Engineering Simulators

FOR DESIGN VERIFICATION & VALIDATION
AND HUMAN FACTORS ENGINEERING

GSE SYSTEMS
Your performance improvement partner
Engineering Simulators

Over 100 High-Fidelity, Full-Scope Simulators Delivered

The resurgence of the nuclear industry has produced many new nuclear designs, resulting in more intelligent control rooms and more complex digital control and safety systems. In addition to new nuclear “First-of-a-Kind” (FOAK) plant design, new types of energy plants such as Integrated Gasification Combined Cycle plants integrate chemical and power generation technologies through a variety of control platforms.

A real-time, dynamic simulator supports the design of the plant in a way that was not available for the previous generation of plant design. The simulator becomes a tool to:

• Reduce project risk during the design process
• Provide an invaluable platform for demonstrating the new design to regulators, customers and stakeholders
• Train operators for licensing prior to plant commissioning

By thinking of simulation as a tool in the plant design process, you multiply the value of your investment.

Critical Issues Facing New Plant Design and Construction

• The plant is using new technology
• The plant is very complex with many operational units.
• The plant will integrate disparate technologies, often for the first time.
• New control and information systems are being introduced that have extensive and complex control and logics.
• Aggressive scheduling is required to improve the return on investment.

Support for Critical Engineering Tasks

GSE’s high-fidelity, dynamic, real-time simulators create a holistic view of the integrated plant design to ensure systems work properly together. Our engineering simulators support:

• Plant System Design
  Validating equipment sizing and system interfaces
• Digital Control System Design and Validation
  Finding problems early in the process when correction is least expensive
• Human Factors Engineering Platform
  Determining the operator’s ability to control the plant and potentially multiple reactors using realistic scenarios with proper feedback
• Operating Procedure Test Bed
  Ensures procedures produce the desired results
• Demonstration for Marketing and PR
  Showing your customers the plant operating before construction starts
• Training and Licensing Operators
  Training operators before the plant is finished

The first time a new plant design will be seen in operation is through the eyes of a simulator
Technical Approach

GSE’s comprehensive suite of high-fidelity JADE™ engineering tools enable accurate integrated design and validation testing prior to plant startup and enable our customers to continue developing real-time models to support their engineering efforts well into the future. GSE’s technology offers:

- Predictive Fluid and Electrical System Modeling Technology
- Rapid Prototyping of Control Room Interfaces and Control Strategies
- Implementation Approach Providing Value Throughout the Process

Visit www.GSES.com/engineering for more information
FOAK Engineering Simulator Development

GSE’s phased, agile approach for developing FOAK engineering simulators considers the fluidity of design data and voids in that data, but allows the engineering team to perform “what if” design scenarios for both control strategy and plant system design.

The project phases are scoped to integrate with the overall plant design process.

- **Phase 1: Basic Engineering Platform**
  Model reactor Thermohydraulic, mainsteam feedwater and condenser systems and other support system – build a base engineering capability to support the development of the main control and protection functions.

- **Phase 2: Build Out from the Base**
  Expand the systems based on the engineering needs and available plant data – roll out for further engineering use.

- **Phase 3: Prototype Control Room**
  Continue to roll out phases toward a larger model platform and toward developing a control station or full control room prototype for human factors engineering.

### Why GSE?

FOAK projects are by their nature high risk, ill defined and require a collaborative approach. GSE as a leader in the simulation industry has been selected, through competitive bid, most of the world’s FOAK and new build projects.

- Extensive experience integrating dynamic models with both stimulated and emulated control systems.
- Experienced engineers – ability to create workable, interim solutions until the plant design is finalized.
- High-Fidelity Modeling Products – you can be confident that the simulator truly represents the performance of the future plant.
- Integrated development environment including VPN access – share electronic data between sites to automate development, allow collaboration and provide just-in-time support.
- Staff Cross-Training.