

Customer profile:

- Development of Europe's space capability
- 2200 staff working for ESA, from all the Member States



Domain: Aerospace

Application:

Development of a custom modeling workbench supporting the design of on-board software architectures

The Need

The on-board spacecraft software is critical to mission success and has to comply with stringent standards.

Facing increasing software complexity, the need for cheaper missions and shorter development timescales, the European Space Agency (ESA) initiated an approach for future On-Board Software development.

Following the SAVOIR (Space Avionics Open Interface aRchitecture) approach (inspired from the automotive standard AUTOSAR), ESA initiated the OSRA methodology (On-board Software Reference Architecture) allowing to model the hardware and the software components, and to define the allocation of these components on the hardware.

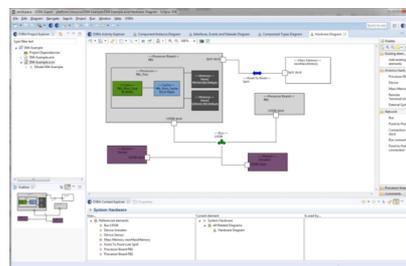
To experiment and test the complete approach, ESA needed a solution to rapidly implement a complete workbench providing dedicated graphical editors.

The Solution

To precisely and concisely express the concepts of OSRA's specific language, UML profile appeared to be complex and semantically ambiguous.

Ecore, the Eclipse technology for defining domain models, coupled with Eclipse Sirius to create custom graphical editors emerged as the most appropriate solution: it allows demonstrative results with a minimum effort, while offering a high potential of extensibility and integration with other tools.

Obeo came in to improve the modeler from an initial prototype to a fully functional and user friendly modeling solution.



The Result

The approach based on a Domain Specific Language fosters unambiguous understanding of the same "reference concepts". Less "a-posteriori" checks on the model are necessary to ensure consistency of design, and engineers are subject to less backtracks due to incorrect choices.

Software architectures being systematized, engineers can produce faster, modify later and subcontract simpler.

Thanks to the improvement of its overall usability, the modeling solution supporting OSRA is now considered to be ready for distribution to European space industry for training purposes and evaluation in industrial context.

Further evolution of the tool would be to introduce collaborative modeling with Obeo Designer Team Edition.

Key points

- Increasing complexity of Spacecraft On-board Software
- Emergence of a reference methodology for future on-board software developments
- Creation of an Open Source based tool supporting this approach

« Sirius is an easy-to-use framework allowing us to focus on graphically modeling. It provides a high potential of integration with other tools »

Andreas Jung
System Software Engineer - ESA-ESTEC