A COLLABORATION PLATFORM FOR AVIONICS SYSTEMS

The Business
The Direction générale de l’armement (DGA), is the French Government Defense procurement and technology agency responsible for the program management, development, and purchasing of weapons systems for the French military.

The Challenge
DGA is involved in the development of complex avionics systems which requires close collaboration of many teams. The problem arises when individual teams use their own software tools and specification languages. As a result, communications between teams become difficult and increasing the likelihood of errors.

The Solution
DGA turned to open-source solutions like the Papyrus modelling tool. Using Papyrus diagrams and the SysML language, we designed an Avionics System which combines within a single platform all the project artifacts, starting from requirements as well as the behaviour, functional, software, and hardware architectures.

The Benefit
Papyrus allowed us to gather dispersed information related to our avionics project into a single uniform environment and to automatically generate reports that describe the system models. This significantly improved communications among members of the different teams.

« Papyrus models help to combine technical specifications, requirements, and other product-specific information from different teams onto a single platform. »
The Business

« Providing the armed forces »

The Direction générale de l’armement (DGA), is the French Government Defense procurement and technology agency responsible for the program management, development, and purchasing of weapons systems for the French military.

Armament programs require that the weapons systems that provide the armed forces with the capacity and performance levels corresponding to their operational needs must be produced at optimal cost and within the specified delivery deadlines. In collaboration with the defense industry, the DGA designs and produces the equipment destined for France’s armed forces.

The DGA’s responsibilities cover the entire lifetime of these programs, from the preparation stage to operational use.

The Challenge

« Modern avionics systems include navigation, communication, display, surveillance, piloting... »

Modern avionics systems are complex and include navigation, communication, display, surveillance, piloting and management of multiple systems, and the hundreds of sub-systems that perform individual functions. The development of such systems requires sophisticated processes conforming to various standards and norms.

Communication issues between numerous stakeholders involved into the development process, lead to serious obstacle in delivering a high quality products. These include difficulties in comprehending and overseeing the project as a whole, the inability to centralize and consolidate technical specifications and requirements issued by different teams, as well as ambiguous and incomplete documentation.

« Overseeing the project as a whole »
In order to cope with the complexity issues while building reliable and robust avionics systems, we turned to innovative model-based tools and new approaches to system engineering. We selected Papyrus, an open-source, model-based engineering tool, because it provides industrial-strength community-backed solutions for system and software developers who demand a standards-compliant, reliable, modular, extensible, and configurable modeling tool.

Six systems constituting the Avionics System were modeled in the SysML language using Papyrus. These systems included navigation, communication, display, surveillance, sensor and piloting. The high level requirements and technical specifications of each system were reviewed, integrated into a single project and linked with corresponding architectural components. The automatically generated reports describe close to a hundred functions of various subsystems.

“Papyrus allowed us to centralize distributed information and to automatically generate reports describing the system models. This significantly improved the communication in our teams.”

OLIVIER - INFOSEC ENGINEER - DGA

(The Tiger combat helicopter is designed to be used without any heavy infrastructure, maintenance can be provided as close to the battlefields. © Éric Cabasse / Fotolia)
The Benefits

The Papyrus platform appears to be a good solution capable of consolidating within a single uniform environment information that is distributed across various project members and teams. This significantly increases the quality of exchanges between different disciplines, which is so important in a large project.

In addition, Papyrus provides a facility to automatically generate different kinds of documentation that describe the system models. This significantly improves the communications among members of different teams. After avionics models, Papyrus add-on will allow analysis of specific performances.

About DGA

Web site: http://www.defense.gouv.fr/dga
Nature: French Government Procurement Agency
Domain: Defense
Employees: 10 000