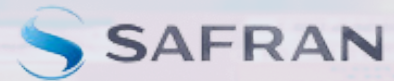


The leader in on-board equipment and systems for airplanes and helicopters accelerates development in collaboration with Polarion ALM



"The real-time traceability visualization is also a strong point of Polarion, especially in the aeronautical regulatory context where it is a critical aspect as it is meticulously inspected during audits and certification."

The situation

SAFRAN Group is one of the leaders in providing systems for aeronautics, space, and defense. The group has 87,000 employees in 27 countries.

Within the group, Safran Aerosystems designs high-tech solutions that optimize aircraft performance and flight safety. As the world's leader in emergency evacuation systems and crew oxygen systems, Safran Aerosystems is also a major player in fuel and fluid systems.

Developments within Safran Aerosystems involve both systems (multiple interfacing equipment contributing to the execution of one or more missions) and individual equipment, whether simple or complex (i.e., several hardware or software modules as interfaces). These developments are made in accordance with guidelines recommended by authorities and customers (ARP-4754, ARP-4761, DO-160, DO-254, DO-178, DO-331...).

"The increasing complexity of customer needs and, therefore, of products, the growing regulatory and internal constraints within the company, and the need to manage an increasing large amount of data have led us to base our developments on a tool framework including the combined use of Model Based System Engineering (MBSE) and Requirement Based Engineering (RBE)", explains Stéphane Francois-Lubin, Team Manager of the System Methods & Tools team, Fuel & Fluid Systems Division, at Safran Aerosystems.

"In addition, the historical tooling for requirements management and traceability (IBM® DOORS, Reqify™...) was beginning to show its limitations", he added:

- Difficulty in tracking various changes, revisions, and configurations,
- Difficulty in generating deliverables,
- Lack of specific templates based on use (e.g., capture of customer needs, definition of processes and plans, system development, equipment, or Hardware/Software modules)
- Time-consuming manual activities
- Non-ergonomic user interfaces

- Difficulties with version upgrades and compatibility issues between versions,
- Lack of customizable views,
- No concurrent editing
- Slowdown in use (tools/macros).

The decision to choose a new requirements management tool also aimed to:

- Improve change management: faster incorporation of customer change requests,
- Better capture and tracking of customer needs to meet exact requirements,
- Simplify and speed up requirements traceability management, whether for derivation or test coverage,
- Reduce time spent on low-value activities (document generation, compilation, generation of indicators...),
- Facilitate multisite and collaborative work.

The chosen solution

Safran Aerosystems chose Polarion® ALM™, a collaborative platform for requirements, quality, and test management, from Siemens Digital Industries Software, with Polarsoft as the authorized Smart Expert reseller on the French market. Polarion met the aforementioned criteria and helped achieve these objectives notably through:

- A modern user interface,
- A natively collaborative solution,
- Dynamic traceability that can be visualized in real time,
- Metrics that are easy to implement and viewed live.

Use of the tool

Safran Aerosystems manages the import of customer specifications in Polarion, the authoring of requirements (systems, equipment, software), traceability between requirements, their validation, the definition of test cases, and their results.

All engineering teams involved in development are gradually integrated into the tool, including system architects, V&V, Safety, Quality, etc.

"Polarion allows multi-site projects to collaborate easily. Engineers can work on the same LiveDocs simultaneously, and potential conflicts during editing are well detected and managed by Polarion. Additionally, it reduces the need to send documents outside of Polarion, as it is based on web technologies (sharing URLs instead)," reports Stéphen Perun, MBSE referent of the System Methods & Tools team.

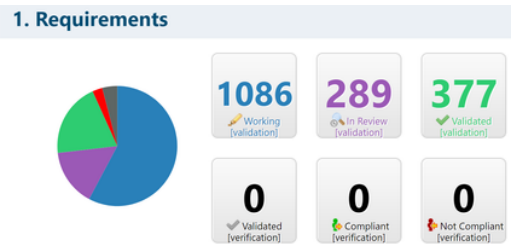
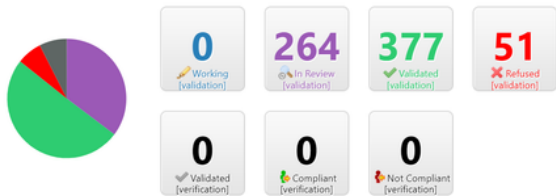
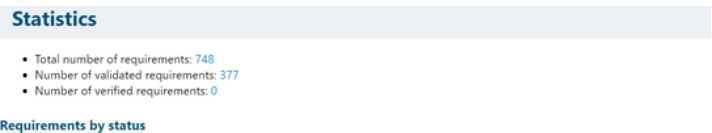
Modularity

Thanks to Template Projects, the System Methods & Tools team easily deploys its engineering meta model when initializing a new project. Moreover, these templates are easily customizable and have been adapted to meet the exact needs and data management requirements of the engineering teams (system template, equipment template, software template, etc.).

"These 'ready-to-use' templates integrate the minimal configuration for our teams to develop our products, as well as the tools and indicators useful at their level", notes Stéphen Perun.

Dynamic Metrics and Reports

Polarion provides useful indicators for both data-producing teams and project management. For instance, the V&V engineer can directly view the progress of his validation work and what remains to be done, while the project manager can visualize the level of completion of various activities at multiple specification levels.



"The real-time traceability visualization is also a strong point of the solution, especially in the aeronautical regulatory context where it is a critical aspect as it is meticulously inspected during audits and certification. This allows, for example, to identify missing traceability as early as possible", explains Kévin Chatelain, RBE referent of the System Methods & Tools team.

Safety Related Req. ID	Safety Related Req. Safety Origin	Organs Safety Related Req. ID	Organs Safety Related Req. Safety Origin
FFQM-2946	CMA-independent	ERD_FQMC-1831	CMA-independent
FFQM-2949	CMA-independent	ERD_FQMC-1048	CMA-independent
FFQM-2950	CMA-independent	ERD_FQMC-1756	FC
FFQM-2948	CMA-independent	ERD_FQMC-2310	N/A
FFQM-32455	DAL-independent		

Configuration Management

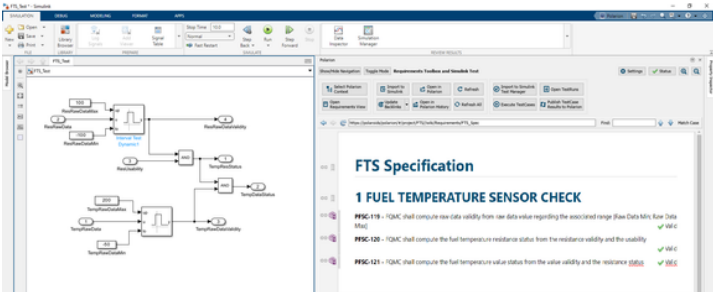
One of the challenges addressed by ALM tools is the configuration management of development artifacts, in particular enabling teams to analyze and work on frozen inputs. Polarion facilitates this batch work through the concept of collections, allowing different teams to work within their context on different versions of a specification.

Thus, one can ensure that an equipment specification has been written with respect to the correct validated version of an upstream specification and that the test cases are based on the correct version of the specification.

Polarion integrates with the testing and development environment of the Fluids & Fuel Systems division, either through off-the-shelf solutions (connectors and extensions provided by the vendor or partners) or through custom solutions using the Polarion API.

Integration with Simulink®

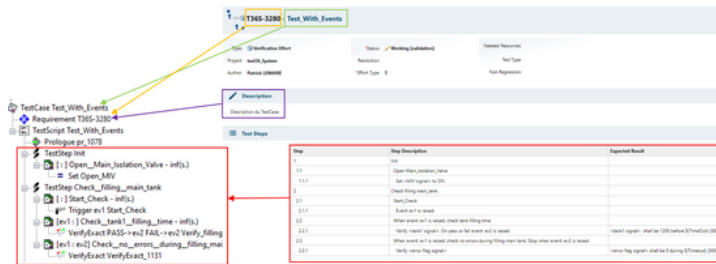
The Simulink connector establishes traceability between simulation elements and requirements and/or tests. The Polarion interface is directly integrated into Simulink, allowing the user to continue working in a familiar environment with data from Polarion. The user can then edit the deliverables in the Polarion environment by simply importing model elements.



Integration with SCADE

The engineering teams also developing with SCADE, and an integrated connector of Polarion allows for traceability between SCADE model elements and Polarion requirements in order to validate the implementation and completeness of the models.

When connectors are not available for interoperability between Polarion and other tools, it is possible to create data transfer gateways between other tools (e.g., TechSAT ADS2 / TPM) and Polarion. Despite the absence of an available connector between TPM and Polarion, Safran Aerosystems has developed a gateway allowing verification teams to transfer their procedures and results from TPM to Polarion.




Support and Assistance

Safran Aerosystems was supported by Polarsoft through various stages of deploying Polarion. Throughout this deployment, the expertise and responsiveness of the Polarsoft team enabled the quick implementation of the tool within Safran Aerosystems' complex and secure IT environment.

Additionally, the various training programs offered by Polarsoft initially allowed administrators and key users to gain the skills needed to configure and improve the Polarion interface according to demands and constraints of users. Subsequently, these trainings also enabled teams to increase their skills in the methodology and handling of Polarion, thereby reducing the adaptation and adoption time for the tool.

Polarion is regularly updated by the vendor with new features and improvements in each new version. Furthermore, a large community of users and developers from various industries provides extensions and connectors, contributes to improving the solution, and offers support that is easily accessible online..

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Reports

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Continuous Improvement

After four years of using Polarion, Safran Aerosystems continues to enhance its implementation methodology in the tool and will continue ongoing projects, especially with the connection to its MBSE environment.

About Polarsoft

Polarsoft provides solutions for Application Lifecycle Management (ALM) with dedicated professional services, including Requirements Management (RM), Risk Management, Quality Assurance (QA) and project management (DevOps, Agile, V).

By marketing and deploying the Polarion ALM solution for thirteen years, Polarsoft has acquired expertise that it leverages for its clients in business areas such as automotive, transportation & logistics, telecommunications, aerospace, defense, medical & pharmaceutical, energy, government & public sector, software vendors & integrators, as well as in fundamental and academic research.

The quality of Polarion products is recognized by TÜV Nord's Trusted Tool certification for ISO 26262 and IEC 61508 standards, and the expertise of Polarsoft's services in requirements engineering is certified by the IREB (International Requirements Engineering Board).

Polarsoft is an authorized Polarion "Smart Expert" reseller of Siemens Digital Industries Software in France. For more information, please visit www.polarsoft.fr.

