

A Mapping between Automotive SPICE and ISO/TS 16949:2009 to support process improvement

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1. Introduction

The final purpose for any organization is to achieve its business goals through the highest possible maturity and capability levels in its processes. Any application domain contains and expresses several models and frameworks, each one describing and capturing one possible viewpoint and definition of the 'reality' to be described. Thus, there is no definitive model, but each model can contribute to express one part (more or less extensive) of the entity to be represented. In the Automotive sector, for instance, processes can be described by the Automotive SPICE PRM [2] (as a customization from the initial ISO/IEC 12207 [3]) or derived from the ISO/TS 16949:2009 [4] requirements (as a customization from the more general ISO 9001:2008 standard). But which is the right one? Why too often do organizations apply separately both the models (by one side a QA group working for achieving the compliance with the ISO/TS standard for certification purposes and on the other side a technical, more focused, group looking for best practices in A-SPICE to be applied for process improvement purposes)?

In such a way, there would be a duplication of efforts and costs and furthermore a potential mismatch about the corrective-improvement actions to be taken after an audit/appraisal, because of moving from different viewpoints for (slightly) different information goals.

Thus, a logical answer for overcoming such misunderstandings can come from the application of *mappings* that represent a sort of 'translations' between different languages for expressing the same concepts, even if with some slight difference in terms of content too.

2. Reasons for a new mapping

Although recognized as relevant and useful for the practical day-to-day activity, not always all models/frameworks in a certain application domain have yet the correspondent mappings ready. Among the existent ones, it is possible to cite the ones between CMMI-DEV and ISO 9001 [5] or an old one between the initial SPICE TR and the first version of CMMI [6] as well as for many other models and domains (e.g. also the one between ITIL, COBIT and ISO/IEC 17999 for the ITSM domain [7]). A recent white paper [8] introduced more information about the 'how' to do it, but not an artefact, as the previously mentioned, that can be directly used by Automotive-related organizations.

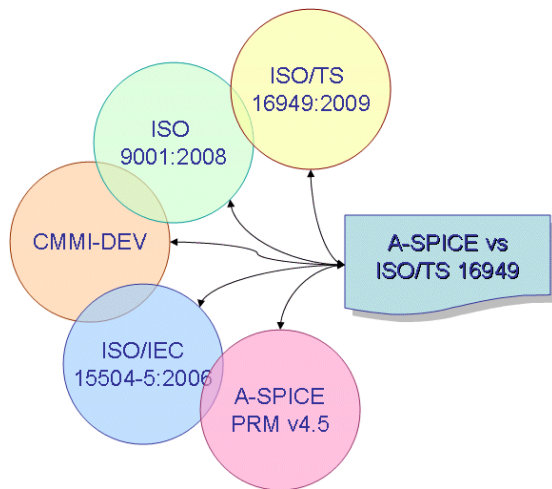


Figure 1 - A logical chain of mappings for the Automotive domain

To the best of our knowledge, in the Automotive domain right now it is possible to take a look at the following mapping information:

- [9] maps the A-SPICE processes of the HIS scope onto CMMI-DEV v1.3, but at a very high level;
- [10] maps CMMI-DEV onto ISO/IEC 15504, but observing the (depth of) coverage by process, not linking single elements;
- [11] maps just the ISO/IEC 15504 processes onto the correspondent ones in the A-SPICE HIS scope in one picture;
- [12] maps ISO/IEC 12207 onto A-SPICE but not directly with CMMI-DEV;
- [13] more than providing a mapping, it shows the complementarities about the safety issue between ISO/IEC 15504-10 and ISO 26262.

Thus, right now a mapping between Automotive SPICE and ISO/TS 16949:2009 (that contains many additional requirements against ISO 9001:2008) is not available.

In Annex A full bi-directional mapping/comparison is provided. For sake of simplicity and better readability, the rating scale adopted was the same than in maturity models (N/P/L/F)¹ with the ISO/IEC 15504 percentages (0-15/16-50/51-85/86-100%). Before presenting few excerpts, it must be stressed that the mapping in such case is between a meta-process model (A-SPICE) and a requirement model (ISO-TS), where the first one specifies suggestions and best practices about the 'how' to do things, while the second one requests 'what' to do, without going in details. Thus, proposed ratings cannot be referred to the application of ISO-TS requirements to a specific organizational quality management system (QMS), that's a further, subsequent evaluation.

Improvers could find benefits coming from ISO/TS to A-SPICE can be useful for improvers, searching for ideas about the best practices to be implemented into the current process, furthermore looking at the list of outcomes that any A-SPICE process provides. The cross links with the main ISO/IEC 15504-5 details can be also helpful to complete the information. For a question of space, notes and

¹ Not/Partially/Largely/Fully achieved.

comments are not reported, but present – if any - in the full mapping for any row/element discussed.

On the opposite, coming from A-SPICE to ISO/TS can be useful for auditors and quality people, trying to validate the coverage of the ISO/TS clauses not only for being conformant, but mostly confident to have implemented the suggestions from the reference model for the automotive domain.

3. Conclusions

Any improvement activity starts with a comparison with similar ones run in that domain/environment. Mappings and comparisons represent what in spoken languages is a ‘translation’ and the possible idiomatic terms for expressing the same concepts. The more the info gathered from such analysis, the less the efforts for creating from scratch a solution.

4. References

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- [5] Mutafelija B., Stromberg H., *Process Improvement with CMMI v1.2 and ISO Standards*, Auerbach, 2008, ISBN 9781420052831
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ANNEX A

Table 1: ISO-TS 16949-2009

clause	Title	+9001:2008?	A-SPICE	BP/GP	strenght	notes
Quality Management Systems						
4.1	General requirements		SUP.7	GP 2.2.1	L	
4.1.1	General requirements - supplemental	Yes	---	---	N	
4.2	Documentation requirements		SUP.7 ---	BP.03 GP 2.2.2	F	
4.2.1	General		SUP.7		L	Lesser scope than a QMS
4.2.2	Quality Manual		SUP.7		L	No specified the interactions among processes
4.2.3	Control of documents		SUP.7 ---	BP.06 GP 2.2.3	F	
4.2.3.1	Engineering specifications	Yes	SUP.7 ---	--- GP 2.2.1	F	
4.2.4	Control of records		SUP.7 ---	BP.06 GP 2.2.2	F	
4.2.4.1	Records retentions	Yes	SUP.7 SUP.8	BP.08 ---	F	
Management Responsibility						
5.1	Management committment		PIM.3	BP.01	L	
5.1.1	Process efficiency	Yes		PA 3.1, PA 3.2	F	
5.2	Customer focus		ENG.1	BP.01	L	
5.3	Quality policy			PA 2.1	L	
5.4	Planning			GP 2.1.2	F	
5.4.1	Quality objectives			PA 2.1	L	
5.4.1.1	Quality objectives - supplemental	Yes		PA 4.1	F	
5.4.2	QMS planning			GP 2.1.2	F	
5.5	Responsibility, authority and communication			GP 3.2.2	F	
5.5.1	Responsibility and authority			GP 2.1.4, 3.2.2	F	
5.5.1.1	Responsibility for quality			GP 3.2.2	L	
5.5.2	Management representative			GP 2.1.4, 2.1.6	L	
5.5.2.1	Customer representative	Yes		GP 2.1.6	F	
5.5.3	Internal communication			GP 2.1.6	F	
5.6	Management review		---	---	N/A	
5.6.1	General			GP 3.1.5	P	
5.6.1.1	QMS performance			GP 2.1.2, GP 2.1.3, GP 4.1.5	L	
5.6.2	Review Input			GP 3.2.6	L	
5.6.2.1	Review Input - supplemental	Yes		GP 3.1.5	P	
5.6.3	Review output			GP 3.2.6	L	
Resource Management						
6.1	Provision of resources			GP 2.1.5, GP 3.2.4	F	
6.2	Human resources		---	---	N/A	
6.2.1	General			GP 3.2.3	F	
6.2.2	Competence, training and awareness		ACQ.13	BP.05 GP 3.1.3	F	
6.2.2.1	Product design skills	Yes	---	---	N	
6.2.2.2	Training	Yes	ACQ.13	BP.15	L	
6.2.2.3	Training on the job	Yes	PIM.3	BP.06 GP 3.1.5	P	
6.2.2.4	Employee motivation and empowerment	Yes		GP 5.2.2	L	
6.3	Intrastructure			GP 3.1.4, GP 3.2.5	F	
6.3.1	Plant, facility and equipment planning	Yes		GP 3.1.4, GP 3.2.5	L	
6.3.2	Contingency plans	Yes		GP 3.1.4, GP 3.2.5	L	
6.4	Work environment			GP 3.1.4,	F	

				GP 3.2.5		
6.4.1	Personnel safety to achieve conformity to product requirements	Yes	ACQ.11 ENG.2	BP.02 BP.01	L	
6.4.2	Cleanliness of premises	Yes	---	---	N	
Product realization						
7.1	Planning of product realization		MAN.3	PA 3.1	L	
7.1.1	Planning of product realization - supplemental	Yes	MAN.3	GP 3.1.4	F	
7.1.2	Acceptance criteria	Yes	MAN.3	GP 3.1.5	L	
7.1.3	Confidentiality	Yes	SUP.7	BP.01	L	
7.1.4	Change control	Yes	SUP.10		F	
7.2	Customer-related processes		---	---	N/A	
7.2.1	Determination of requirements related to the product		ENG.1 ENG.2 ENG.4	BP.01 BP.01 BP.01	L	
7.2.1.1	Customer-designated special characteristics	Yes	---	---	N	
7.2.2	Review of requirements related to the product		ENG.1 ENG.3	BP.01, BP.03, BP.05 BP.05	F	
7.2.2.2	Organization manufacturing feasibility	Yes	MAN.3	BP.07 (note 10)	L	
7.2.3	Customer communication		MAN.3	BP.08, GP 2.1.5, GP 2.1.6	F	
7.2.3.1	Customer communication - supplemental	Yes	MAN.3	GP 2.1.5, 2.1.6	L	
7.3	Design and development		---	---	N/A	
7.3.1	Design and development planning		MAN.3		F	
7.3.1.1	Multidisciplinary approach	Yes	---	---	N	
7.3.2	Design and development inputs		MAN.3	BP.03	L	
7.3.2.1	Product design input	Yes	MAN.3 ENG.2 ENG.4	BP.03 BP.02 BP.02	L	
7.3.2.2	Manufacturing process design input	Yes	---	---	N	
7.3.2.3	Special characteristics	Yes	ENG.1	---	N	Absent
7.3.3	Design and development outputs		MAN.3 ENG.2 ENG.4	BP.06 BP.05 BP.05	L	
7.3.3.1	Product design outputs - supplemental	Yes	---	---	N	
7.3.3.2	Manufacturing process design output	Yes	---	---	N	
7.3.4	Design and development review		ENG.2 ENG.4 SUP.4	BP.05 BP.05	L	
7.3.4.1	Monitoring	Yes	MAN.3	BP.11, GP 3.1.5	F	
7.3.5	Design and development verification		ENG.8		F	
7.3.6	Design and development validation		ENG.10		F	
7.3.6.1	Design and development validation - supplemental	Yes	ENG.10	GP 3.1.1	L	
7.3.6.2	Prototype programme	Yes	ENG.1 MAN.3	(see BP.06 note2) (see BP.07 note 10)	P	
7.3.6.3	Product approval process	Yes	SPL.2	BP.10	F	
7.3.7	Control of design and development changes		SUP.8 SUP.10		F	
7.4	Purchasing		---	---	N/A	
7.4.1	Purchasing process		ACQ.4		F	
7.4.1.1	Statutory and regulatory conformity	Yes	ACQ.12		F	
7.4.1.2	Supplier QMS development	Yes	ACQ.4	BP.01	L	
7.4.1.3	Customer-approved sources	Yes	ACQ.3	BP.02	L	
7.4.2	Purchasing information		ACQ.11 ACQ.13		L	
7.4.3	Verification of purchased product		SPL.2		F	
7.4.3.1	Incoming product conformity to requirements	Yes	SPL.2	BP.10	F	
7.4.3.2	Supplier monitoring	Yes	ACQ.4		F	
7.5	Production and service provision		---	---	N/A	
7.5.1	Control of production and service		ENG.3		L	

	provision		ENG.5 ENG.6			
7.5.1.1	Control plan	Yes		PA 2.2	P	Not explicitly mentioned
7.5.1.2	Work instructions	Yes		PA 2.2	P	Not explicitly mentioned
7.5.1.3	Verification of job set-ups	Yes		GP 2.2.4	P	Not explicitly mentioned
7.5.1.4	Preventive and predictive maintenance	Yes	ACQ.13	BP.15, PA 5.1	L	
7.5.1.5	Management of production tooling	Yes		GP 2.1.5	L	
7.5.1.6	Production scheduling	Yes		GP 2.1.2	P	Not specified JIT
7.5.1.7	Feedback of information from service	Yes		GP 2.1.6	L	
7.5.1.8	Service agreement with customer	Yes	ACQ.3	BP.03	F	
7.5.2	Validation of processes for production and service provision		ENG.8 ENG.10		L	
7.5.2.1	Validation of processes for production and service provision - supplemental	Yes	---	---	N	
7.5.3	Identification and traceability		SUP.8		F	
7.5.3.1	Identification and traceability - supplemental	Yes	---	---	N	
7.5.4	Customer property		ACQ.12	BP.01	L	
7.5.4.1	Customer-owned production tooling	Yes	ACQ.12	BP.09, BP.10	P	
7.5.5	Preservation of product		SUP.8	BP.11	L	To be eventually extended also to physical products
7.5.5.1	Storage and inventory		MAN.6 SUP.8	GP 2.1.5	L	
7.6	Control of monitoring and measuring equipment		MAN.6	GP 2.1.5	L	Infrastructure and facilities
7.6.1	Measurement system analysis	Yes	MAN.6	GP 3.1.5, 4.1.6	L	
7.6.2	Calibration/verification records	Yes	ENG.7 SUP.8	BP.04 (note 7) BP.11	P	In SUP.8, seen as configuration items
7.6.3	Laboratory requirements	Yes	---	---	N/A	
7.6.3.1	Internal laboratory	Yes	---	---	N	
7.6.3.2	External laboratory	Yes	---	---	N	
Measurement, analysis and improvement						
8.1	General		---	---	N/A	
8.1.1	Identification of statistical tools	Yes	MAN.6	GP 4.1.6	L	
8.1.2	Knowledge of basic statistical concepts	Yes	MAN.6	GP 4.1.6	L	
8.2	Monitoring and measurement		MAN.6	PA 4.1	F	
8.2.1	Customer satisfaction		MAN.6	BP.03, BP.07	L	
8.2.2.1	Customer satisfaction - supplemental	Yes	MAN.6	GP 2.1.2	L	
8.2.2	Internal audit		SUP.1	GP 3.1.5	F	
8.2.2.1	QMS audit	Yes	SUP.1	GP 3.1.5	F	
8.2.2.2	Manufacturing process audit	Yes	SUP.1	GP 3.1.5	L	
8.2.2.3	Product audit	Yes	SUP.1	GP 3.1.5	P	
8.2.2.4	Internal audit plans	Yes	SUP.1	BP.03, GP 2.1.2	F	
8.2.2.5	Internal auditor qualification	Yes	SUP.1	GP 2.1.5	L	Not specified criteria, see e.g. ISO/IEC 19011:2011
8.2.3	Monitoring and measurement of processes		MAN.6	PA 4.1	L	
8.2.3.1	Monitoring and measurement of manufacturing processes	Yes	MAN.6	PA 4.1	L	
8.2.4	Monitoring and measurement of product		MAN.6	BP.05, GP 2.2.3	F	
8.2.4.1	Layout inspection and functional testing	Yes	---	---	N	
8.2.4.2	Appearance items	Yes	---	---	N	
8.3	Control of non-conforming product		SUP.1 PIM.3	BP.05 (note 5)	F	
8.3.1	Control of non-conforming product - supplemental	Yes	---	---	N	
8.3.2	Control of reworked product	Yes	---	---	N	
8.3.3	Customer information	Yes	MAN.6	BP.03, BP.07	P	Customer info are generically part of 'data'
8.3.4	Customer waiver	Yes	MAN.6	GP 3.1.1	P	Tailoring guidelines

						for measurements
8.4	Analysis of data		MAN.6	BP.07, BP.08, GP4.1.6, GP 5.1.2	F	
8.4.1	Analysis and use of data		MAN.6	BP.07, BP.08, GP4.1.6, GP 5.1.2	F	
8.5	Improvement		---	---	N/A	
8.5.1	Continual improvement		PIM.3 MAN.6 MAN.3	PA 5.1 BP08 BP12	F	
8.5.1.1	Continual improvement of the organization	Yes	PIM.3	PA 3.1, 5.1	F	
8.5.1.2	Manufacturing process improvement	Yes	PIM.3	PA 5.1	L	
8.5.2	Corrective action		MAN.5	BP.07, GP 4.2.4	L	
8.5.2.1	Problem solving	Yes	MAN.5 SUP.9	GP 4.2.4 ---	L	
8.5.2.2	Error-proofing	Yes	MAN.5 SUP.9	GP 4.2.4 ---	F	
8.5.2.3	Corrective action impact	Yes	MAN.5 SUP.9	GP 4.2.4 ---	F	
8.5.2.4	Rejected product test/analysis	Yes	SUP.9	BP.09, PA 5.1	F	
8.5.3	Preventive action		PIM.3	GP 5.1.3	F	

Table 2: A-SPICE PAM v4.5

Process	Title	BP	Title	ISO-TS clauses	strenght	notes
ACQ.03	Contract agreement	BP.01	Negotiate the contract/agreement	---	N	Out of scope in ISO-TS
ACQ.03	Contract agreement	BP.02	Specify rights and duties	---	N	
ACQ.03	Contract agreement	BP.03	Review contract/agreement for supplier capability monitoring	---	N	
ACQ.03	Contract agreement	BP.04	Review contract/agreement for risk mitigation	---	N	
ACQ.03	Contract agreement	BP.05	Approve contract/agreement	---	N	
ACQ.03	Contract agreement	BP.06	Award contract/agreement	---	N	
ACQ.03	Contract agreement	BP.07	Communicate results to tenderers	---	N	
ACQ.04	Supplier Monitoring	BP.01	Agree on joint processes and joint interfaces	5.5.2.1	L	
ACQ.04	Supplier Monitoring	BP.02	Exchange all relevant information	7.2.3	F	
ACQ.04	Supplier Monitoring	BP.03	Review technical development with the supplier	7.2.2.1, 7.5.2	L	
ACQ.04	Supplier Monitoring	BP.04	Review progress of the supplier	7.4.3.2, 7.5.1, 7.5.1.7, 7.5.1.8	F	
ACQ.04	Supplier Monitoring	BP.05	Track open items	7.3.4.1	L	
ACQ.04	Supplier Monitoring	BP.06	Act to correct deviations	7.3.4 lett. b)	L	
ACQ.04	Supplier Monitoring	BP.07	Agree on all changes	7.3.4 lett. b)	L	
ACQ.11	Technical Requirements	BP.01	Elicitate needs	---	N	
ACQ.11	Technical Requirements	BP.02	Define technical requirements	7.4.1, 7.4.2	F	
ACQ.11	Technical Requirements	BP.03	Identify acquisition needs	7.4.2	L	
ACQ.11	Technical Requirements	BP.04	Ensure consistency	7.4.1, 7.4.2	L	
ACQ.11	Technical Requirements	BP.05	Identify affected groups	---	N	
ACQ.11	Technical Requirements	BP.06	Communicate to affected groups	---	N	
ACQ.11	Technical Requirements	BP.07	Establish a change mechanism	7.4.1	L	Criteria for ...
ACQ.11	Technical Requirements	BP.08	Track impact of changing technology	7.4.1	L	Any necessary action...
ACQ.11	Technical Requirements	BP.09	Identify constraints and standards	7.4.1.1	P	
ACQ.11	Technical Requirements	BP.10	Ensure compliance of stated requirements	7.4.1, 7.4.2	L	
ACQ.12	Legal and Administrative	BP.01	Identify relevant regulations	4.1, note 3	F	See §1, note 2

	requirements					
ACQ.12	Legal and Administrative requirements	BP.02	Consider relevant regulations	7.2.1 lett. c), 7.3.2 lett. b)	L	
ACQ.12	Legal and Administrative requirements	BP.03	Agree on (contractual) terms and conditions	7.4.1.1	P	
ACQ.12	Legal and Administrative requirements	BP.04	Ensure usage of agreed terms and conditions	7.4.1.1	P	
ACQ.12	Legal and Administrative requirements	BP.05	Establish acceptance criteria	---	N	
ACQ.12	Legal and Administrative requirements	BP.06	Establish escalation mechanisms	---	N	
ACQ.12	Legal and Administrative requirements	BP.07	Establish management of intellectual property rights	7.5.4 note	P	
ACQ.12	Legal and Administrative requirements	BP.08	Provide for warranties and service level agreements	7.2.1, note	L	
ACQ.12	Legal and Administrative requirements	BP.09	Define provision for the suppliers	7.3.3 lett. b)	F	
ACQ.12	Legal and Administrative requirements	BP.10	Establish criteria for liability issues	7.1.2, 8.2.3.1, 8.2.4	L	
ACQ.13	Project requirements	BP.01	Identify relevant groups	---	N	
ACQ.13	Project requirements	BP.02	Communicate with relevant groups	---	N	
ACQ.13	Project requirements	BP.03	Define organizational requirements	7.4.1, 7.4.2	P	
ACQ.13	Project requirements	BP.04	Define management requirements	7.4.2	P	
ACQ.13	Project requirements	BP.05	Identify required competencies	7.4.1, 7.4.2	L	
ACQ.13	Project requirements	BP.06	Define responsibilities and goals	7.4.1	P	Criteria for ...
ACQ.13	Project requirements	BP.07	Identify information needs	7.4.1	P	Criteria for ...
ACQ.13	Project requirements	BP.08	Define exchange of information	---	N	
ACQ.13	Project requirements	BP.09	Establish criteria for interim work products	---	N	
ACQ.13	Project requirements	BP.10	Establish payment requirements	---	N	
ACQ.13	Project requirements	BP.11	Identify risks	7.4.1	P	Criteria for ...
ACQ.13	Project requirements	BP.12	Communicate risks	---	N	
ACQ.13	Project requirements	BP.13	Define ownership of relationships	---	N	E.g. RACI matrices
ACQ.13	Project requirements	BP.14	Define rights for use and distribution	---	N	
ACQ.13	Project requirements	BP.15	Establish support and maintenance requirements	7.4.1	P	
ACQ.14	Request for proposals	BP.01	Define rules for CFP/ITT	---	N	Out of scope in ISO-TS
ACQ.14	Request for proposals	BP.02	Assemble requirements	---	N	
ACQ.14	Request for proposals	BP.03	Establish terms and conditions for CFP/ITT	---	N	
ACQ.14	Request for proposals	BP.04	Define financial terms	---	N	
ACQ.14	Request for proposals	BP.05	Define project terms	---	N	
ACQ.14	Request for proposals	BP.06	Define technical terms	---	N	
ACQ.14	Request for proposals	BP.07	Identify relevant regulations	---	N	
ACQ.14	Request for proposals	BP.08	Prepare and issue a CFP/ITT	---	N	
ACQ.15	Supplier Qualification	BP.01	Establish qualification criteria	7.4.1	P	
ACQ.15	Supplier Qualification	BP.02	Evaluate supplier	7.4.1	F	
ACQ.15	Supplier Qualification	BP.03	Short-list suppliers with required qualification	4.2.4, 7.4.1, 7.4.1.2 note	L	Records of the results...
ACQ.15	Supplier Qualification	BP.04	Evaluate any shortfalls	7.4.1	F	
ACQ.15	Supplier Qualification	BP.05	Perform corrective actions	7.4.1	F	
SPL.01	Supplier tendering	BP.01	Establish communication interface	---	N	
SPL.01	Supplier tendering	BP.02	Perform customer enquiry screening	---	N	
SPL.01	Supplier tendering	BP.03	Establish customer proposal evaluation criteria	---	N	
SPL.01	Supplier tendering	BP.04	Evaluate customer request for proposal	---	N	
SPL.01	Supplier tendering	BP.05	Determine need for preliminary pre-studies	---	N	
SPL.01	Supplier tendering	BP.06	Identify and nominate staff	---	N	
SPL.01	Supplier tendering	BP.07	Prepare supplier proposal response	---	N	
SPL.01	Supplier tendering	BP.08	Establish confirmation of agreement	---	N	

SPL.02	Product release	BP.01	Define the functional content of releases	7.3.3, 7.5.1 lett. f)	L	
SPL.02	Product release	BP.02	Define release products	7.3.3, 7.5.1 lett. f)	L	
SPL.02	Product release	BP.03	Establish a product release classification and numbering scheme	7.3.3, 7.3.3.1, 7.3.3.2	F	
SPL.02	Product release	BP.04	Define the build activities and build environment	---	N	
SPL.02	Product release	BP.05	Build the release from configured items	---	N	
SPL.02	Product release	BP.06	The type, service level and duration of support for a release are communicated	7.3.3, 7.3.3.1, 7.3.3.2	P	
SPL.02	Product release	BP.07	Determine the delivery media type for the release	7.3.3 note	P	Implicitly stated
SPL.02	Product release	BP.08	Identify the packaging for the release media	---	N	
SPL.02	Product release	BP.09	Define and produce the product release documentation/notes	4.2.3, 4.2.4, 7.5.1 lett. f)	P	Generic, for any process
SPL.02	Product release	BP.10	Ensure product release approval before delivery	7.5.1 lett. f)	L	
SPL.02	Product release	BP.11	Ensure consistency	---	N	
SPL.02	Product release	BP.12	Provide a release note	4.2.4, 8.2.4	P	
SPL.02	Product release	BP.13	Deliver the release to the intended customer	7.5.1 lett. f)	L	
ENG.01	Requirement elicitation	BP.01	Obtain customer requirements and requests	5.2, 7.2.1, 7.2.1.1, 7.2.2	L	Nothing about special characteristics
ENG.01	Requirement elicitation	BP.02	Understand customer expectations	8.4, 8.4.1	L	Analysis of any data
ENG.01	Requirement elicitation	BP.03	Agree on requirements	7.2.2	L	
ENG.01	Requirement elicitation	BP.04	Establish customer requirement baseline	4.2.4, 7.3.2	L	
ENG.01	Requirement elicitation	BP.05	Manage customer requirements changes	7.1.4, 7.2.2	L	
ENG.01	Requirement elicitation	BP.06	Establish customer-supplier query communication mechanism	4.2.3.1	L	
ENG.02	System requirements analysis	BP.01	Identify system requirements	5.2, 7.2.1, 7.2.2	F	
ENG.02	System requirements analysis	BP.02	Analyze system requirements	8.4	L	Analysis of any data
ENG.02	System requirements analysis	BP.03	Determine the impact on the operating environment	7.2.1 note 2; 7.3.2.1	L	
ENG.02	System requirements analysis	BP.04	Prioritize and categorize system requirements	4.1 lett. c), 7.1	P	
ENG.02	System requirements analysis	BP.05	Evaluate and update system requirements	7.1.4	L	For any change
ENG.02	System requirements analysis	BP.06	Ensure consistency and bilateral traceability of customer req's to system req's	7.5.3	F	
ENG.02	System requirements analysis	BP.07	Communicate system requirements	7.2.3, 7.3.2.1	F	
ENG.03	System architectural design	BP.01	Define system architectural design	7.3, 7.3.3, 7.3.3.1, 7.3.3.2	L	
ENG.03	System architectural design	BP.02	Allocate system requirements	7.5.3	F	
ENG.03	System architectural design	BP.03	Define interfaces	7.3.1	F	...interfaces between different groups
ENG.03	System architectural design	BP.04	Develop verification criteria	7.1 lett c), 7.1.2	F	
ENG.03	System architectural design	BP.05	Verify system architectural design	7.3.4	F	
ENG.03	System architectural design	BP.06	Ensure consistency and bilateral traceability of system req's to system architectural design	7.5.3	F	
ENG.03	System architectural design	BP.07	Communicate system architectural design	7.2.3, 7.3.2.1	F	
ENG.04	Software requirement analysis	BP.01	Identify software requirements	5.2, 7.2.1, 7.2.2	F	
ENG.04	Software requirement	BP.02	Analyze software requirements	8.4	L	Analysis of any data

	analysis					
ENG.04	Software requirement analysis	BP.03	Determine the impact of the operating environment	7.2.1 note 2; 7.3.2.1	L	
ENG.04	Software requirement analysis	BP.04	Prioritize and categorize software requirements	4.1 lett. c), 7.1	P	
ENG.04	Software requirement analysis	BP.05	Evaluate and update software requirements	7.1.4	L	For any change
ENG.04	Software requirement analysis	BP.06	Ensure consistency and bilateral traceability of system req's to software requirements	7.5.3	F	
ENG.04	Software requirement analysis	BP.07	Ensure consistency and bilateral traceability of system architectural design to software requirements	7.5.3	F	
ENG.04	Software requirement analysis	BP.08	Communicate software requirements	7.2.3, 7.3.2.1	F	
ENG.05	Software design	BP.01	Develop software architectural design	7.3, 7.3.3, 7.3.3.1, 7.3.3.2	L	
ENG.05	Software design	BP.02	Allocate software requirements	7.5.3	F	
ENG.05	Software design	BP.03	Define interfaces	7.3.1	F	...interfaces between different groups
ENG.05	Software design	BP.04	Describe dynamic behaviour	7.2.1 lett. b) d)	P	A-SPICE is more specific
ENG.05	Software design	BP.05	Define resource consumption objectives	7.2.1 lett. b) d)	P	A-SPICE is more specific
ENG.05	Software design	BP.06	Develop detailed design	7.3	F	
ENG.05	Software design	BP.07	Develop verification criteria	7.1 lett. c), 7.1.2	F	
ENG.05	Software design	BP.08	Verify software design	7.3.4	F	
ENG.05	Software design	BP.09	Ensure consistency and bilateral traceability of software req's to software architectural design	7.5.3	F	
ENG.05	Software design	BP.10	Ensure consistency and bilateral traceability of software architectural design to software detailed design	7.5.3	F	
ENG.06	Software construction	BP.01	Define a unit verification strategy	---	N	Strategy is not planning
ENG.06	Software construction	BP.02	Analyze software units	7.2.2, 7.3.2	P	
ENG.06	Software construction	BP.03	Prioritize and categorize software units	4.1 lett. c), 7.1	P	
ENG.06	Software construction	BP.04	Develop software units	7.3.3	P	
ENG.06	Software construction	BP.05	Develop unit verification criteria	7.1 lett. c), 7.1.2	F	
ENG.06	Software construction	BP.06	Verify software units	7.3.4	F	
ENG.06	Software construction	BP.07	Record the results of unit verification	4.2.4	F	
ENG.06	Software construction	BP.08	Ensure consistency and bilateral traceability of software detailed design to software units	7.5.3	F	
ENG.06	Software construction	BP.09	Ensure consistency and bilateral traceability of software requirements to software units	7.5.3	F	
ENG.06	Software construction	BP.10	Ensure consistency and bilateral traceability of software units to test specification for software units	7.5.3	F	
ENG.07	Software integration test	BP.01	Develop software integration strategy	---	N	Strategy is not planning
ENG.07	Software integration test	BP.02	Develop software integration test strategy	---	N	Strategy is not planning
ENG.07	Software integration test	BP.03	Develop test specification for software integration	7.3.3	L	
ENG.07	Software integration test	BP.04	Integrate software units and software items	---	N	
ENG.07	Software integration test	BP.05	Verify the integrated software	7.3.5	F	
ENG.07	Software integration test	BP.06	Record the results of software integration testing	4.2.4, 7.3.5	F	
ENG.07	Software integration test	BP.07	Ensure consistency and bilateral traceability of software architectural design to software integration test specification	7.5.3	F	
ENG.07	Software integration test	BP.08	Develop regression testing strategy and perform regression testing	7.3.5	P	...and any necessary action...
ENG.08	Software testing	BP.01	Develop software test strategy	---	N	Strategy is not planning
ENG.08	Software testing	BP.02	Develop test specification for	7.3.3	L	

			software test			
ENG.08	Software testing	BP.03	Verify integrated software	7.3.5	F	
ENG.08	Software testing	BP.04	Record the results of software testing	4.2.4, 7.3.5	F	
ENG.08	Software testing	BP.05	Ensure consistency and bilateral traceability of software requirements to software test specification	7.5.3	F	
ENG.08	Software testing	BP.06	Develop regression test strategy and perform regression testing	7.3.5	P	...and any necessary action...
ENG.09	System integration test	BP.01	Develop system integration strategy	---	N	Strategy is not planning
ENG.09	System integration test	BP.02	Develop system integration test strategy	---	N	Strategy is not planning
ENG.09	System integration test	BP.03	Develop a test specification for system integration	7.3.3	L	
ENG.09	System integration test	BP.04	Integrate system elements	---	N	
ENG.09	System integration test	BP.05	Verify the integrated system	7.3.5	F	
ENG.09	System integration test	BP.06	Record the results of system integration testing	4.2.4, 7.3.5	F	
ENG.09	System integration test	BP.07	Ensure consistency and bilateral traceability of system architectural design to system integration test specification	7.5.3	F	
ENG.09	System integration test	BP.08	Develop regression testing strategy and perform regression testing	7.3.5	P	...and any necessary action...
ENG.10	System testing	BP.01	Develop system test strategy	---	N	Strategy is not planning
ENG.10	System testing	BP.02	Develop test specification for system test	7.3.3	L	
ENG.10	System testing	BP.03	Verify integrated system	7.3.5	F	
ENG.10	System testing	BP.04	Record the results of system testing	4.2.4, 7.3.5	F	
ENG.10	System testing	BP.05	Ensure consistency and bilateral traceability of system req's to the system test spec's	7.5.3	F	
ENG.10	System testing	BP.06	Develop system regression test strategy and perform testing	7.3.5	P	...and any necessary action...
SUP.01	Quality assurance	BP.01	Develop project quality assurance strategy	7.3.1 lett b), 8.2.2	P	part of the QA process
SUP.01	Quality assurance	BP.02	Develop and maintain an organization structure which ensure that QA is carried out and report independently	7.3.1	F	
SUP.01	Quality assurance	BP.03	Develop and implement a plan for project QA based on a QA strategy	7.1 lett. c), 7.1.4, 7.3.1 lett. b), 8.2.2	F	part of the QA process
SUP.01	Quality assurance	BP.04	Maintain evidence of QA	4.2.4	F	
SUP.01	Quality assurance	BP.05	Assure quality of WPs	8.3	F	
SUP.01	Quality assurance	BP.06	Assure quality of process activities	8.5.1.2	F	
SUP.01	Quality assurance	BP.07	Track and record QA activities	4.2.3, 4.2.4	F	
SUP.01	Quality assurance	BP.08	Report QA activities and results	8.4	P	
SUP.01	Quality assurance	BP.09	Ensure resolution on non-conformance	8.5.2, lett. f)	F	
SUP.01	Quality assurance	BP.10	Implement an escalation mechanism	8.5.2.1	P	
SUP.02	Verification	BP.01	Develop a verification strategy	7.3.5	L	part of the verification process
SUP.02	Verification	BP.02	Develop criteria for verification	7.3.5, 7.4.3, 7.5.1.3	L	
SUP.02	Verification	BP.03	Conduct verification	7.3.5, 7.4.3, 7.5.1.3	L	
SUP.02	Verification	BP.04	Determine and track actions for verification results	8.5.2	P	
SUP.02	Verification	BP.05	Report verification results	8.4.1	P	
SUP.04	Joint review	BP.01	Define review elements	7.3.1, 7.3.5, 8.2.4	L	
SUP.04	Joint review	BP.02	Establish a mechanism to handle review outcomes	7.3.5, 8.2.4	P	
SUP.04	Joint review	BP.03	Prepare joint review	7.3.5, 8.2.4	L	
SUP.04	Joint review	BP.04	Conduct joint review	7.3.5, 8.2.4	L	
SUP.04	Joint review	BP.05	Distribute the results	5.5.3	P	Generic, for any internal communication
SUP.04	Joint review	BP.06	Determine actions for review results	7.3.5, 8.2.4	P	

SUP.04	Joint review	BP.07	Track actions for review results	8.2.4	L	
SUP.04	Joint review	BP.08	Identify and record problems	8.5.2.1	F	
SUP.07	Documentation	BP.01	Develop a documentation management strategy	4.2.1, lett.a)	L	Strategy is not planning
SUP.07	Documentation	BP.02	Establish standards for documentation	4.2.1	L	
SUP.07	Documentation	BP.03	Specify documentation requirements	4.2	F	
SUP.07	Documentation	BP.04	Identify the relevant documentation to be produced	4.2.1, Note#2	L	
SUP.07	Documentation	BP.05	Develop documentation	---	N	
SUP.07	Documentation	BP.06	Check documentation	4.2.3, 4.2.4	F	
SUP.07	Documentation	BP.07	Distribute documentation	4.2.3.1	P	
SUP.07	Documentation	BP.08	Maintain documentation	4.2.3, 4.2.4, 4.2.4.1	F	
SUP.08	Configuration management	BP.01	Develop a configuration management strategy	---	N	See also ISO 10007
SUP.08	Configuration management	BP.02	Identify configuration items	4.2.3, 7.3.7, 7.5.3, 8.3	L	
SUP.08	Configuration management	BP.03	Establish a configuration management system	4.2.3, 7.3.7, 7.5.3 note, 8.3	F	
SUP.08	Configuration management	BP.04	Establish branch management strategy	---	N	Strategy is not planning
SUP.08	Configuration management	BP.05	Establish baselines	4.2.3, 7.3.7, 7.5.3, 8.3	L	
SUP.08	Configuration management	BP.06	Maintain configuration item description	4.2.3, 7.3.7, 7.5.3, 8.3	F	
SUP.08	Configuration management	BP.07	Control modifications and releases	4.2.4	F	
SUP.08	Configuration management	BP.08	Maintain configuration item history	4.2.4.1	F	
SUP.08	Configuration management	BP.09	Report configuration status	7.5.3	P	
SUP.08	Configuration management	BP.10	Verify the information about configured items	7.5.3	P	
SUP.08	Configuration management	BP.11	Manage backup, storage, archiving, handling, delivery of configuration items	4.2.4, 7.5.3	F	
SUP.09	Problem resolution management	BP.01	Develop a problem resolution management strategy	8.3, 8.5.2.1	F	part of the problem mgmt process
SUP.09	Problem resolution management	BP.02	Establish a consistent problem resolution management strategy	8.3, 8.5.2.1	F	part of the problem mgmt process
SUP.09	Problem resolution management	BP.03	Identify and record the problem	8.5.2.1	F	
SUP.09	Problem resolution management	BP.04	Investigate and diagnose the cause and impact of the problem	8.5.2.1	F	
SUP.09	Problem resolution management	BP.05	Execute urgent resolution action, where necessary	8.5.2.1	F	
SUP.09	Problem resolution management	BP.06	Raise alert notifications, where necessary	8.5.2.1	F	
SUP.09	Problem resolution management	BP.07	Initiate change request	8.5.2.1	F	
SUP.09	Problem resolution management	BP.08	Track problems to closure	8.5.2.1	F	
SUP.09	Problem resolution management	BP.09	Analyze problem trends	8.4, 8.4.1, 8.5.2.1	F	
SUP.10	Change request management	BP.01	Develop a change management strategy	---	N	Strategy is not planning
SUP.10	Change request management	BP.02	Establish a consistent change management strategy	---	N	Strategy is not planning
SUP.10	Change request management	BP.03	Identify and record the change request	4.2.3.1	F	
SUP.10	Change request management	BP.04	Record the status of change requests	4.2.3.1	F	
SUP.10	Change request management	BP.05	Establish the dependencies and relationships to other CRs	7.1.4	P	Implicitly stated
SUP.10	Change request management	BP.06	Assess the impact of change	4.2.3.1 note, 7.1.4	F	See the FMEA process
SUP.10	Change request management	BP.07	Analyze and prioritize CRs	4.2.3.1 note, 7.1.4	F	
SUP.10	Change request	BP.08	Approve CRs before implementation	4.2.3.1	F	

	management			note, 7.1.4 note 1		
SUP.10	Change request management	BP.09	Identify and plan the V&V activities to be performed for implemented changes	4.2.3.1 note, 7.1.4	F	
SUP.10	Change request management	BP.10	Schedule and allocate CRs	4.2.3.1 note, 7.1	L	
SUP.10	Change request management	BP.11	Review the implemented change	4.2.3.1 note, 7.2.2	F	
SUP.10	Change request management	BP.12	CRs are tracked until closure	4.2.3.1 note, 7.3.7	F	
MAN.03	Project management	BP.01	Define the scope of work	7.1, 7.3.1	F	
MAN.03	Project management	BP.02	Define project lifecycle	7.1, 7.3.1	P	
MAN.03	Project management	BP.03	Determine and maintain estimates for project attributes	7.1, 7.3.1	L	
MAN.03	Project management	BP.04	Define project activities	7.1, 7.3.1	F	
MAN.03	Project management	BP.05	Define skill needs	7.1, 7.3.1	F	
MAN.03	Project management	BP.06	Define and maintain project schedule	7.1, 7.3.1	F	
MAN.03	Project management	BP.07	Identify and monitor project interfaces	7.3.1	L	
MAN.03	Project management	BP.08	Establish project plan	7.1	F	
MAN.03	Project management	BP.09	Implement the project plan	---	N	
MAN.03	Project management	BP.10	Monitor project attributes	7.3.4, 8.2.3	P	
MAN.03	Project management	BP.11	Review and report progress of the project	7.3.4, 7.3.4.1	L	
MAN.03	Project management	BP.12	Act to correct deviations	7.3.4 lett. b)	F	
MAN.05	Risk management	BP.01	Establish risk management scope	---	N	
MAN.05	Risk management	BP.02	Define risk management strategies	7.3.1.1	P	
MAN.05	Risk management	BP.03	Identify risks	7.2.2.2	P	
MAN.05	Risk management	BP.04	Analyze risks	7.2.2.2	P	
MAN.05	Risk management	BP.05	Define risk treatment actions	6.4.1	P	
MAN.05	Risk management	BP.06	Monitor risks	7.2.2.2, 7.3.4.1	P	
MAN.05	Risk management	BP.07	Take corrective actions	8.5.2	P	
MAN.06	Measurement	BP.01	Establish organizational commitment to measurement	---	N	
MAN.06	Measurement	BP.02	Develop measurement strategy	---	N	Strategy is not planning
MAN.06	Measurement	BP.03	Identify measurement information needs	8.1, 8.2.1, 8.5.1	F	
MAN.06	Measurement	BP.04	Specify measures	8.1, 8.2.1, 8.2.3, 8.5.3	F	
MAN.06	Measurement	BP.05	Perform measurement activities	8.2.1, 8.5.1	F	
MAN.06	Measurement	BP.06	Retrieve measurement data	8.2.1, 8.4, 8.5.1	F	
MAN.06	Measurement	BP.07	Analyze measures	8.4	F	
MAN.06	Measurement	BP.08	Use measurement information for decision-making	8.4.1	L	
MAN.06	Measurement	BP.09	Communicate measures	7.2.3, 8.2.2	F	
MAN.06	Measurement	BP.10	Evaluate information products and measurement activities	8.4.1	L	
MAN.06	Measurement	BP.11	Communicate potential improvements	8.5.1	P	
PIM.03	Process improvement	BP.01	Establish commitment	5.1, 8.5.1	F	
PIM.03	Process improvement	BP.02	Identify issues	8.5.1.1	F	
PIM.03	Process improvement	BP.03	Establish process improvement goals	8.5.1.1	F	
PIM.03	Process improvement	BP.04	Prioritize improvements	8.5.1.1	F	
PIM.03	Process improvement	BP.05	Plan process changes	8.5.1.1	F	
PIM.03	Process improvement	BP.06	Implement process changes	8.5.1.1	F	
PIM.03	Process improvement	BP.07	Confirm process improvement	8.5.1.1	F	
PIM.03	Process	BP.08	Communicate result of improvement	8.5.1.1	F	

	improvement					
PIM.03	Process improvement	BP.09	Evaluate the results of the improvement project	8.5.1.1	F	
REU.02	Reuse program management	BP.01	Define orgazational reuse strategy	---	N	Strategy is not planning
REU.02	Reuse program management	BP.02	Identify domains for potential reuse	---	N	
REU.02	Reuse program management	BP.03	Assess domains for potential reuse	---	N	
REU.02	Reuse program management	BP.04	Assess reuse maturity	---	N	
REU.02	Reuse program management	BP.05	Evaluate reuse proposals	---	N	
REU.02	Reuse program management	BP.06	Implement the reuse program	---	N	
REU.02	Reuse program management	BP.07	Get feedback from reuse	7.3.3.2, '7.5.1.7	P	
REU.02	Reuse program management	BP.08	Monitor reuse	8.2	P	