ALSTOM Schilling Robotics (www.schilling.com) is the world leader in telerobotic technology. Their systems operate in the world's most hazardous environments, from the crushing pressure of the ocean floor, to the high radiation of nuclear reactors, and the toxic atmosphere of waste facilities.

Schilling needs a reliable software framework: a critical fault in the software running these systems could result in the loss of very expensive equipment. More than that, the software must be flexible and able to support rapid development across Schilling's multiple, complex product lines.

That's why they chose Real-Time Innovations’ ControlShell programming environment and NDDS distributed networking layer.

ControlShell Enables Fast and Reliable Control System Development

Schilling uses RTI's ControlShell application environment to develop software for the control of robotic modules such as the Titan 3 and Conan remote manipulator systems, and the Quest Remotely Operated Vehicle (ROV). With ControlShell, Software engineers can:

- Develop, test and deploy incrementally. Using ControlShell, Schilling engineers design incrementally and develop applications using only the host systems. They can then import the applications to the embedded target architecture after satisfactory testing, without needing the final hardware. The same debugging and monitoring tools are available throughout the development cycle.

- Share understandable designs. ControlShell's intuitive graphical development environment lets control software engineers share, understand, review, and modify the software designs and implementations quickly. Software designs created in ControlShell's control data-flow and state chart diagrams are easily understood by the separate software and engineering teams. This has made a significant impact on Schilling's productivity.

- Reuse code. With ControlShell's component technology, Schilling engineers can reuse large amounts of code from project to project.

Using ControlShell, over 60 percent of the code first developed for a sub-sea operations project controlling a dual Titan 3 arm system was reused in a nuclear waste cleanup project controlling boom-mounted dual Conan arms extended from mobile ceiling mounts. This saved the engineers valuable time and effort.

As a complete application development environment and software framework, ControlShell has been an integral part of Schilling’s successful production of reliable robotics products for demanding customers.

RTI Consulting Services Provide Valuable Expertise Early in Project Cycle

RTI's consulting partnership with ALSTOM Schilling Robotics has proved beneficial to Schilling's critical phases of design, implementation, and new product testing. RTI provides training and software development consulting. On several occasions when Schilling needed additional support to meet their stringent delivery deadlines, RTI personnel assisted Schilling in designing and implementing the software control systems.

"RTI consultants produce high quality designs and code that works 'right out of the box.' I like to bring them in very early in a project and take advantage of their expertise."
NDDS Provides a Flexible Networking Backbone

RTI's NDDS real-time publish-subscribe (RTPS) networking middleware ties together the distributed computing architectures Schilling uses for many of its advanced products. Providing a common, real-time-communications API across a wide variety of processor architectures and operating systems, NDDS simplifies data distribution across heterogeneous computer platforms. This gives Schilling's engineers the flexibility to select the processors and operating systems most appropriate for each project.

Dual Titan Arms

"We got the dual Conans up and running in a matter of days. It would have been months if we had not been able to reuse the ControlShell components developed for the Titan project."

Schilling's latest product is the Quest ROV, used underwater for servicing, installation, exploration, salvage, and recovery operations. It runs from an all-electric propulsion system with an advanced network design to reduce the complexity of the cabling between the ROV and its support ship. Schilling used ControlShell to develop its control software. NDDS lets developers build on top of a distributed computing environment using standard IP technology. This past summer Quest successfully passed its open water testing in the deepest part of Lake Tahoe, more than 1,000 feet underwater.

*The entire Quest control system is based on the publish-subscribe paradigm. We made that choice based on its flexibility and efficiency. We use NDDS throughout, and it has proven to be very reliable. This allowed me to focus my resources on the other aspects of the control system."

Richard Gross, Schilling Chief Software Engineer.

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RTI Products are the Right Tools for Your Software Needs

Real-Time Innovations, Inc. is a leading developer of revolutionary tools for the real-time software market. Let RTI products and services smooth the way for your next project, using:

ControlShell - Graphical programming tool for intelligent control

WaveWorks - Middleware & tools for system & object visualization, debugging, and monitoring. The communications engine is NDDS, and the debug & analysis tool is WaveSurf.

ScopeTools - Execution, data, and memory analysis tools for Tornado.

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