RQA QUALITY MANAGEMENT CAPABILITY

For SES ENGINEERING Studio

THE REUSE COMPANY

A SMARTER WAY TO IMPROVE THE QUALITY OF YOUR ENGINEERING ITEMS

ABOUT

RQA - QUALITY Management Capability is an additional capability of **SES ENGINEERING Studio**, a software environment aimed to digitalize systems engineering capabilities. RQA - QUALITY Management Capability allows the user to define, calculate, manage, and report quality for any engineering item accessed from any available connection in **SES ENGINEERING Studio.**

Poor-quality engineering items during the project concept and design phases leads to rework, extra costs, delays and, severe consequences if not detected.

A tool to automate the routine quality inspection and analysis of different types of engineering items helps minimize the cost of quality inspections, while increasing the consistency and overall quality of the projects.

Defects can be caused either by inadequate engineering decisions or by the incorrect representation of engineering information in requirements, models, etc. Automatize the quality inspection activities will give engineers more time for better decision-making while providing means to detect and fix defects.

Natural Language Processing and Artificial Intelligence provide a semantic analysis towards more accurate inspections.

QUALITY

While performing the quality analysis, RQA - QUALITY Management Capability analyzes engineering items using the agreed best practices and rules (including INCOSE guide to Writing Requirements), checklists, policies, etc. to identify defects, inconsistencies, and incomplete information.

TIME

The quality inspection of requirements specification is a task that requires several steps and that can be very time-consuming when not realized automatically.

MONEY

Reducing rework (and consequently costs) caused by flaws at all levels in your system engineering items can be achieved by automating peer-reviewing and quality analysis.

MAKING THE CONCEPT OF QUALITY ANALYSIS UNIVERSAL

The current version of RQA extends the quality analysis concept and now covers all the engineering items generated during the systems engineering lifecycle. Quality must be managed not only within requirements, but also within logical models (UML or SysML), physical models (MODELICA, Simulink, etc.), 3D models, test cases, FMEA tables... and even textual documents (e.g.a SEMP): all these types of engineering items can now be analyzed with RQA.

CUSTOMIZABLE QUALITY FUNCTIONS

Different companies, different industries, methodologies and types of projects, different types of documents and diagrams at different levels of abstraction?
RQA is the tool that can cope with this plethora of different engineering items, methods, processes and tools. RQA provides tailored analysis and configurable assessments, represented in a centralized system quality scoreboard, with the intention to provide a quick understanding of the current quality status, and quality evolution of a project.

RELEVANT FIGURES

Close to 90% of the defects are introduced during
the Requirements Engineering and Design phases. However, only 20% are actually discovered.

RQA - QUALITY Management Capability helps reducing the defect rate by enabling a thorough and early detection of issues in requirements specifications, thus reducing the cost induced by requirement reviews.

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THE QUALITY MANAGEMENT CAPABILITY PERSPECTIVE

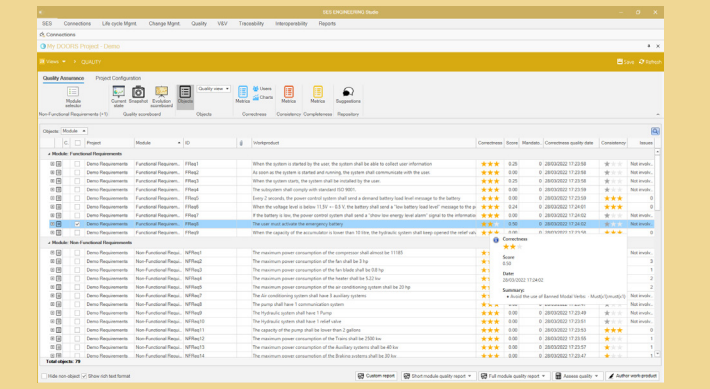
SES ENGINEERING Studio provides means to connect to a large number of engineering tools (requirements management tools, UML/SysML/MBSE tools, simulation tools, MS Excel sheets, MS Word documents…), accessing the key elements managed in those tools, and provide an automatic inspection based on the CCC criteria.

CCC - Correctness, Consistency and Completeness- are the three quality dimensions to thoroughly analyze any engineering artifact. While Correctness is focused on the quality of individual items, Consistency and Completeness consider the whole specification (document, model...) or sets of specifications to detect missing elements, as well as the lack of consistency among them.

SPECIAL CASE: REQUIREMENTS QUALITY ANALYSIS

The RQA-QUALITY Management Capability provides an extensive set of quality metrics to analyze different types of requirements repositories: IBM DOORS (both classic and NG), PTC Windchill Requirements, 3D Experience Requirements Manager, Siemens Polarion, Siemens Teamcenter, DS Reqtify, MS Word, MS Excel, ReqIF and OSLC compliant information sources.

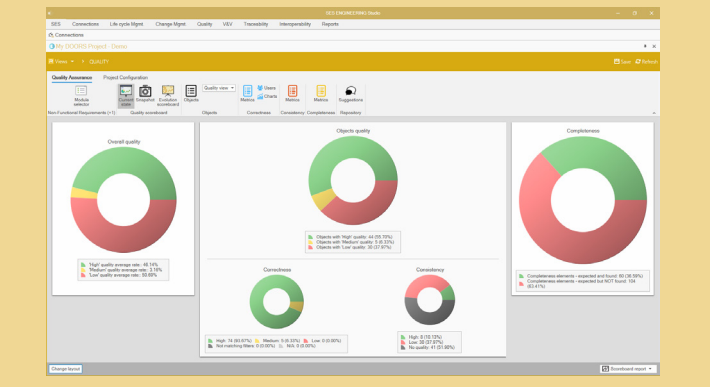
These metrics follow the CCC approach and include extensibility and customization mechanisms which enable increasing the number of metrics by using parameterizable metrics (metrics that can easily be configured by the end-users), custom-code metrics (metrics which can be coded by advanced end-users), and checklist-based metrics (which enable a manual-oriented inspection).



THE CONCEPT OF QUALITY PROJECT

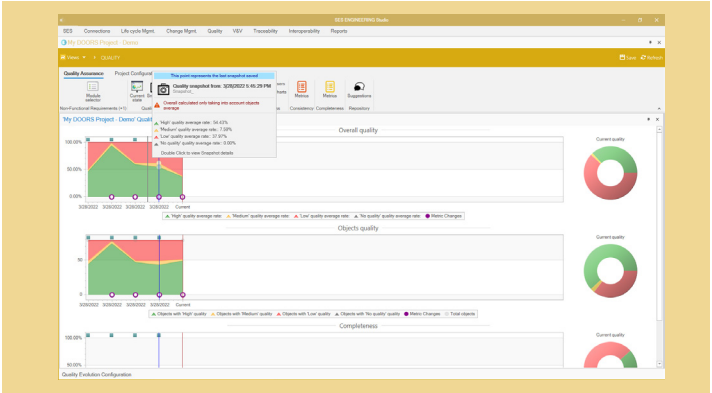
The QUALITY Management Capability for **SES ENGINEERING Studio** uses the notion of Quality Project to manage the quality of large and heterogeneous sets of engineering items in one single inspection process. A Quality Project addresses the quality of a set of requirement modules, architectures, models, documents and other types of engineering items, allowing a proper and global quality management activity. A Quality Project, which might contain requirement documents, UML/SysML models, physical models, textual documents, spreadsheets…, will not only provide correctness checking, but also an overall completeness and consistency check.

Moreover, since every project is different, and every piece of that project is different, the QUALITY Management Capability allows a flexible mechanism to assess different elements within the same Quality Project with a different combination of quality metrics.



QUALITY ALONG THE SUPPLY CHAIN

SES ENGINEERING Studio offers functions to reduce inefficient interactions between OEMs and suppliers throughout the supply chain by allowing all parties to share a common quality view. OEMs can establish a set of metrics in **RQA-QUALITY Management Capability (a quality certificate)** and share this certificate with everyone in the supply chain. After that, the OEM can receive periodic quality reports from the supplier allowing the overview of the results using a simple procedure.



LIBRARIES

Safety-critical system development must comply with standards. Beside the out-of-the-box metrics, knowledge libraries are available on The REUSE Company's website: the rules described in the INCOSE Guide for Writing Requirements, the recommendations of the NASA's Systems Engineering Handbook, the requirements patterns defined by EARS (the Easy Approach to Requirements Syntax) and SOPHIST, the glossary, patterns and quality rules defined in the ECSS standards followed by the space industry... You can also create your own set of metrics and share it in the form of a quality library.

THE QUALITY MANAGEMENT CAPABILITY WITHIN THE ECOSYSTEM OF CAPABILITIES OF SES ENGINEERING STUDIO

- The rules that help create high-quality systems engineering items (requirements, model names, messages names, etc.) in RAT - AUTHORING Tool based on the CCC approach (Correctness, Consistency, Completeness), are defined in the RQA - QUALITY Management Capability.
- KM - KNOWLEDGE Manager defines the textual patterns used by some of the quality metrics managed in the RQA - QUALITY Management Capability. KM - KNOWLEDGE Manager also enables to define the controlled vocabulary and knowledge structures used during the quality inspection by the RQA - QUALITY Management Capability.
- The Verification & Validation Capability goes beyond the concepts of quality management defined in RQA and covers the Verification and Validation stage, thus reusing all the quality metrics, quality analysis and reports defined in the RQA - QUALITY Management Capability into the V&V Capability.
- TRACEABILITY Studio shares the connectivity capabilities and brings additional functionality to quality management, like hyper-traceability.

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