

Institute for Radiological Protection and Nuclear Safety Verifies Nuclear Safety Software with PolySpace™ Products for C/C++

The Institute for Radiological Protection and Nuclear Safety (IRSN) conducts specialized assessments of nuclear and radiological risk. IRSN was formed by the merger of the Institute of Nuclear Protection and Safety (IPSN) and the Office for Protection against Ionizing Radiation (OPRI). Serving public authorities throughout France, IRSN is responsible for evaluating the safety of nuclear installations, managing dangerous materials, and protecting the environment and human health.

Assessing the software in use at nuclear installations is a vital but often challenging task. IRSN engineers use PolySpace™ Client for C/C++ and PolySpace™ Server for C/C++ to conduct static analysis of this software and detect run-time errors such as division by zero, noninitialized variables, and data overflow.

“PolySpace belongs to a new generation of analysis tools” explains one IRSN engineer. “It represents a large step forward for the verification of safety-related software.”

THE CHALLENGE

In the past, IRSN used a set of methods and tools, grouped in a software toolbox called ATLAS, to assess software at nuclear reactors. Employing ATLAS was an effective but time-consuming approach. To provide rapid support to the Directorate for Nuclear Facility Safety (DSIN), which relies on IRSN technical expertise to investigate nuclear safety, IRSN engineers sought to accelerate the verification process.

“To provide fast answers, we need automated tools,” notes the IRSN engineer.



Assessing safety at a nuclear power plant.

THE SOLUTION

IRSN adopted PolySpace products for C/C++ to speed the verification of safety-critical software at two nuclear installations in France.

IRSN engineers used PolySpace to identify all instructions in the code that could have led to run-time errors, including arithmetic exceptions, overflow on integer or floating-point data, and use of variables that had not been initialized.

THE CHALLENGE

To verify safety-critical software used in nuclear facilities

THE SOLUTION

Use PolySpace to automatically detect run-time errors in code

THE RESULTS

- Safety-critical software verified
- Assessments accelerated
- More time for complex analysis

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IRSN engineer

THE RESULTS

■ **Safety-critical software verified.**

IRSN engineers used PolySpace products for C/C++ to exhaustively assess and verify neutron measurement applications at 900 megawatt electrical (MWe) installations.

■ **Assessments accelerated.** With PolySpace, IRSN is now able to check software for run-time errors in less time, enabling more efficient use of available resources.

■ **More time for complex analysis.** By automating static analysis of applications, PolySpace enables IRSN engineers to spend time on more complex tasks, including verifying the functional accuracy.

To learn more about IRSN, visit
www.irsn.fr/en

APPLICATION AREAS

- Industrial automation and machinery
- Control design
- Verification and validation

PRODUCTS USED

- PolySpace™ Client for C/C++
- PolySpace™ Server for C/C++

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