RQA - QUALITY STUDIO

As a capability for SES ENGINEERING Studio or Stand-Alone

THE REUSE COMPANY

A SMARTER WAY TO IMPROVE THE QUALITY OF YOUR REQUIREMENTS, DOCUMENTS, AND MODELS.

ABOUT

RQA – QUALITY Studio® allows engineers to define, calculate, manage, and report quality for any work product accessed from any available connection in SES ENGINEERING Studio (requirements, logical models, functional models, simulations, test cases, physical assemblies, risks, etc.)

It is well known in the Systems Engineering domain that poor-quality engineering items during the project concept and design phases lead 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. Automating 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 for more accurate inspections.

QUALITY

While performing the quality analysis, **RQA – QUALITY Studio®** analyzes requirements and other engineering items using the agreed-best practices and rules (including the INCOSE Guide to Writing Requirements), checklists, policies, etc. to identify defects, inconsistencies, and incomplete information.

TIME

The quality inspection of requirements specifications 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 – QUALITY Studio®** extends the quality analysis concept and now covers all the **engineering items generated during the systems engineering life cycle**. 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, types of projects, different types of documents and diagrams at different levels of abstraction?

RQA – QUALITY Studio® is the tool that can cope with this plethora of different engineering items, methods, processes, and tools. **RQA – QUALITY Studio®** 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.

EARLY DETECTION OF DEFECTS

Close to 90% of the defects are introduced during the Requirements Engineering and Design phases. However, only 20% are actually discovered.
RQA – QUALITY Studio® helps reduce the defect rate by enabling a thorough and **early detection of issues** in **requirements specifications** and **logical models**, thus reducing the cost induced by human reviews.

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THE QUALITY MANAGEMENT CAPABILITY PERSPECTIVE

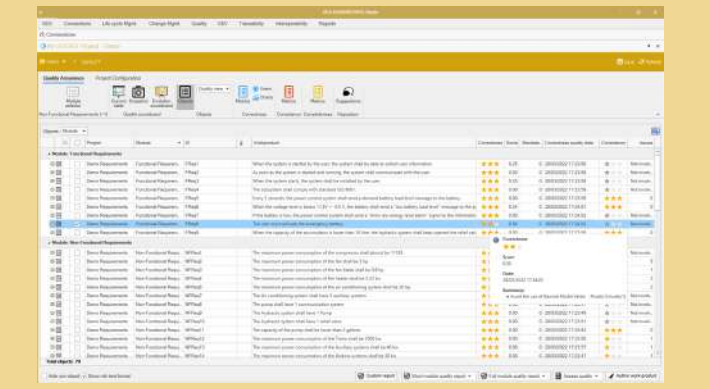
The RQA – QUALITY Studio® provides a means to connect to a large number of **engineering tools** (requirements management tools, UML/SysML/MBSE tools, simulation tools, MS Excel sheets, MS Word documents…), accessing the key elements managed in those tools, and provide an automatic inspection based on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

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

SPECIAL CASE: REQUIREMENTS QUALITY ANALYSIS

RQA – QUALITY Studio® provides an extensive set of **quality metrics** to analyze different types of requirements repositories: **IBM DOORS** (both 9.x and Next Generation), **PTC Windchill Requirements, Siemens Polarion, Codebeamer, Siemens Teamcenter, MS Word, MS Excel,** among others.

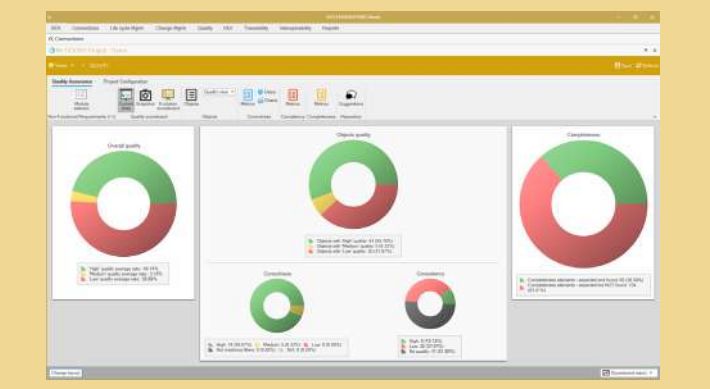
These metrics follow the **CCC approach** and include extensibility and customization features that enable increasing the number of metrics by using parameterizable metrics (metrics that can easily be configured by the end-users), custom-code metrics (metrics that can be coded by advanced end-users),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



THE CONCEPT OF QUALITY PROJECT

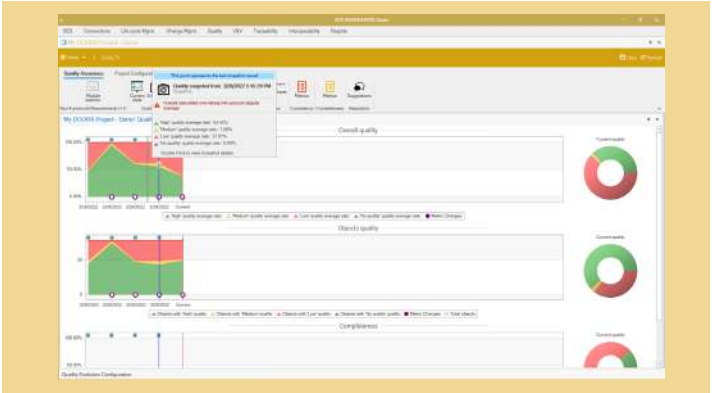
RQA – QUALITY Studio® uses the notion of a **Quality Project** to manage the quality of large and heterogeneous sets of engineering items in one single inspection process. A Quality Project addresses the quality of a set of **requirements modules, architectures, models, documents**, and other types of engineering items, allowing a proper and global **quality management activity**. A Quality Project, which might connect to requirements documents, UML/SysML models, physical models, textual documents, spreadsheets, etc. 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 **RQA – QUALITY Studio®** 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

RQA – QUALITY 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 Studio®** (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 systems 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 in 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

SES ENGINEERING Studio is a Software tool designed to manage the System of interest life cycle by integrating and interoperating the complete **ecosystem of tools** involved in its concept, development, production, utilization, support, and retirement. By becoming the Integration Hub, SES provides full **technical management support (Configuration management, Traceability management, Conflict management, Quality management, Information management, Knowledge management, PLE,** etc.) to an extended list of connectable tools allowing smart **interoperability** among them and complete **life cycle support**. The combination of **connectivity** to existing tools, **interoperability** among them, **technical management digitalization** for whatever connection, **ontologies**, a repository for **synchronizing the sources of truth** provides a powerful system life cycle management solution with a strong REUSE approach.

The **RQA – QUALITY Studio®** is completely integrated inside SES. It represents the quality capability of the SES environment and, therefore, can be combined with the rest of the capabilities SES offers, to provide a holistic and complete Digital Systems Engineering approach.

CONTACT

The REUSE Company
contact@reusecompany.com
www.reusecompany.com
@ReuseCompany

North & East Europe
Spanska Ambassadens Handelsavdelning
Drottninggatan 82
111 36 Stockholm – Sweden
+46 (0) 72 232 24 63

West Europe, the Americas & Japan
Margarita Salas, 16
Parque Tecnológico LEGATEC
28919- Leganés. Madrid (Spain)
+34 912 17 25 96