Power plant simulation in today’s world is becoming more important than ever due to higher energy needs and therefore increased requirements for power plant reliability and their safe operation.

Each power plant process is driven by multiple components. Many of these components have specific plant relay logic to ensure their proper operation. It may seem simple to simulate such logic, except for one problem: there is so much of it that it is nearly impossible to keep track of how each logic system is modeled.

GSE Systems has developed JLogic as an enhanced graphical simulation software tool for modeling plant logic systems. As a part of GSE’s JADE environment, JLogic shares our single graphical user interface and offers the portability of a truly platform independent software tool.

Benefits

Each system model tends to take on the personality of its modeling engineer. JLogic solves that problem by allowing all modelers to graphically and consistently construct the model just like the plant logic diagrams.

JLogic supports useful and rigorous engineering development for training models and evaluation of simulated plant logic systems by:

- Displaying dynamic logic states through the use of color changes
- Providing the flexibility to create a user library for new icons and templates
- Minimizing simulation engineering effort while enhancing model developer productivity
- Using JADE’s single GUI allows system drawings to be viewed on any instructor, trainee, or engineer’s JStation
- Allowing portability across Microsoft, Linux, and UNIX operating systems

Functionality

The JLogic modeling tool provides the capability of grouping various components together. This permits the user to define the logic in a component such as an individual circuit card, group the components of the card into a single icon, and utilize that icon on subsequent systems. Similarly, individual logic circuits can also be grouped together to represent a complete system or subsystem from a software perspective. This allows the user to control the number of discrete software modules generated to represent the plant control system.

JLogic has two modes of operation – Edit Mode and Test Mode.

- Edit Mode – Using logic components an engineer can create a logic diagram. All the logic components, such as contacts, relays etc., are individual or grouped modeling blocks.
- Test Mode – As it is object-oriented, an engineer can monitor network responses in the Test Mode without generating and compiling any modeling program.

Implementation

JLogic™ JADE™ Schematic Logic Modeling Software

GSE Systems
www.gses.com/simulation
Implementation

JLogic is an auto code generator available for Windows®, Linux, and UNIX operating systems that frees you from the traditional burden of creating simulation models for logic systems. For user flexibility and maintainability, JLogic produces standard FORTRAN code.

The reference logic diagram can be created by using icons for specific objects and making connections between them. Relay type ladder logic strings are built from a set of wire icons using a standard drag and drop technique. The wire icons are used to generate the logic network graph. Each icon is associated with its property dialog box for easy tag name, initial state, and dependency condition assignment. The icons include:

- Power Bus
- Ground Bus
- Wire Path
- Branch Node
- Normally Open Contact
- Normally Closed Contact
- Relay
- Light
- Coil
- Time-delayed Pick Up Relay
- Time-delayed Drop Out Relay
- User-Defined Logic Block
- Text

Summary

Within the JADE environment, high-fidelity simulation of plant schematic logic systems is achieved through the use of JLogic. It provides a consistent modeling technique that any engineer familiar with the plant drawings can modify and debug with no knowledge of the source code. JLogic belongs to the GSE System’s family of high-fidelity models that assure accurate representation of the plant process, so that trainees and engineers can observe true interactions of the plant logic and dynamic systems.