



Mark VIe* Virtual Controller

fact sheet

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The Mark VIe Virtual controller is used to simulate control system responses in a software environment. It is provided with an Application Programming Interface (API) for high-fidelity simulations. The virtual controller facilitates system validation testing, installation support, operator training, maintenance training, and on-going change management.

Overview

A virtual controller runs the same site-specific application software as the actual process control system. Instead of communicating with real inputs and outputs (I/O), an external software model of the process (or a simulation executive) drives the I/O with the Win32 API exposed by the virtual controller.

Unlike the actual plant process, which should not be interrupted or manipulated for training purposes, the virtual controller supports a variety of features to enhance system analysis and training. These features include: Run, Stop, Pause, Step, Set/Clear Breakpoints, Watch, Save/Restore IC, Overrides, and Backtrack commands, as well as utility functions such as simulation time management and performance metrics.

In addition, the simulation can be run synchronously where the Simulation Executive sends a command to the virtual controller to step one or more frames. The simulation can also be run asynchronously, where the virtual controller runs independently of the Simulation Executive at a rate determined by the controller configuration using simulation time.

For further flexibility, simulator Fast Time and Slow Time can be implemented by a variable step rate and variable step size.

When the simulation is running synchronously, the Simulation Executive can execute Fast Time and Slow Time by varying the rate of the step commands to the virtual controller or by varying the number of frames to run for each step command.

System Integration

Each virtual controller consists of four major processes that perform the following:

- Run application code
- Provide communication interface with the ToolboxST* configuration and diagnostics software
- Provide Ethernet Global Data (EGD) services
- Provide alarm services to the simulator

The API is exposed as a dynamically linked library that helps provide setup and communication with all external programs. The I/O is arranged by specifying an identification number that is common with the plant model and the virtual controller. The libraries export the features and functions that third-party software or a graphical user interface (GUI) can use to run and control the simulator.

Benefits

- Improved operator effectiveness with training on a high-fidelity simulation of the controls and plant process
- Faster response to fault conditions resulting in less downtime
- Better use of process analysis tools
- Training without risk to the actual plant equipment

Reference

For additional information, refer to *GEH-6742, Mark VIe Virtual Controller User Guide*.

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