SimSci Control Simulation software is part of the Dynamic Simulation Suite (DSS), offering process engineering tools ranging from automated control strategy optimization to 3-D virtual reality Operator Training Simulation (OTS). Control Simulation empowers you to design, operate, and optimize your plant, allowing for efficient operator training, control systems validation, and enhanced plant performance.

Control Simulation software turns the actual Foxboro Evo Control Processor (CP) source code into a Simulated Control Processor (Control Simulation). Control Simulation uses the same communication protocol and connects to the same hardware and software as Foxboro® CP270/CP280. The Simulated Control Processor provides a comprehensive environment for modeling, validation, and system checkout. Control Simulation also includes a light version of DYNSIM® process modeling software and the capability to bulk configure tie-back models to aid in training.
Summary
As part of the Dynamic Simulation Suite of products, Control Simulation software provides Foxboro Process Automation Suite users with a comprehensive environment for modeling, testing, and system checkout prior to start-up.

Business Value
- Dramatically reduce the time required for commissioning and startup of a Foxboro I/A Series or Control Core Services system
- Design superior quality real-time control software
- Provide high-quality operator training
- Accurately analyze and troubleshoot system response and performance, saving time and resources

Benefits
- Dramatically reduce commissioning and start-up times
- Design superior quality real-time control software
- Provide an ideal retrofit/upgrade design environment
- Analyze and troubleshoot system response and performance

Key Product Features
- Identical functionality to a Foxboro CP
- One-to-one Control Simulation to real CP relationship
- Supports virtualization and cloud environments
- Small hardware footprint
- Supports all standard Foxboro configuration tools
- Can be mixed with real CPs during the Process Automation System (PAS) Factory Acceptance Test (FAT)
- Easy to bulk configure tie-back models
- Supports direct links to other control software, including Triconex, Rockwell, Emerson, Siemens, GE, Yokogawa; and many other PLC, SIS, PAS,

The Perfect Off-Line Simulation and Verification Tool

Perfect Fit Foxboro Software Connectivity
Control Simulation software is built from the CP270/CP280 algorithms and communication infrastructure as a Foxboro CP. All operational and engineering applications, processes, and equipment that function with I/A Series or Control Core Services systems, will run the same way with Control Simulation software.

Control Simulation software fully emulates the Foxboro ladder logic, sequence of events, and motor drive actuator, which normally execute in the Fieldbus Modules (FBMs). Furthermore, controls deploy to an Control Simulation exactly as they do to a real CP for all Foxboro configurators: Integrated Control Configurator (ICC), I/A Series Configuration Component (IACC), and Foxboro Evo, without modification.

Signal Cross-Referencing Utilities
The simulation model in Control Simulation software drives the system’s field input and output signals. The cross-reference database in the Control Simulation environment defines the exchange of Input/Output data between the control blocks and the process model. Additional cross-reference utilities perform dynamic loading of cross-reference modifications, verification of control point and model parameters, simulation of various I/O malfunctions and the ability to service points at different time intervals.
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Accurate Process Simulation

Control Simulation software allows a wide range of simulation models to be generated for testing, validation and training.

Purposes:

- A control model library which can be used for simple “tie-back” simulation models.
- A DYNSIM Dynamic Simulation model “starter kit” with valves, pumps, vessels, heat exchangers and limited multi-component thermodynamics. With a full DYNSIM license, these models can be extended to detailed process models including full thermodynamics, compression, distillation, and reactions.

Simulation Command and Control

Control Simulation software offers special command and control simulation features to allow engineers absolute command of simulation processes.

- The RUN/FREEZE capability permits the user to halt a testing procedure at any point in time and receive a detailed comprehensive view of the entire control system performance.
- The STEP capability permits the engineer to run a model forward in single steps; enabling an extremely accurate diagnosis of equipment trips and stability issues.
- The SPEED capability allows the engineer to decrease or increase the simulation speed relative to real time.
- The SAVE/RESTORE capability allows accurate archiving of any system state for later use in training and/or troubleshooting.

Control Simulation Applications

The unique features of Control Simulation software provide unmatched ability and performance in Foxboro control system emulation.

Control System Checkout and Engineering

Control Simulation software enables comprehensive control system checkout and tuning before and after plant start-up, check out of new controls and the corresponding Human Machine Interface (HMI) well in advance of commissioning the control system. This dramatically reduces the critical plant start-up time and eliminates unforeseen defects in the control system software. The reduced start-up time translates into significant cost savings, and shortens outage and retrofit times for existing installations.

PAS Factory Acceptance Testing

Control Simulation software provides accurate and cost-effective means to satisfy the rigorous scrutiny of Factory Acceptance Testing, regardless of system complexity. The bundled process modeling tool can provide virtually all of the necessary conditions to thoroughly exercise your entire control system. The Bulk Configuration tool bundled with the application enables tieback configuration and parameterization.
Operator Training

Control Simulation software allows operators to thoroughly learn about control system response and performance safely. Operators can run through a wide variety of start-up, shut-down and malfunction scenarios using the process model. Control Simulation software comes equipped with a consistent and reusable training environment to test operator reaction and response times. Training exercises can be replayed, baselined and certified to provide a convenient review and teaching tool.

Plant Performance

Control Simulation software provides the ideal no-risk experimental environment for evaluating proposed control system revamps, retrofits and upgrades. It is the ideal test bed for process modifications, control strategy development and system additions or changes.

The combination of industry experience, proven technology, and service expertise at Invensys provides the right tools to achieve and maintain optimal control of your plant.

Dynamic Simulation Suite

Control Simulation software is part of the Dynamic Simulation Suite (DSS) line of products. DSS from SimSci offers process engineering tools ranging from automated control strategy optimization to 3-D virtual reality Operator Training Simulation (OTS). DSS provides a single, integrated dynamic simulation and emulation environment composed of DYNSIM, Control Simulation, Control Simulation Plus™, and EYESIM AR/VR Immersive Training Systems that empowers you to design, operate, and optimize your plant. DSS will satisfy your requirements for operator training, validation, and enhanced plant performance.

Clients all over the world are realizing the following benefits:

- Lower capital and operating expenditures
- Lower market risk
- Shorter plant commissioning schedules
- Reduced equipment damage
- Better operator effectiveness and agility
- Increase process uptime
- Higher plant performance efficiency
- Optimized process control during transients
- Refined process designs
- Faster, equivalent on-the-job training
- Superior control system software designs
- Regulatory compliance documentation
- Increased operational safety