

WG Activities on Accreditation of Software Testing



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Working Group on Accreditation of Software Testing,
APLAC Technical Committee**

Contents

- I . **Background and Objectives**
- II . **Supplementary(Specific) Requirements of Accreditation Bodies**
- III . **Documents' Characteristics on ABs**
- IV . **Discussion and Future Work**

Background and Objectives

- **To facilitate software testing activities;**
- **To enlarge the scope of accreditation in various fields such as functional safety of systems; and,**
- **To propose comprehensive documents on APLAC level.**
- Functional safety systems are discussed**

Activities of WG

- **WG was launched in Bali meeting, Dec. 2009;**
 - **Documents were translated, circulated and collected from ABs(2010-2011); and,**
 - * No comments**
 - **Performed review of documents (2011).**
 - * Few participants**
- (Comments/suggestions from A2LA)**

Review of Documents on ABs

- . **KOLAS-SR-015; Software Testing Laboratories (Nov., 2009)**
- . **A2LA- R214; Information Technology Testing(July, 2010)**
- . **NATA; Information and Communications Testing(Mar., 2011)**
- . **NVLAP, IAJAPAN ; Focused on Common Criteria (Security only)**

Classification	KOLAS	A2LA	NATA
1. Scope	○	○	○
2. Normative references	○	○	○
3. Terms and definitions	○	○	○

- . **Blank; Testing based on ISO/IEC 17025**

Review of Documents on ABs

Classification		KOLAS	A2LA	NATA
4. Management requirements	4.1 Organization		Permanent facilities	Permanent site
	4.2 Management system			NATA endorsement
	4.3 Document control			
	4.3.1 General			
	4.3.2 Document approval and issue			
	4.3.3 Document control			Maintenance of traceability
	4.4 Review of requests, tenders and contracts		Test environment	Capability, ISO/IEC TR 15504
	4.5 Subcontracting of tests and calibrations			Accredited NATA facility
	4.6 Purchasing services and supplies		Any ASP services	
	4.7 Service to the customer			
	4.8 Complaints			
	4.9 Control of nonconforming testing and/or calibration work		Conform to the documented test methodologies	
	4.10 Improvement			
	4.11 Corrective action			
	4.12 Preventive action			
4.13 Control of records				
4.13.1 General		Complete identification of the test environment	Identification	
4.13.2 Technical records				
4.14 Internal audits			A twelve-month	
4.15 Management reviews			At least once per year	

Review of Documents on ABs

Classification		KOLAS	A2LA	NATA
5. Technical requirements	5.1 General			
	5.2 Personnel	Competence		Competence
	5.3 Accommodation and environmental conditions	Protection of Facility confidentiality	Separated from any design and production	Hardware and associated software
	5.4 Test and calibration methods and method validation			
	5.4.1 General			
	5.4.2 Selection of methods		Define and document a testing methodology	Testing Methodology
	5.4.3 Laboratory-developed methods			A draft standards is Not available
	5.4.4 Non-standard methods	Partially applied		
	5.4.5 Validation of methods	Almost applied	Test coverage, case results, suites	Results of test tool are traceable to international standards
	5.4.6 Estimation of uncertainty of measurement		MU may introduced in statistical analysis, etc.	
	5.4.7 Control of data			
	5.5 Equipment	May include test devices provided By customers	Specific installed software or system and suitable tests to confirm functionality	Included hardware and software

Review of Documents on ABs

Classification		KOLAS	A2LA	NATA
5. Technical requirements	5.6 Measurement traceability			
	5.6.1 General	Validation	Not applicable	Associated MU must be traceable
	5.6.2 Specific requirements			
	5.6.3 Reference standards and reference materials			Indicate the traceability to international standard test suites
	5.7 Sampling	“		Combinations of Different conditions and variables, etc
	5.8 Handling of test and calibration items		Under configuration management	Copies may be made, and are traceable to the original item
	5.9 Assuring the quality of test and calibration results		Efforts documented by the lab.	Relating to PT
	5.10 Reporting the results			
	5.10.1 General		Test suites	Interrelate to show a complete accredited test
	5.10.2 Test reports and calibration certificates			
	5.10.3 Test reports			
	5.10.4 Calibration certificates			
	5.10.5 Opinions and interpretations			
	5.10.6 Testing and calibration results obtained from subcontractors			
5.10.7 Electronic transmission of results				

Major Points to be Compared

- 1. Scope
 - KOLAS, A2LA and NATA
- 5.3 Accommodation and environmental conditions
 - KOLAS : protection and confidentiality
 - A2LA : separation of any design/development or production
 - NATA : hardware and associated software
- 5.4.6 Estimation of measurement uncertainty (MU)
 - A2LA
- 5.6 Measurement traceability
 - NATA
- 5.7 Sampling
 - KOLAS and NATA
- 5.8 Handling of test and calibration items
 - A2LA and NATA

Documents' Characteristics – 1. Scope

KOLAS	A2LA	NATA
<p>Embedded Software Testing;</p> <ul style="list-style-type: none">• security software,• embedded software,• bio-recognition software,• game software,• mobile software, etc.	<p>Information Technology; < Types of testing ></p> <ul style="list-style-type: none">• Computer security testing• Mathematical and computational science testing• Communication & protocol testing• Software diagnostics and conformance testing• Software program testing• Network technology testing• Systems conformance testing	<p>Information and Communications Technology;</p> <p><Classes and subclasses of test ></p> <ul style="list-style-type: none">• Information security evaluation• Gaming software tests• Acceptance tests• Functionality tests• Performance tests• Stability tests• Compatibility tests• Technical Embedded System tests• Healthcare tests<ul style="list-style-type: none">01 Secure Message Delivery02 Healthcare Identifiers

5.3 Accommodation and environmental conditions

KOLAS	A2LA	NATA
<p>Protection of facility confidentiality and ownership</p> <ul style="list-style-type: none"><li>• The policy and procedure for the confidential information and customers' ownership to be protected.<li>• The policy and procedure for the facility storing the confidential test information.<li>• Conduct the ethics policy to protect customers' confidential information and ownership.<li>• Define the ownership protection system.	<ul style="list-style-type: none"><li>• Separated from any design or production environment. No other concurrent activities occurring during testing.<li>• Any virtual environments or other special configurations shall be fully documented in the test records along with a justification to be defined.<li>• When ASP services are utilized for testing, any outside system shall be documented in the technical records.	<ul style="list-style-type: none"><li>• 'Environment' includes the hardware and associated software on which the software being tested is running.<li>• The test environment and the software under test shall be controlled and records kept.

5.4.6 Estimation of Measurement Uncertainty (MU)

KOLAS	A2LA	NATA
<p>Based on ISO/IEC 17025</p> <p>No additions</p> <p>Not applicable</p>	<p>• MU may be applied to IT under the following conditions:</p> <p>When the SUT is performing mathematical operations or using approximations and rounding in statistical analysis, calculus, or geometry, an uncertainty may be introduced by the algorithms themselves. Where this becomes significant to the output or functioning of the SUT, MU shall be documented</p>	<p>Based on ISO/IEC 17025</p> <p>No additions</p>

5.6 Measurement traceability

KOLAS	A2LA	NATA
<ul style="list-style-type: none">• System : Based on ISO/IEC 17025• Software only : No additions <p>Not applicable</p>	<ul style="list-style-type: none">• System : Based on ISO/IEC 17025• Software only : No additions <p>Not applicable</p>	<ul style="list-style-type: none">• System : Based on ISO/IEC 17025• Software only : No additions <p>* Associated MU must be traceable</p> <ul style="list-style-type: none">• Determined for each link of the traceability chain back to a realized standard

5.7 Sampling ; Selection of test cases

KOLAS	A2LA	NATA
<ul style="list-style-type: none">• To test different conditions and combination of variables• Needed to be re-executed for regression testing	<p>Based on ISO/IEC 17025</p>	<ul style="list-style-type: none">• To test different conditions and combination of variables;• Selection of regression tests to rerun;• Selection of source code to review based on risk;• Randomness testing in gaming systems. Sampling records for testing conducted must be maintained.

5.8 Handling of test and calibration items

KOLAS	A2LA	NATA
<p>Based on ISO/IEC 17025</p> <p>No additions</p>	<ul style="list-style-type: none">Laboratories shall maintain software test candidates (SUT samples) under configuration management with appropriate metadata to ensure it is unique.SUTs maintained under a common configuration management system accessible by customers shall be controlled and isolated.	<ul style="list-style-type: none">Apply specifically to the test items.<ul style="list-style-type: none">In the case of software, copies of the test item may be made and used for testing provided that the copies are traceable back to the original supplied test item and are controlled e.g. by lodgement in a version control system.Additional labelling of equipment under test may not be necessary

Summary, Discussion and Future Work

- Scope of testing ; All different types of testing
 - Software only, IT, ICT, CC
- Accommodation and environmental conditions
 - Focused on confidentiality, documents, and records
- Estimation of MU
 - May be applied to the statistical analysis, etc. in A2LA
- Measurement traceability
 - Not applicable for software only in all ABs
- **Functional safety systems ***
 - Current specific requirements are applicable to any kind of testing (?)

* Functional safety systems

- Electrical/Electronic/Programmable Systems (IEC 61508)

focuses on Responsible Person (SIL 1, 2, 3, 4)

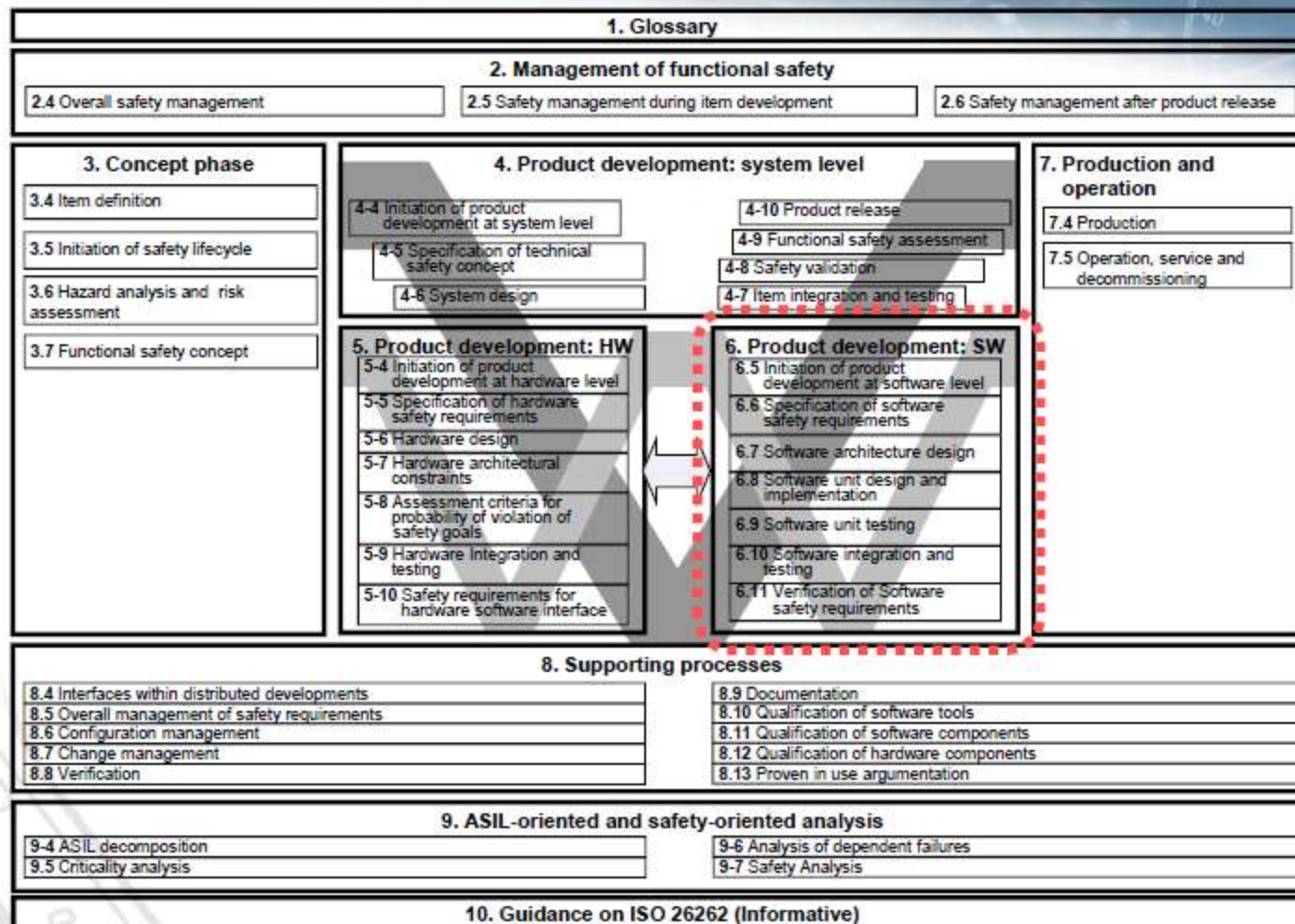
*SIL (Safety Integrity Level)

- Automotive Electrical/Electronic System (AEES)

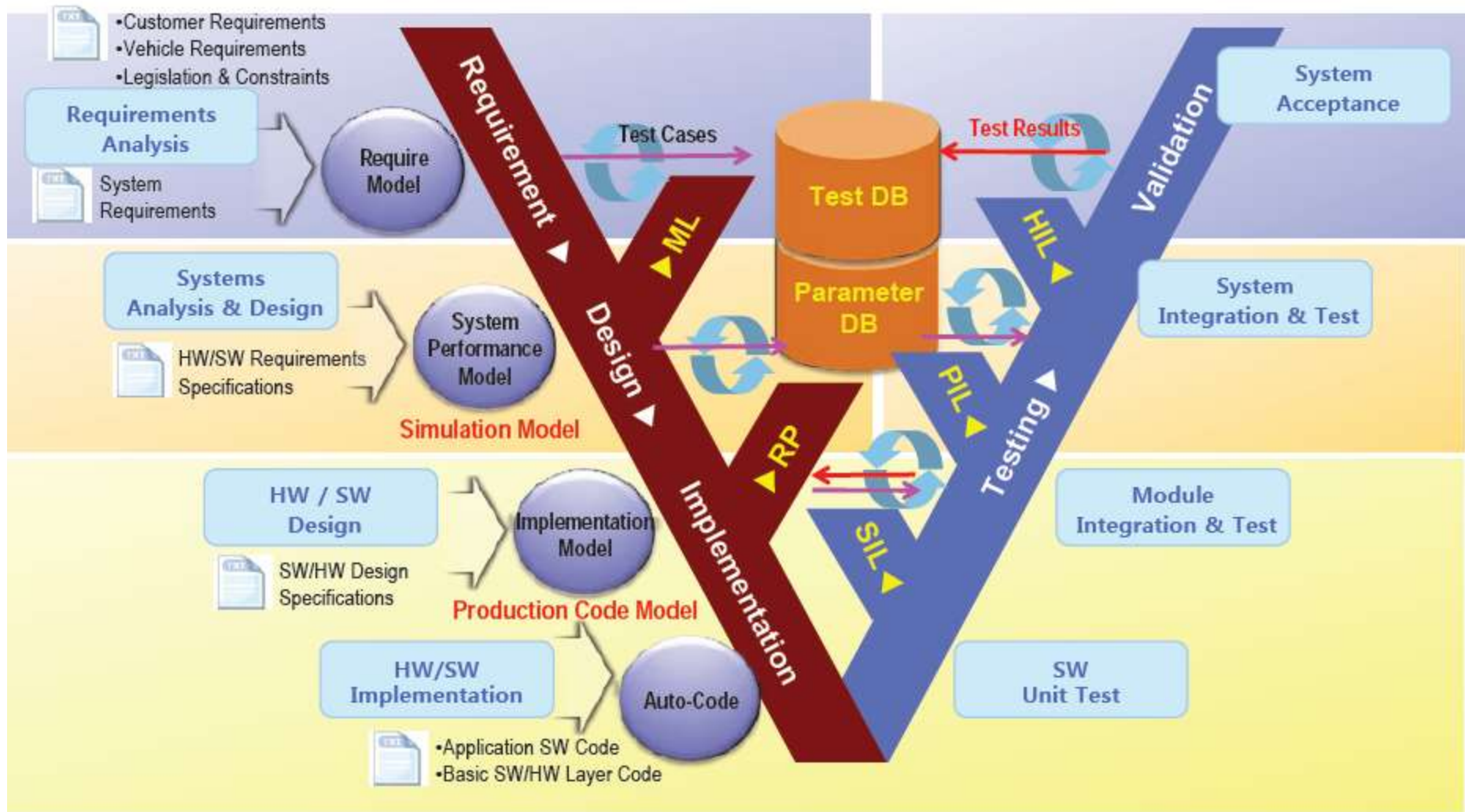
focuses on Safety Management System (SMS)
(ISO 26262-6; FDIS) (ASIL A, B, C, D)



Functional safety systems



□ MBD (Model Based Development) Process



Summary, Discussion and Future Work

- Continue to study on a various types of software testing
 - Add to appendix, note, references, etc
- WG recommends software experts to participate in activities
 - Propose to hold a workshop on software testing included functional safety systems in 2012
- Finally, a guidance document may be prepared by APLAC level

Thank You!

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