®, TestSPICE)

* e.g. „VDA Assessor Guideline“ for Automotive SPICE®

Current intacs™ Certification Levels



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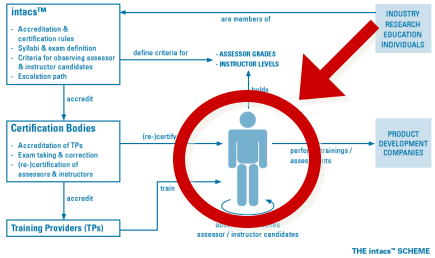
* e.g. „VDA Assessor Guideline“ for Automotive SPICE®

Future intacs™ Certification Levels



- Proven teaching skills
- Approval by an accredited instructor (observation process)
- No training course or exam

"intacs™ certified Instructor Competent Level"
(qualified for all passed Process Expert PAMs and Extensions; domain specific qualifications may apply*)

"intacs™ certified Instructor Provisional Level"
(qualified for all passed Process Expert PAMs and Extensions; domain specific qualifications may apply*)

- Continuously and actively contributes to the international ISO/IEC 15504 community's knowledge & best practices
- No training course or exam

"intacs™ certified Principal Assessor"
(qualified for all passed Process Expert PAMs and Extensions; domain specific qualifications may apply*)

- Active assessment experience
- Passed training course & exam
- Capable of leading assessments

"intacs™ certified Competent Assessor"
(qualified for all passed Process Expert PAMs and Extensions; domain specific qualifications may apply*)

- Passive assessment experience
- Passed training course & exam
- Capable of acting as a co-assessor

"intacs™ certified Provisional Assessor"
(qualified for all passed Process Expert PAMs and Extensions; domain specific qualifications may apply*)

- Little or no assessment experience
- Passed training course & exam
- Capable of supporting internal improvement activities

"intacs™ certified Process Expert"
(Automotive SPICE®, Test SPICE, Medical SPICE, ISO 20000, …)

* e.g. „VDA Assessor Guideline" for Automotive SPICE®

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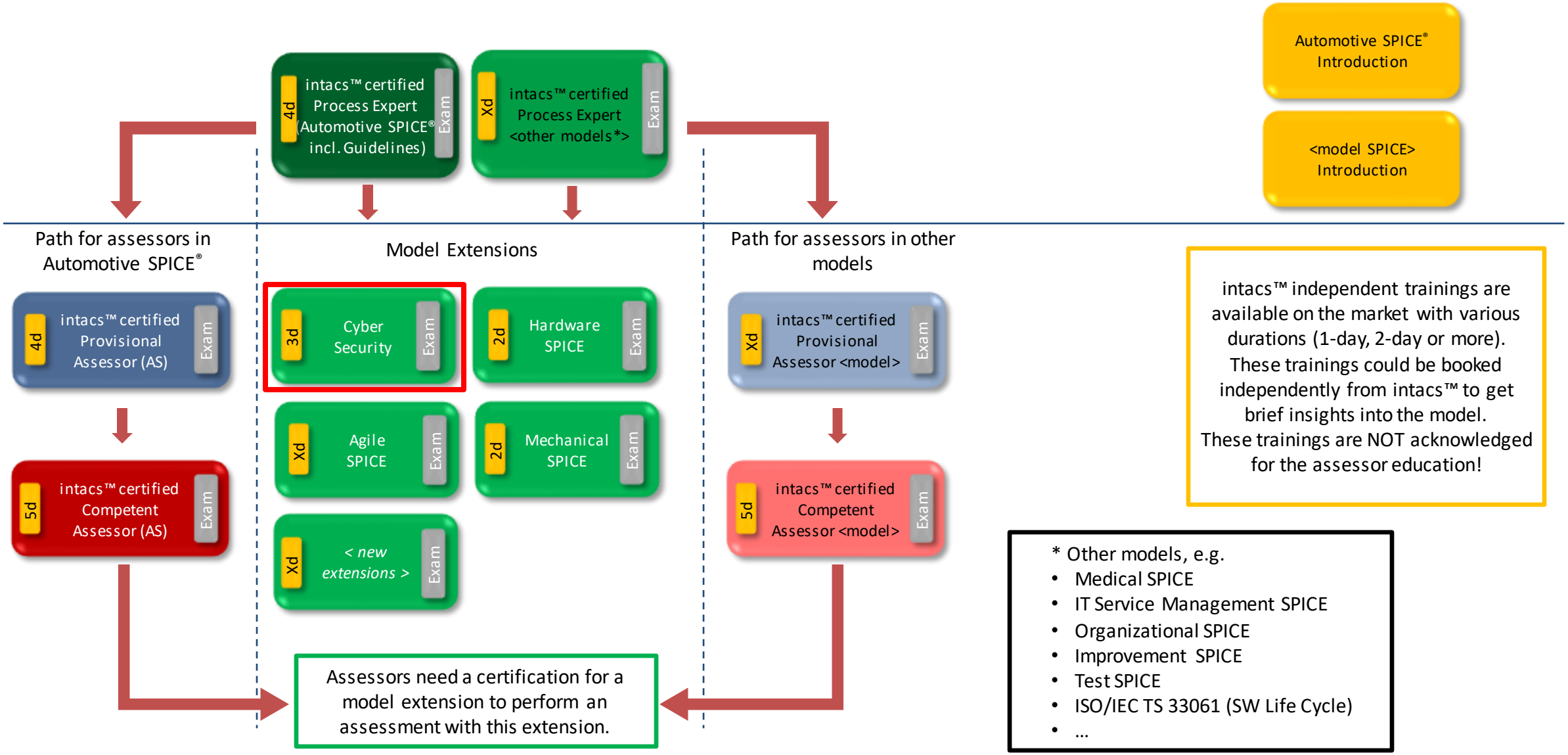
New intacs™ Training Architecture

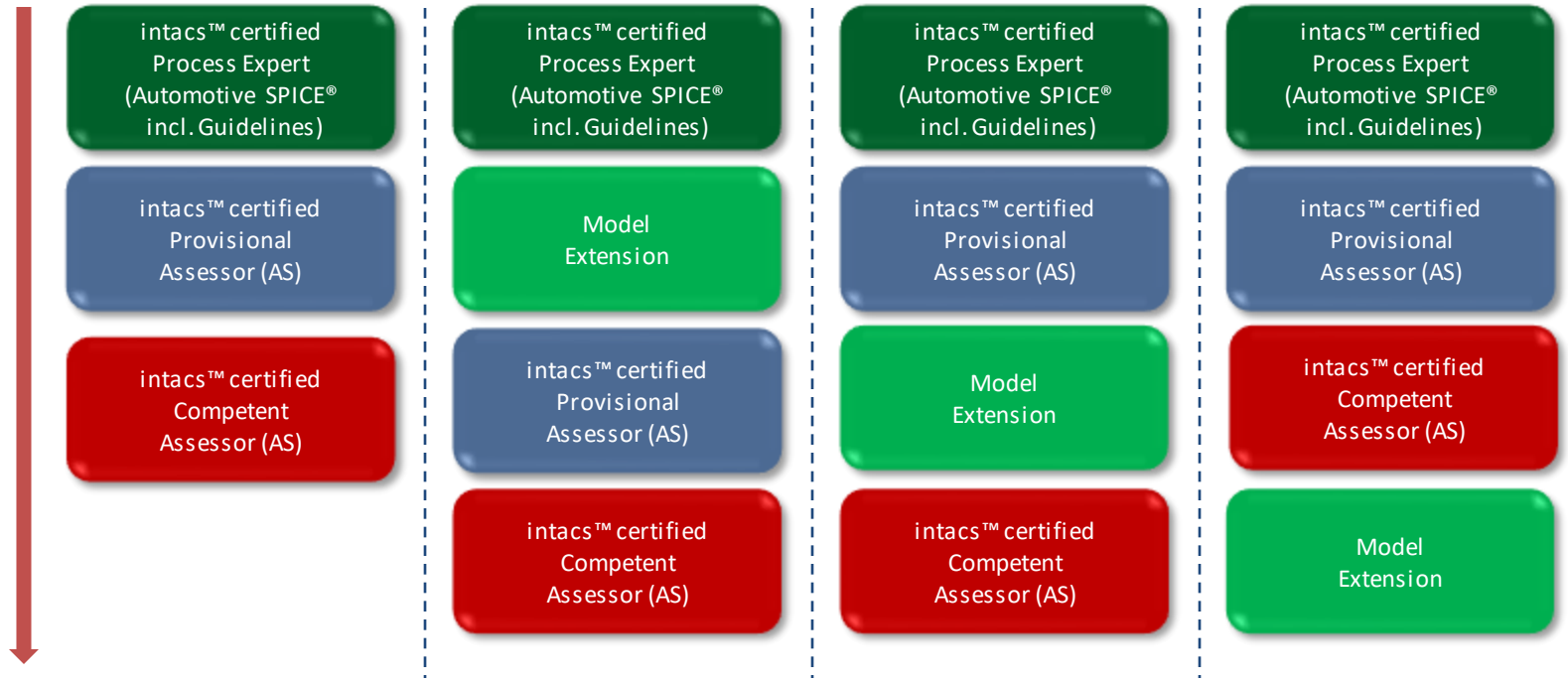


intacs™ independent trainings are available on the market with various durations (1-day, 2-day or more). These trainings could be booked independently from intacs™ to get brief insights into the model. These trainings are NOT acknowledged for the assessor education!

* Other models, e.g.
- Medical SPICE
- IT Service Management SPICE
- Organizational SPICE
- Improvement SPICE
- Test SPICE
- ISO/IEC TS 33061 (SW Life Cycle)
- …

Training Combinations, e.g. for Automotive SPICE® Assessors

- “intacs™ Certified Process Expert” is always the mandatory first training
- Model extensions can be attended at any time after the Process Expert training



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intacs™ Roadmap – New Trainings and Exams

Timeframe	Topic	
Jan. 2021 – Oct. 2021	Development of Training Material: Cybersecurity for Automotive SPICE®	✓
July 2021 – March 2022	Development of Training Material: Process Expert (Automotive SPICE®)	
July 2021 – March 2022	Development of Training Material: Provisional Assessor (Automotive SPICE®)	
July 2021 – March 2022	Development of Training Material: Competent Assessor (Automotive SPICE®)	
April 2021 – March 2022	Development of Exam Questions	
October 2021	Publication of VDA QMC Cybersecurity for Automotive SPICE®	✓
November 2021	First Pilot Training „Cybersecurity for Automotive SPICE®“ for Instructors	✓
Q1 / 2022	Start of „intacs™ certified Cybersecurity for Automotive SPICE®“ Trainings	
Q2 / 2022	Start of new intacs™ certified (Expert, Provisional, Competent) Trainings	
Q4 / 2022	Yellow draft of Automotive SPICE® 4.0	

Thank you !

DO YOU HAVE ANY QUESTIONS ?

Bernhard Sechser

intacs™ Principal Assessor & Instructor

Member of the intacs™ Advisory Board

Head of intacs™ Regional Representatives

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