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International Software Consulting Network

VDA QMC
AUTOMOTIVE SPICE®
training partner

Automotive SPICE and Functional Safety

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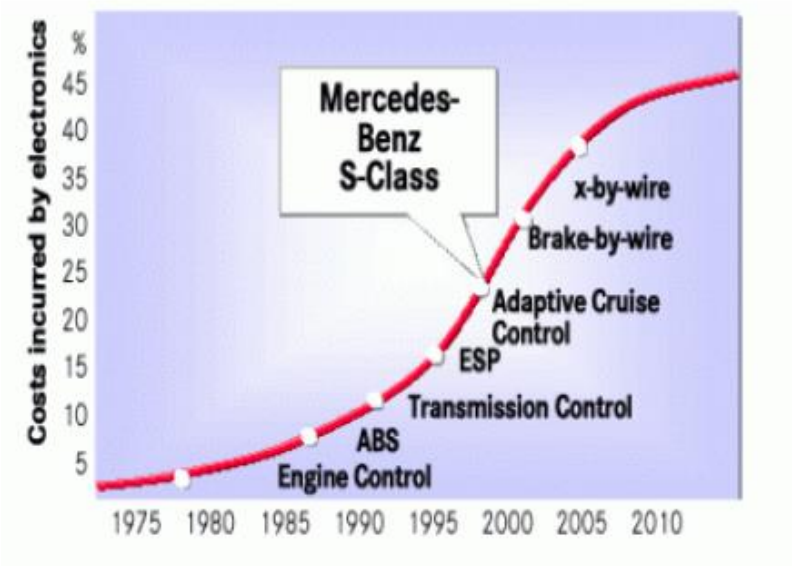
a VDA Certified Automotive SPICE Training Partner

The Goal of SPICE: Managing Complexity

- Professional management of increasing complexity caused by the dependence of electronics, and software in th car.

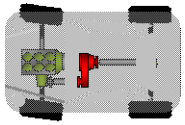


Reference:
Daimler Chrysler AG,
EuroSPI 2001 Conference,
Limerick, Irland

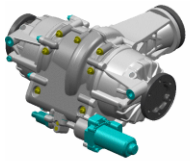
2001 is the founding year of
HIS pushing ASPICE in Germany

The Goal of SPICE
Understanding the Functional Flows

- **Professional Traceability of requirements related with mechanics, electronics, and software in the car.**

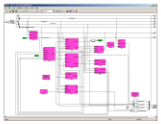


Requirement Requests (Customer)



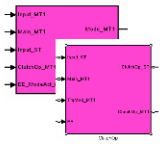
System Requirements

Requirements referring to more than one Sub-System



Sub-System Requirements

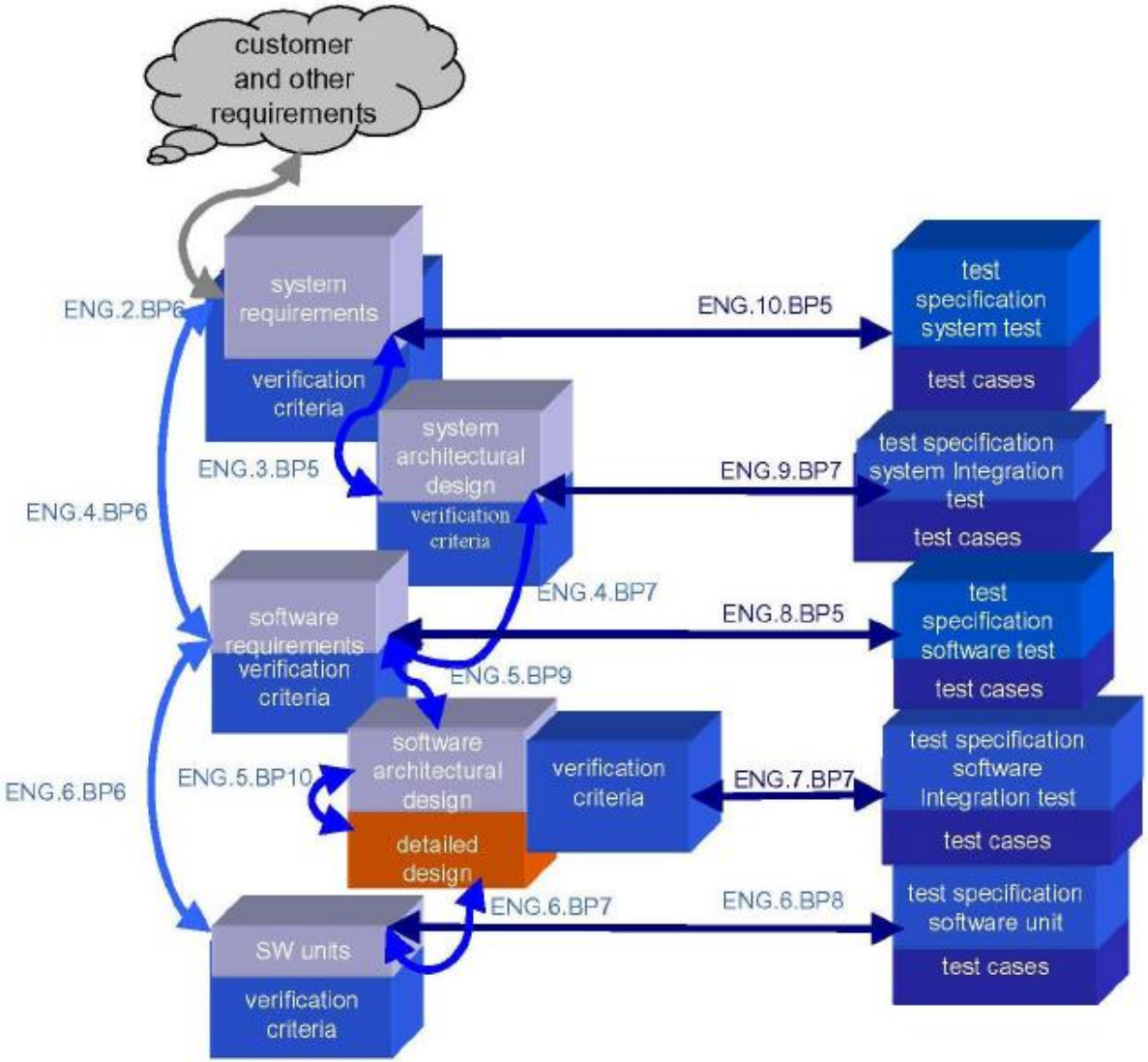
- Different components
- No common requirements
- Different responsibilities



Detailed Requirements

Reference:
Magna Powertrain AG,
Key Note,
EuroSPI 2008 Conference,
Dublin, Irland

Bilateral Traceability



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SPICE Assessment Model German Automotive Scope

HIS Scope: www.his-automotive.de

Engineering Process Group	
ENG.2	System requirements analysis
ENG.3	System architectural design
ENG.4	Software requirements analysis
ENG.5	Software design
ENG.6	Software construction
ENG.7	Software integration
ENG.8	Software testing
ENG.9	System integration
ENG.10	System testing

Support Process Group	
SUP.1	Quality assurance
SUP.8	Configuration Management
SUP.9	Problem resolution management
SUP.10	Change request management

Management Process Group	
MAN.3	Project management

Acquisition Process Group	
(optional)	
ACQ.4	Supplier Monitoring

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ASPICE Reference Model

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Acquisition Process Group		
ACQ .3	Contract Agreement	
ACQ .4	Supplier Monitoring	H, Fo
ACQ .11	Technical Requirements	
ACQ .12	Legal and Administrative Requirements	
ACQ .13	Project Requirements	
ACQ .14	Requests for Proposals	
ACQ .15	Supplier Qualification	

Engineering Process Group		
ENG.1	Requirements Elicitation	Fi
ENG.2	System Requirements Analysis	H, Fi, Fo
ENG.3	System Architectural Design	H, Fi, Fo
ENG.4	Software Requirements Analysis	H, Fi, Fo
ENG.5	Software Design	H, Fi, Fo
ENG.6	Software Construction	H, Fi, Fo
ENG.7	Software Integration	H, Fi, Fo
ENG.8	Software Testing	H, Fi, Fo
ENG.9	System Integration	H, Fi, Fo
ENG.10	System Testing	H, Fi, Fo

Support Process Group		
SUP .1	Quality Assurance	H, Fi, Fo
SUP .2	Verification	Fo
SUP .4	Joint Review	Fo
SUP .7	Documentation	
SUP .8	Configuration Management	H, Fi, Fo
SUP .9	Problem Resolution Management	H, Fi, Fo
SUP .10	Change Request Management	H, Fi, Fo

Management Process Group		
MAN.3	Project Management	H, Fi, Fo
MAN.5	Risk Management	Fi, Fo
MAN.6	Measurement	

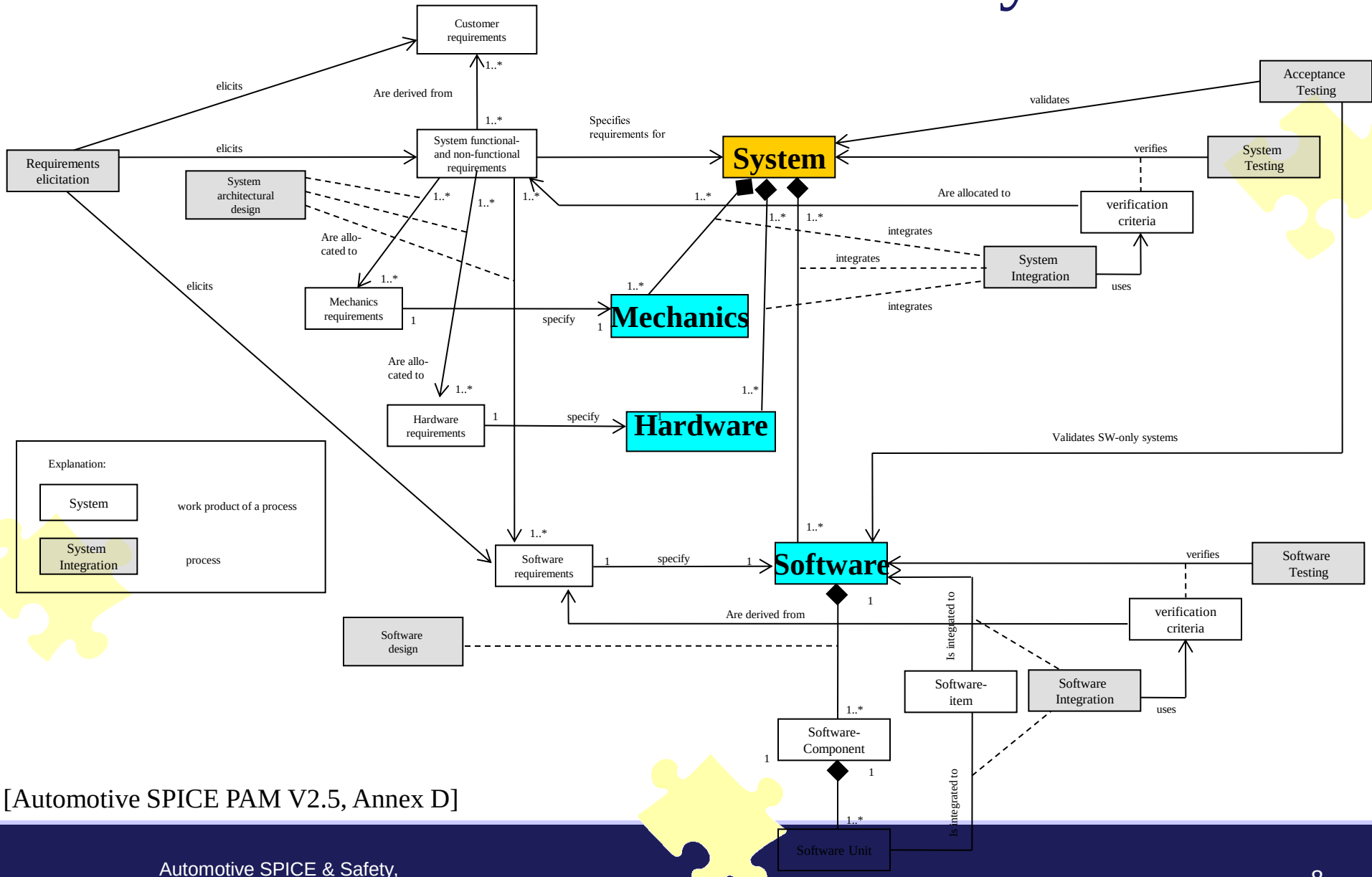
Process Improvement Process Group		
PIM .3	Process Improvement	

Reuse Process Group		
REU.2	Reuse-Program-Management	

Supply Process Group		
SPL.1	Supplier Tendering	
SPL.2	Product Release	Fi

H = HIS-Gruppe, Fi= Fiat, Fo = Ford

Bilateral Traceabaility



[Automotive SPICE PAM V2.5, Annex D]

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Capability Levels

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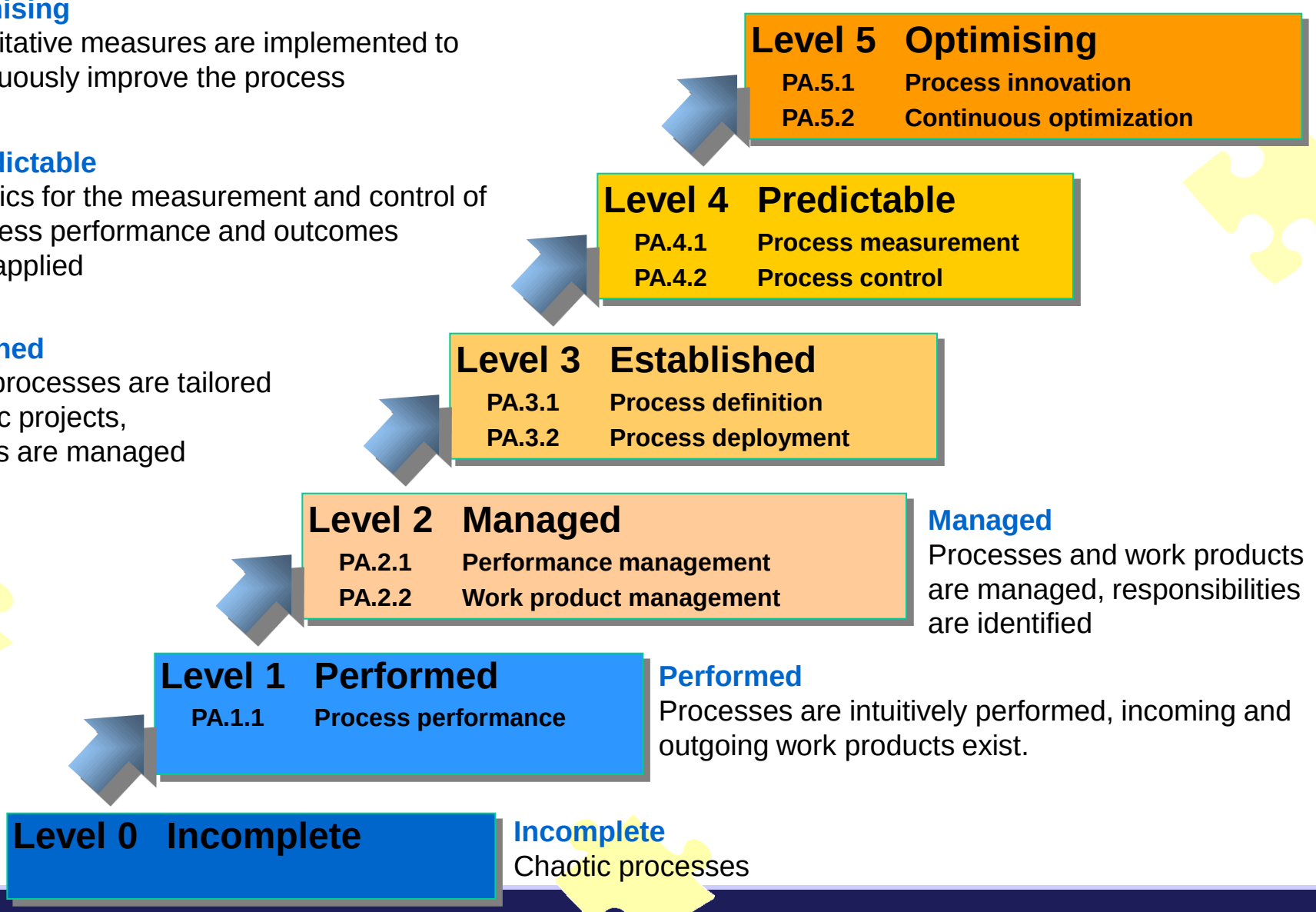
Optimising
Quantitative measures are implemented to continuously improve the process

Predictable
Metrics for the measurement and control of process performance and outcomes are applied

Established
Defined processes are tailored to specific projects, resources are managed
.



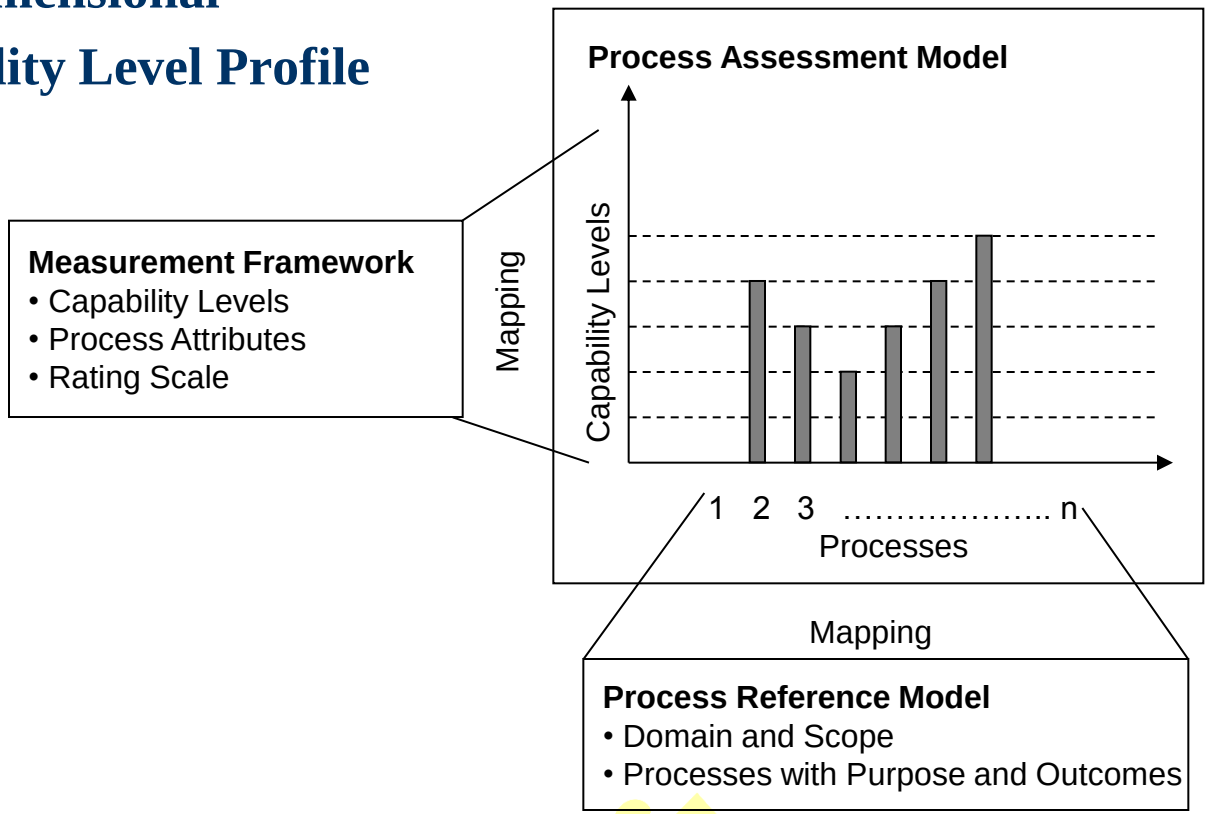
Managed
Processes and work products are managed, responsibilities are identified

Performed
Processes are intuitively performed, incoming and outgoing work products exist.

Incomplete
Chaotic processes

SPICE Assessment Model

- **Two-dimensional**
- **Capability Level Profile**



Rating Scale

N	**Not achieved** Outcome/achievement not existent, or not really, implemented	**0% to 15 %**
P	**Partially achieved** Some outcomes/achievements implemented, but projects/OUs still incapable of reaching quality, time, or budget goals & targets	**> 15 % to 50 %**
L	**Largely achieved** Outcome/achievement imply a certain likelihood, however no certainty, of reaching quality, time, and budget goals & targets	**> 50 % to 85 %**
F	**Fully achieved** No process risk with respect to quality, time, budget goals & targets identified, even in presence of imperfections	**> 85 % to 100 %**

Example Rating
ACQ.4 Supplier Monitoring

Indicator		Rating	
BP 1	Establish and maintain communications	L	PA 1.1 = F
BP 2	Exchange information on technical progress	F	
BP 3	Review supplier performance	F	
BP 4	Monitor the acquisition	F	
GP 2.1.1	Identify objectives	L	PA 2.1 = L
GP 2.1.2	Plan and monitor process	L	
GP 2.1.3	Control performance	P	
GP 2.1.4	Define responsibilities	P	
GP 2.1.5	Identify resources	L	
GP 2.1.6	Manage interfaces	F	
GP 2.2.1	Define requirements for WP	L	PA 2.2 = F
GP 2.2.2	Define req. for doc/control	F	
GP 2.2.3	Identify/document/control WP	F	
GP 2.2.4	Review/adjust WP	F	

Level 1
Process Attribute

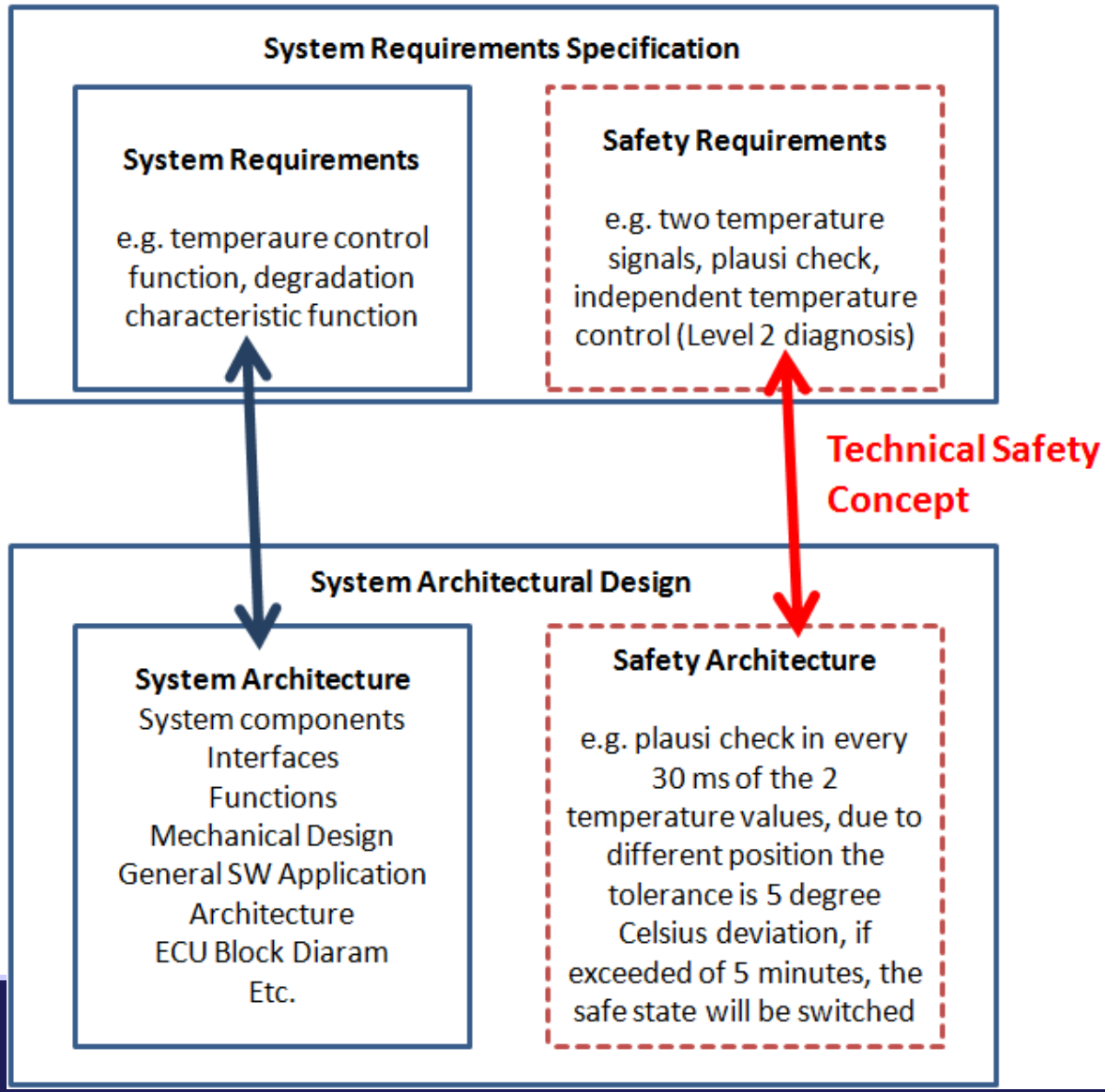
Level 2
Process Attributes

Example Rating
Capability Level Profile across Processes

Process		Capability Level / Process Attribute	1	2		3		4		5		
			PA 1.1	PA 2.1	PA 2.2	PA 3.1	PA 3.2	PA 4.1	PA 4.2	PA 5.1	PA 5.2	
ENG.1	Requirements elicitation		F	L	L	L	P					← CL 2
ENG.2	System requirements analysis		F	F	L	F	L					← CL 2
ENG.3	System architectural design		F	F	F	L	L					← CL 3
ENG.4	Software requirements analysis		P	N	L	P	P					← CL 0
ENG.5	Software design		L	L	F	P	N					← CL 1
ENG.6	Software construction		F	F	L	L	P					← CL 2
ENG.7	Software integration		N	P	P	L	P					← CL 0
MAN.3	Project management		F	N	P	L	L					← CL 1
SUP.8	Configuration management		P	N	L	F	P					← CL 0
SUP.1	Quality assurance		P	F	L	F	L					← CL 0
ACQ.4	Supplier monitoring		F	L	F	F	P					← CL 2

ISO 26262 Integration

Red = Additional Safety Relevant Content



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ISO 26262 Integration

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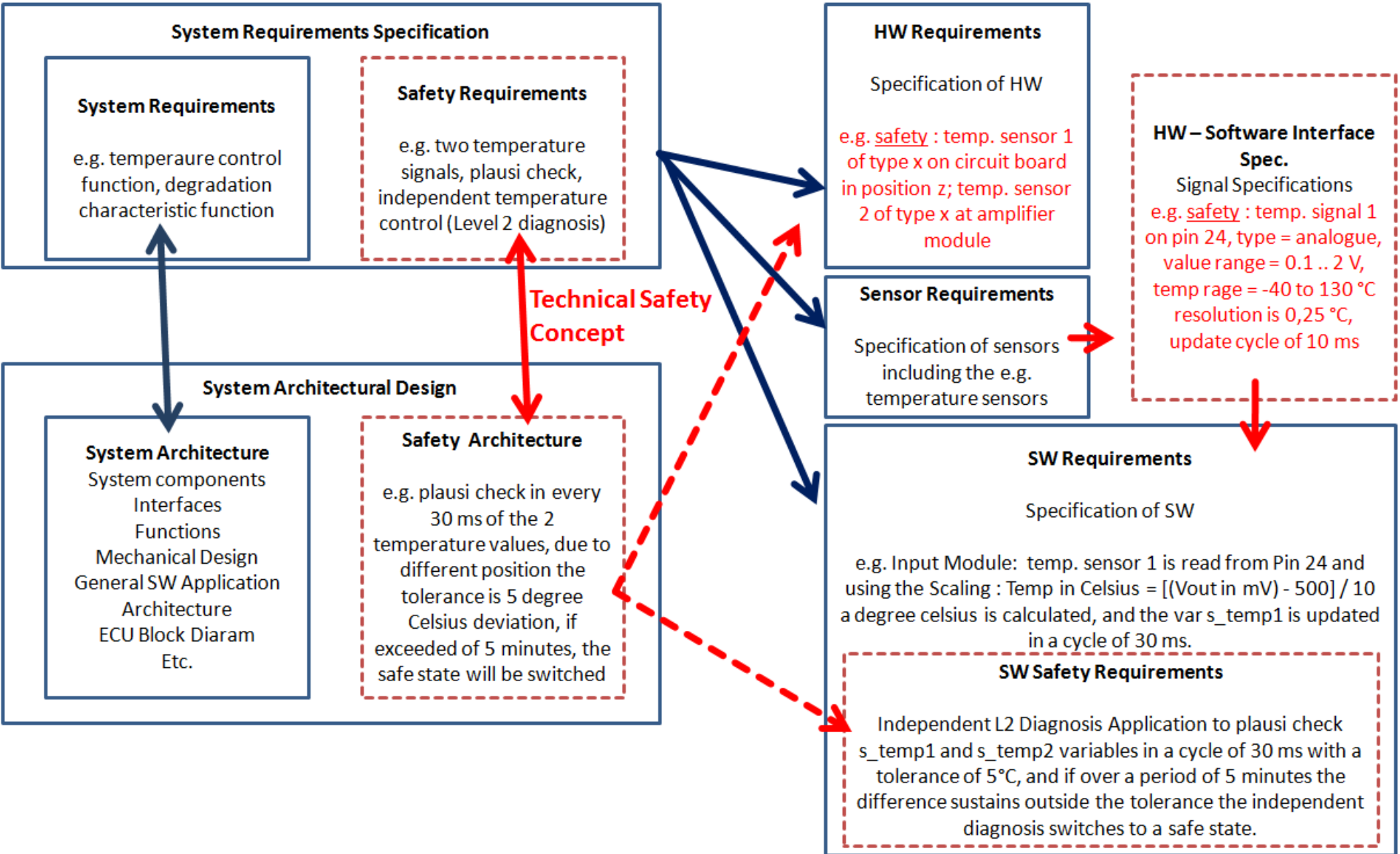
Red = Additional Safety Relevant Content



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Integrated Assessment 1/2

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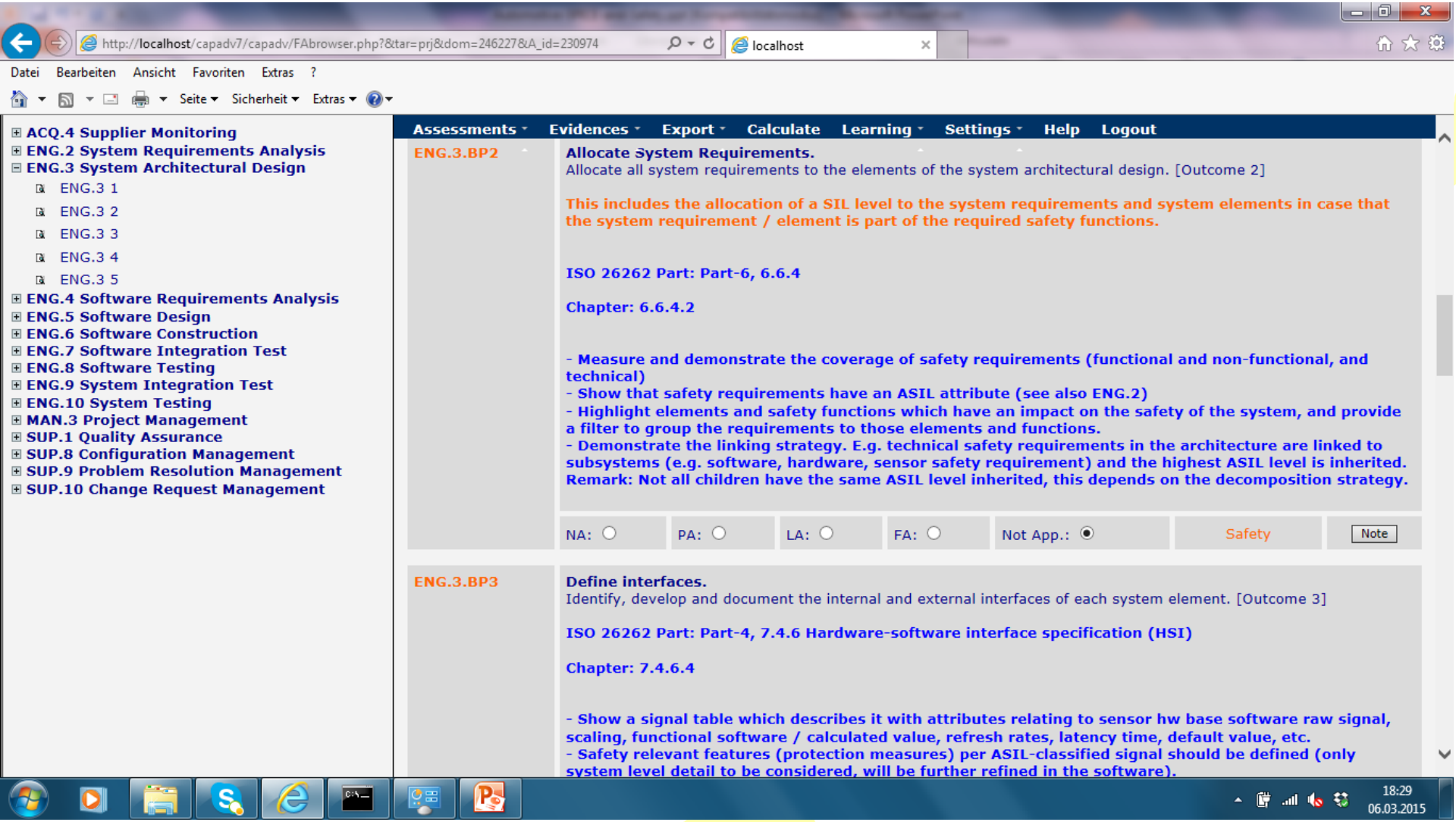
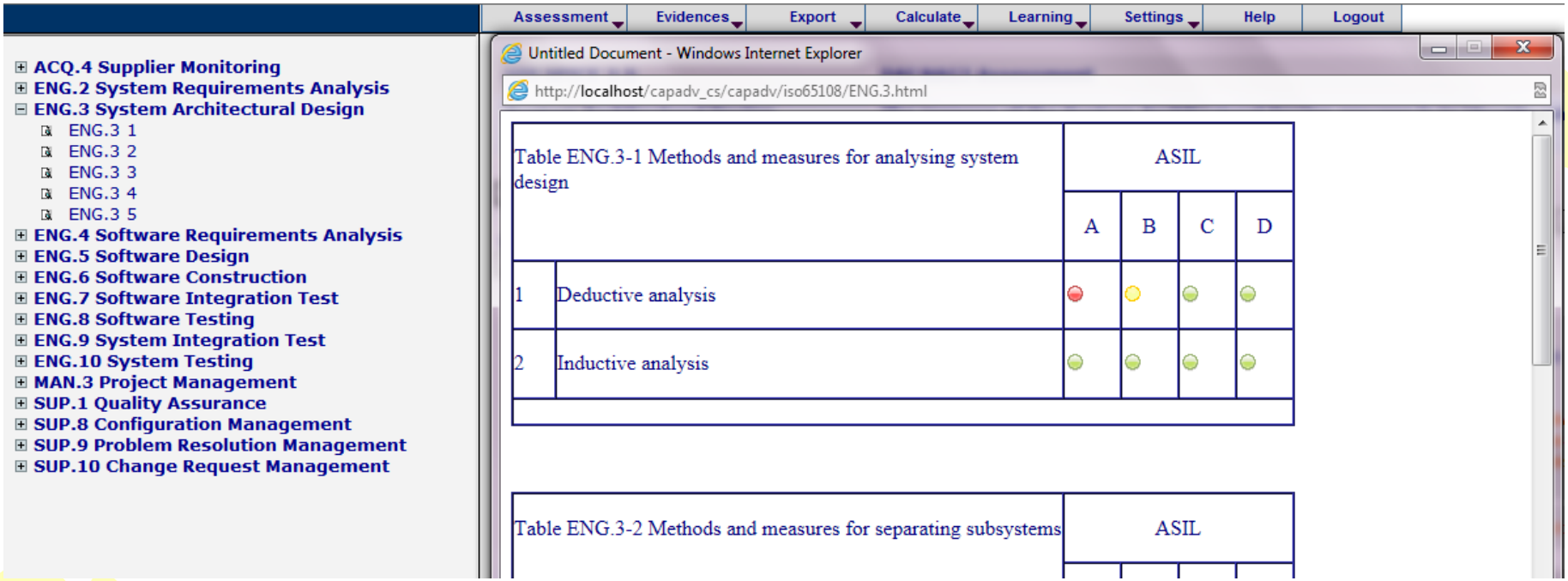


Integrated Assessment 2/2



Automotive SPICE Assessment Model

- **German manufacturers require a level 3 in all HIS processes**
  - **In VW the capability levels are used to determine the A-,B-,C-supplier rating.**
- **Fiat (+Chrysler) published a Fiat/Chrysler Scope in 2012.**
- **Nissan uses a checklist which is 90% similar to Automotive SPICE.**
- **Ford uses a HIS Scope plus 3 more processes.**

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Links

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Links:

- http://2015.eurospi.net
- http://soqrates.eurospi.net
- http://www.intacs.info
- http://www.automotivespice.com
- http://www.vda-qmc.de
- http://www.his-automotive.de

Courses

- **ECQA:** http://ECQA.org
- **ECQA certified Safety Manager/Engineer** http://safeur.eu
- **AQUA** http://www.automotive-knowledge-alliance.eu