Thales Optronics Embraces I-Logix' Rhapsody To Develop Higher Quality Applications, Increase Productivity and Shorten Development Lifecycles

Thales Optronics Ltd, part of the Thales Group which has 65,000 employees worldwide with a presence in 50 countries, is a supplier of electro-optical systems and equipment, providing high technology defense products for land, sea and air applications. Products include items such as Periscopes and Optronic Masts, Airborne surveillance systems, InfraRed Search and Track (IRST), Automotive systems, Medical systems and Infra Red (IR)/Thermal Imaging (TI) cameras and systems. Thales Optronics is currently expanding into specialized civil markets using its unique electro-optical technology. Thales Optronics brings together a number of companies with competencies in the optronics field in order to maximize synergies, efficiencies and economies in areas of similar technologies and capabilities, and provide customers with an expanded optronics and optics product range, better responsiveness and products that are more cost effective.

In 1999 Thales Optronics Ltd., based in the UK, set out to select a Unified Modeling Language™ (UML™) based visual application development platform for the development of their embedded software. Thales Optronics selected Rhapsody® after a competitive evaluation against other tools, including Rational Rose. "We had initially been attracted by the concept of Rational's complete 'tool suite'. However, I-Logix' strategy with regard to design-level debugging, fully deployable production-code generation, and ability to maintain continuous and automatic synchronization between the UML model, the documentation, and the code was a key factor in our selection of Rhapsody," said Jack Cunningham, Head Of Discipline, Software, Thales Optronics Ltd. "In addition, the flexibility to integrate Rhapsody with a wide range of other tools enables a greater freedom of choice. We are able to select the 'best-of-class' tools, such as requirements traceability and configuration management, for our development."

Prior to adopting Rhapsody, the Thales Optronics development methods were largely based around traditional functional decomposition and data flow modeling approaches. While they had some tool support, their processes suffered from all of the traditional software development problems. For example, the difficulty and cost of keeping design documentation up to date with respect to the code under development, as well as an inability to effectively identify specification defects until late in the lifecycle where they are expensive to rectify.

Many of the systems developed at Thales Optronics have complex dynamic control requirements, for example, the control of periscope masts. Prior to the adoption of Rhapsody Thales Optronics had no satisfactory method for modeling the dynamic behavior. The software engineers had no way of reliably visualizing the effects of their designs until they integrated the full systems with the hardware.

Rhapsody has enabled Thales Optronics to effectively model and graphically visualize the dynamic control aspects of the systems through the use of both static UML diagrams and animation, with views such as sequence diagrams and animated statecharts. As both the project manager and an engineer from one project said, "Rhapsody has enabled us, for the first time ever, to properly and effectively review and validate our designs". Rhapsody has greatly improved the engineer's ability to communicate their specifications and designs, including better communication between the Systems Engineering and Software Engineering disciplines. Using the diagrams within Rhapsody, the Systems Engineers are able to graphically conceptualize the model. Thales Optronics Systems Engineers now actively contribute to the software design review process, enabling any misunderstandings of the system requirements to be detected much earlier in the lifecycle. With Rhapsody, application validation, including behavior, occurs throughout the development process, before system integration, saving development time, energy and expense.

Rhapsody has also been important in improving communications and relationships with customers. The ability to demonstrate graphical expressions of requirements has enabled ambiguities in original customer specifications to be discovered in reviews with the customer. Confirming designs early allow the Software Engineers to stay focused on developing rather than spending their time trying to understand the customer specifications.

"Thales Optronics is at the leading edge of model-based software development, where the analysis, design,

auto code, document generation and test phases are driven from the one model captured in Rhapsody. This invariably leads to higher quality applications, better productivity, and shorter development lifecycles," said Cunningham.

Since its adoption within Thales Optronics, Rhapsody has been used on a number of different projects. With Rhapsody, projects have evolved in a more iterative manner. For Thales Optronics, the combination of full behavioral code generation and design-level debugging capabilities has enabled them to test early and often, including model-level testing with the real hardware. "The ability to test earlier and more often provides a greater confidence in the correctness of the system under development, up front, in the lifecycle. This provides tremendous benefits in both the quality of the systems we produce and in productivity gains," said Cunningham. "Prior to the adoption of Rhapsody, there had been little change in software productivity for a number of years. Since then, taking into account the full lifecycle from concept-to-code, productivity has steadily risen to a point where it is now three times the level prior to Rhapsody's introduction."

"We have found I-Logix to be very flexible and responsive in meeting our needs. For example, recently we had to support overseas integration trials at almost zero notice. I-Logix was very helpful in facilitating this. As a result, the trials were a great success, said Cunningham. "Using Rhapsody, our engineers were able to graphically demonstrate the execution of our software to the other integration partners, leading to an unambiguous understanding of how our software worked, and how it affected the overall system. Working on site, the Software Engineers were then able to change the software model to address the identified issues, and at the click of a button generate the new correctly functioning code. This ability to automatically generate code and documentation from a design model is something that our partners on this program have had no success with using a competitor's UML tool. For their part, all they could do was record the manifestation of faults seen and send these back to base where engineers were waiting to blindly make changes to the source code. Our ability to identify and rectify problems easily on site was greatly appreciated by the integration authority."

In 1999, Thales Optronics made a commitment to change the way they were developing their applications. They selected the Rhapsody UML-based visual application development platform as a standard for development. Rhapsody has allowed Thales Optronics Software and Systems Engineers to work more closely in the development of their products. They are now able to take the visual specifications to both customers and other groups within the organization, allowing them to validate that the system design meets requirements prior to further development. With Rhapsody, the engineers are able to focus on developing the application instead of the code. Rhapsody allows the developers to test their designs up front with model-code associativity, then automatically produce the code and the documentation. The ability to develop in an iterative fashion has increased productivity and reduced cost for Thales Optronics.
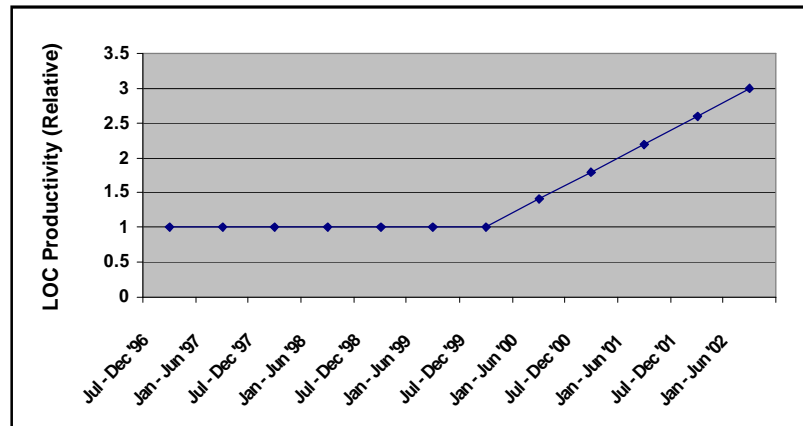
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