**3KEYMASTER™ Solutions for Nuclear Power Plants**

**Why Use 3KEYMASTER?**

Simulation involves model development, integration, execution, test, visualization, and analysis. The 3KEYMASTER environment, developed by WSC, provides everything needed to accomplish these tasks, with time-saving efficiency and engineering rigor, in a single, integrated environment.

**Key Components**

- Graphical Engineering Station (GES) with extensive run-time simulation controls and data visualization
- Powerful executive to run your models
- Versatile integration platform for Real-time I/O, third-party systems and code
- Complete suite of engineering-grade modeling tools and components library

**Why Choose 3KEYMASTER?**

3KEYMASTER is the first simulation environment developed ground-up for the Microsoft Windows® operating system. Its open architecture, fully object-oriented approach, and leveraging of the Windows environment, offers distinct advantages in speed and usability.

To support nuclear power plant simulation, WSC provides 3KEYRELAP5-RT, our adaptation of the RELAP5 and NESTLE codes, to run in real-time under the 3KEYMASTER environment. Both codes provide best-estimate models for simulating nuclear reactors.

WSC has a reputation for working closely with its customers to provide a complete spectrum of high-quality and cost-effective simulation services. WSC maintains a partnering arrangement with I/O, panel, and computer system vendors to offer each customer an optimal solution.

**Services Provided by WSC**

- Complete simulator development, test, integration, and program management services for PWR, BWR, VVER, CANDU reactors/suppliers
- Procurement, test, integration, and installation of hardware panels, I/O and computer systems
- Simulator consulting services, assessments, and problem resolution including systems from other vendors and SAE
- Simulator upgrades and modernization
- On-site and off-site maintenance contracts

**3KEYMASTER Advantages**

- Fast, efficient, and cost-effective object-oriented technology with graphics-based model construction, test, deployment, and data visualization - see the 3KEYMASTER product sheet
- Best-estimate code models for neutronics and thermal-hydraulics using 3KEYRELAP5-RT™ minimizes tuning needs. 3KEYRELAP5-RT can also be extended to modeling secondary systems - see the 3KEYRELAP5-RT Product Sheet.
- Comprehensive high-fidelity modeling for all plant systems using WSC’s suite of engineering-grade 3KEYMASTER Modeling Tools. Knowledge of physical principles and equation solution methods are embedded in the tools - see the Modeling Tools Product Sheet
- Accurate modeling of logic and control systems - for both traditional logic and control and DCS emulation, stimulation, or “virtual” control systems integration. DCS solutions are increasingly important in newer designs and upgrades - see the DCS Solutions Brochure
- Extendable - Provides easy re-hosting or porting of legacy or custom code to preserve your existing investments
- Easy integration with third-party software, hardware, I/O systems, and panels
- Powerful Instructor Station and training management - comprehensive, customizable, and integrated solution for developing and implementing a training and certification program - see the Instructor Station Product Sheet
3KEYMASTER Applications

WSC's technology provides great flexibility in deploying simulation for a variety of uses to provide bottom-line benefits in engineering cost-reduction, schedule savings, quality management, and training. Most plants require training simulators, but WSC's technology makes it affordable to have multiple deployments of a plant-specific, engineering-grade simulator across various departments (i.e., engineering) in addition to the training department. This is increasingly important for both new-builds and existing plants. For new-builds, a simulator can be deployed in engineering at the start of the project.

3KEYMASTER Application Examples

- Conduct safety analysis studies and generate data in support of licensing applications
- Perform Human Factors Engineering studies, test and refine Human-Machine Interface design
- Perform systems engineering functions - develop and verify process sheets, P&IDs, Control & Logic diagrams, and build a central repository based catalog of plant equipment
- Perform Control and Logic systems test, tuning, and V&V, including changes as a result of upgrades and migration to DCS
- Test and validate plant system modifications
- Test and validate operating procedures and plant system test procedures
- Perform studies for validating procedures and time estimates for plant manipulations in conjunction with maintenance or modifications outage planning
- Use 3KEYMASTER as an authority-source of plant design-basis engineering data - e.g., P&IDs, Logic and Control diagrams, etc.
- Implement a rigorous learning management, training, testing and certification program using the powerful 3KEYITS™. This can be extended beyond operator training to other departments, e.g. engineering and maintenance
- See SAE brochure for additional applications

3KEYMASTER Simulator Configurations

- Full-scope replica - full hard panel, soft-panels and control room environment integration with high-fidelity plant models
- Part-task or compact simulators - only specific systems are fully simulated to train operators on specific tasks, with simplified modeling of the remaining systems. Panels can be emulated using LCDs
- TouchPanel control room panel replica - interactive training using touch screen technology and a soft-panel based full-scope simulator
- Multiple installations of the above types of simulators, including soft-panel based full-scope simulators outside the operations training room, for engineering analysis
- Graphical Engineering Station for desktop simulation and systems engineering

To learn more about WSC's simulation products, solutions, and services, visit

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