

 SURFACE VEHICLE STANDARD	 J2746 APR2009
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Software Assessment Repository	

RATIONALE

Not Applicable.

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1. SCOPE

This standard is intended to provide corporations that develop embedded software for the automotive industry direction on how to effectively publish and promote their organization's development capabilities. The organization's maturity may be measured through several capability assessment methods; this document addresses how the results of those assessments are shared within the SAE J2746 Software Assessment Repository. The repository is the online database system utilized by the SAE to facilitate accurate and secure sharing of corporations' software development capabilities.

The SAE Software Assessment Repository is a web-based repository that allows organizations that develop embedded software to post and share their assessments in a uniform, disciplined manner. The repository does not mandate the use of one assessment method over another; rather, it reports the salient results from industry accepted assessment methods. It is important to recognize that both OEM's and suppliers developing software which goes into vehicles should participate in the SAE J2746 Repository and follow improved practices of software engineering. Since car manufacturers OEMs (Original Equipment Manufacturer) also develop embedded software, they should participate in the Software Assessment Repository in addition to the supply base.

In order to better focus software improvements in the industry, the intent of Software Process Improvement (SPI) and related assessments must be focused upon industry specific technologies. When a customer is interested in the capabilities of a supplier, the relevance of those capabilities to the customer's need is critical. SAE J2746 proposes to utilize the Functional Domains of the automotive electronics systems as defined by AutoSAR to partition suppliers' capabilities. The six functional domains as defined by AutoSAR are Chassis, Powertrain, Safety, Multimedia/Telematics, Body/Comfort and Human Machine Interface.

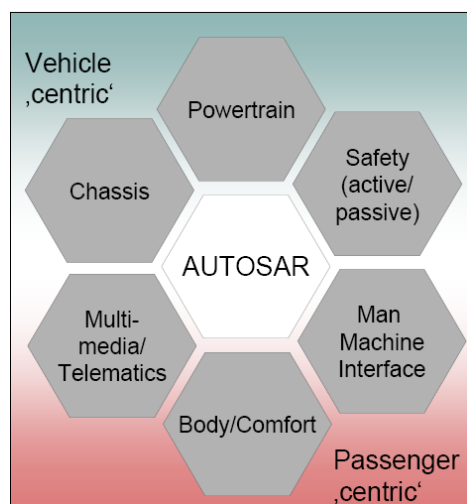


FIGURE 1 - AUTOSAR FUNCTIONAL DOMAINS

These functional domains provide the repository the ability to better define the capabilities of OEMs and Suppliers for creating specific types of product software. Furthermore, by also understanding the geographic locations of OEM's and Supplier's engineering facilities, it is possible to understand the capability of a specific team, in a specific location to create a product of a specific Functional Domain. Instead of a blanket statement that Company Y is Level 3, a more precise statement of; "Company Y's engineering team located in Facility X and engineering products of Functional Domain Z is Level 3" would be found within the SAE J2746 Software Assessment Repository (SAR), and offer a higher fidelity of insight into a company's capabilities.

1.1 Purpose

The impact of software development on pre-production engineering costs has escalated in the last five years to unprecedented levels. Much of this cost is impacted by the quality and reliability of the software deliveries to vehicle builds. Rapid growth of feature content in electronics products has opened the field for new suppliers whose qualifications for software development are often not clear. Organizational level assessments from CMMI, SPICE or other methods do not offer enough granularity or relevance to the OEM's to ensure quality, on-time delivery. The question should not be, "Is this supplier capable?" But rather, "Is the team this supplier intends to use on this product capable of engineering software for products of this Functional Domain?" The significant difference between the answers to these two questions acts as the motivation for the SAE J2746 Software Assessment Repository. The intent of the repository is to promote finer resolution of software capability in an effort to dramatically improve the quality and reliability of automotive embedded software. This support will promote better software development in the industry reducing pre-production engineering re-work, as well as costly warranty issues which result from poor software quality.

2. REFERENCES

There are no referenced publications specified herein.

3. DEFINITIONS

3.1 Terms

Term	Definition
Assessed	To determine the value, significance or extent of – http://dictionary.reference.com In context of this document, refers to the organization which was the subject of a capability assessment
Automotive Embedded Software	Software typically written to interact with hardware to perform a function generally utilized in electronics that are on-board production automobiles
AutoSAR	AUTOSAR (AUTomotive Open System ARchitecture) is an open and standardized automotive software architecture, jointly developed by automobile manufacturers, suppliers and tool developers. (http://www.autosar.org)
CMMI	Capability Maturity Model Integration, ® Registered mark of Carnegie Mellon University is a process improvement approach that provides organizations with the essential elements of effective processes. It can be used to guide process improvement across a project, a division, or an entire organization. CMMI helps integrate traditionally separate organizational functions, set process improvement goals and priorities, provide guidance for quality processes, and provide a point of reference for appraising current processes. (http://www.sei.cmu.edu)
ISO/IEC 15504 (SPICE)	ISO/IEC 15504 is published as a full international standard under the general title Information Technology — Process Assessment.
SAR	Software Assessment Repository, the on-line database of software assessments created by organizations participating in SAE J2746.

4. TECHNICAL REQUIREMENTS

In the fall of 2005, the Automotive Industry established the SAE J2746 Software Assessment Repository (SAR) Task Force with the purpose of achieving significant improvements in software quality and reductions in cost throughout the automotive supply chain.

The Software Engineering Institute (SEI) and International Standards Organization (ISO) have developed specific guidelines for software development processes that have been embraced throughout the supply chain in the manufacture of products for automotive applications, as well as other industries. These requirements are published internationally as ISO 15504-series (aka SPICE and AutoSPICE), and CMMI v1.2 Dev by SEI. In this document these standards will be collectively referred to as CMMI/SPICE.

An initiative of the SAE J2746 Task Force was the development of a global scheme for the use of assessment results performed by assessors, based on the CMMI/SPICE standards. This system will house assessment data which will be available to the SAE J2746 SAR members by the establishment and maintenance of a common global SAE J2746 Software Assessment Repository (SAR).

4.1 Software Assessment Repository Vision

Foster the improvement of automotive software development capabilities by promoting more effective software process improvement activities and assessments

Repository Motivations

- Is Automotive Software Quality Improving?
- Is it better or cheaper?
- Is "Our Company is Capability Level X" useful?
 - Does the declaration have enough resolution?
 - Is it marketed and interpreted appropriately?
 - What group(s) was(were) assessed and when?
- Do Assessment Results Distinguish Suppliers?
 - Are the OEM's doing Assessments internally?
 - Do the OEM's want to write more software?
 - What is the Automotive Industry capability/maturity as a whole?
 - How does our organization compare to the collective whole?
- How can improvement initiatives costs be contained?
 - Can accurate results of assessments be easily available to my customers?
 - Can I reduce the number of assessments?

Potential Repository Impacts

- Reduce Redundant OEM Assessments
 - Reduce OEM Assessment Expense
 - Saves supplier burden
- Provide Consistent Results
 - Improve Assessment Meaning & Interpretation
 - Provide details of the maturity level
 - Prevent surprise issues due to loose interpretations
- Improvement in Industry Software Quality
 - By promoting effective process improvement
 - Visibility to organizations and their improvement initiatives
 - Benchmarking and tracking the overall maturity of the Industry

4.2 Goals of SAE J2746 Software Assessment Repository

The Software Assessment Repository has five main goals designed to assist in achieving the stated Vision. These five goals are as follows:

1. Develop criteria to annotate results of assessments providing information which will assist the SAE in measuring automotive industry software development capabilities.
 - a. Develop a detailed set of evaluation criteria.
 - b. Annotate the assessment results provided by users of the repository.
 - c. Assist the SAE in measuring automotive industry software development capabilities.
2. Provide guidelines for understanding annotated assessment data and its use in evaluation of potential software suppliers.
 - a. Help a user determine the capability of a software supplier in a specific area.
 - b. Explain the SAE annotation criteria defined in Goal #1, to interpret a supplier's results.



3. Create a data repository for automotive organizations to selectively share capability assessment results between customer and supplier.
 - a. Actual assessment results plus SAE annotations
 - i. In the basic form/method in which the supplier was assessed
 - ii. If the supplier was assessed using CMMI, then CMMI results will be reported.
 - b. Additional SAE annotations will be provided
 - i. Added to help refine the fidelity of the information from assessments (Goal #1)
 - ii. A simple interpretation guide will be provided to explain these SAE annotations, and their definition (Goal #2)
 - c. Allow detailed sharing between repository members
 - i. Access granted by supplier to customer
 - ii. Details are restricted only to potential customers
 - d. Provide global secure access
4. Analyze repository data and publish industry "state of practice" reports.
 - a. Generate relevant Auto Industry Analysis
 - i. Specific results not publicly tied to supplier
 - ii. Comparison of ECM software suppliers by Functional Domain
 - b. Mean, Min and Max on different Process Areas
 - i. To compare your possible suppliers against
 - c. Compilation of best practices
5. Establish industry software development capability targets.
 - a. Prescribe the use of SAE standards to close gaps and achieve industry targets

4.3 Role Descriptions of Various Users of the Software Assessment Repository

4.3.1 Assessor

The individual responsible for performing the capability assessment and compilation of the analysis data being placed into the repository could be any person from the assessed organization or neutral 3rd party qualified individual. May also enter the data into the repository if they have Organizational Administrative rights for the company that they assessed.

4.3.2 Assessed

The Assessed is the SAE J2746 SAR participating organization that has stored their assessment results in the on-line SAR.

4.3.3 Administrator

The Administrator is a person who has the authority to update and remove assessment results. There are three types of administrators.

4.3.3.1 SAE Administrator

The SAE Administrator is a person who grants User IDs, and has access to all areas of the SAE J2746 SAR, including archived data.

4.3.3.2 Regional Administrator (Asia, Europe, Americas)

The Regional Administrator is a person who is allowed to make modifications to data once it has been entered into the SAE Assessment Repository.

4.3.3.3 Organizational Administrator

The Organizational Administrator is one or more people at the Assessed organization that has “Organizational Admin” privileges to the repository for their organization. The Organizational Administrator will have the authority to perform the following actions:

- Enter assessment results.
- Grant any user access to view the company’s assessment results.
- Grant access to other people within their organization to have Organizational Admin privilege.

4.3.4 User

The User is any person who has an ID in the SAE Software Assessment Repository. They may be employees of Assessed organizations that are members of SAE J2746 SAR. Users are assigned access privileges which allow, or prevent access to assessment results stored in the database.

4.4 Use Case: Enter Assessment Results

4.4.1 Brief Description

This use case is designed to describe the events that occur when the assessed organization has received their assessment results, and are ready to publish this information into the SAE software assessment repository. The Actor for this use case will be referred to as “The Assessor”. The Assessor could be any person from the assessed organization or the certified assessor. This use case will cover the steps for the Assessor to enter the assessment results into the SAE software assessment repository.

4.4.2 Flow of Events

4.4.2.1 Basic Flow

Enter Assessment Results.

This use case starts when an organization receives assessment results and wants to provide them to the SAE Software assessment repository to publish.

- a. The Assessor, on behalf of the assessed organization, will log into the repository with a user name and password that is exclusive for that organization’s account.

NOTE: Accounts in the system are linked to assessing organizations which allows them the rights to enter data.

- b. The Assessor will choose “New Assessment Results”.
- c. The Assessor will fill in information specific to the assessment (e.g., organizational, assessment scope, assessment target, assessment type, etc.). See the SAE Assessment Criteria for more details.
- d. The Assessor will enter assessment results by Process Area.

NOTE: Process Areas will be based upon Assessment Type (CMMI or SPICE).

- Each process area will have a pull down of results for each section of that process area (Fully, Largely, Partially, None etc).
- It will be required to enter a result for each section related to that process area for the given Target Level for CMMI-staged assessments.