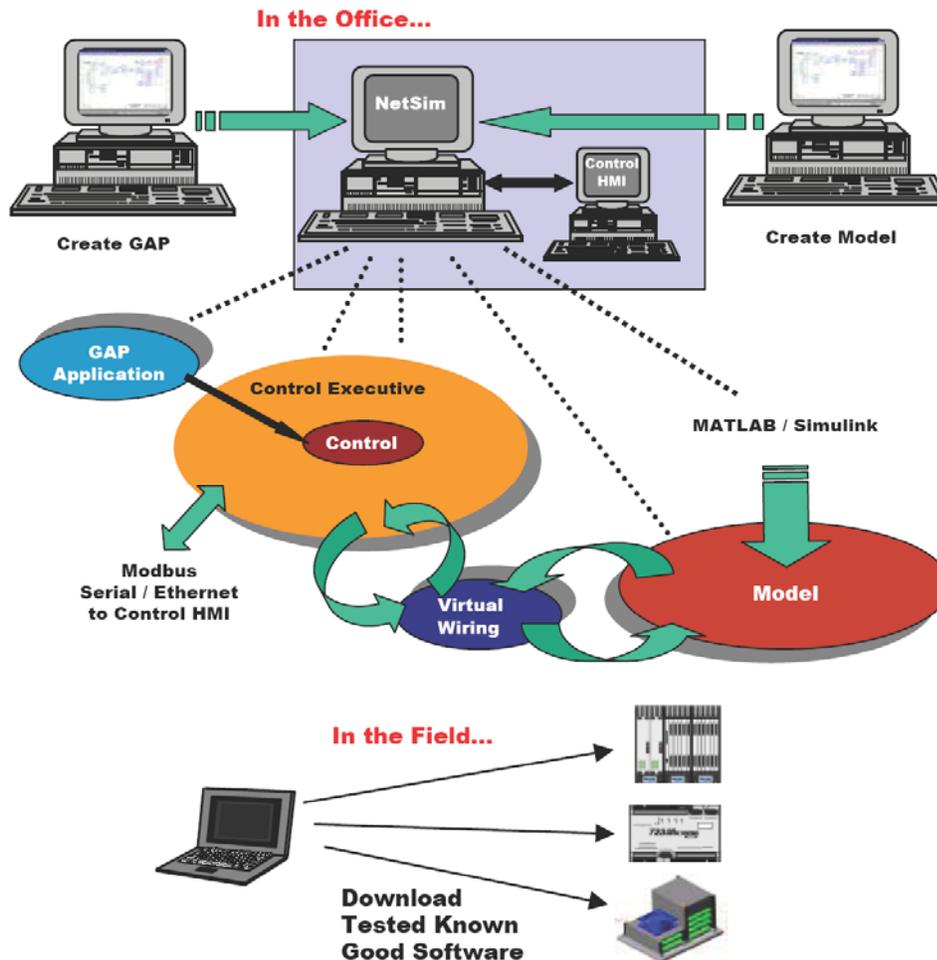


NetSim™

Control Simulation Software



- Debug software in the office
- Import and use OEM's models
- Reduce commissioning time
- Reduce commissioning risk
- Can be done by the customer or by Woodward
- Works in combination with other Woodward software tools like Monitor GAP™ and Control Assistant to view and analyze internal operation of software
- Works directly with the system HMI to see what the operator sees
- Provides complete confidence in the control application software

Description

NetSim™ provides a powerful simulation environment that brings Woodward's GAP™ generated control software and the model together into co-simulation. NetSim has been applied to gas turbine generator packages, co-gen stations, mainline steam turbines, large process refrigeration systems, natural gas pipeline stations, hydro power generating stations, marine applications and more.

NetSim produces a virtual test stand in the office or in the field on a desktop or laptop computer. Without specific hardware or wiring in the loop, the engineer can simply exercise the software's I/O to determine how the logic performs, or run it against a closed-loop model. This saves time and money by checking the operation of the application and finding problems before going to the field.

"Time" is controlled by the modeling software, giving the user complete control of program execution to thoroughly test and analyze control code, even to the point of freezing individual time steps.

Testing with NetSim validates the control software. The GAP (Graphical Application Programmer) code executes on the control exactly the same as it does in simulation. Using mathematical models for the prime mover, NetSim slashes field-commissioning time of turbines and engines.

NetSim provides a generic Windows application program interface (API) so industry-standard modeling languages can be used. Each modeling environment has its own attributes and features, so each engineer or OEM can decide which environment is best suited to its needs.

The model I/O is "Virtually Wired" to the GAP I/O using a Microsoft Excel based utility. The ease of use of Excel and the compatibility of Excel with other standard database programs makes it easy to maintain interface code.

The Control Executive synchronizes time between the model and the control software so that rate group execution of the GAP is perfectly preserved. Because the model owns and controls "time," this co-simulation environment is ideal for testing. The simulation can be quickly advanced (faster than real time) to a trouble spot, stopped to allow review of current conditions, then single-stepped through the problem area to allow debugging. The dynamic response of the control is unaffected because the model is running in the same relative time frame.

Control software testing typically was sequential with availability of the actual control hardware and simulator test stand. NetSim allows the separation of software testing from hardware testing.

NetSim provides an ideal training environment for operators and other plant personnel. A NetSim training simulator, coupled with the actual HMI software on a separate PC, provides an excellent platform to train personnel on unit start-up, shutdown, load transients and simulated equipment failures. Operators gain experience with the control and HMI interface so they know how to respond when it really counts.

The Software

Woodward has outstanding simulation capability using our NetSim Simulation Tool. It works directly with Woodward's Graphical Application Programmer (GAP).

NetSim provides accurate control simulation for Woodward's hardware platforms. The GAP code is compiled for simulation or for the target hardware in an identical manner. Today, NetSim supports the following Woodward hardware platforms:

- MicroNet™ Plus (5200 processor)
- MicroNet™ (Pentium processor)
- MicroNet TMR® (5200 processor)
- MicroNet TMR® (040 processor)
- Atlas-II™ (5200 processor)
- AtlasPC™ (Pentium processor)
- 2301D (floating point compilation)
- PCMHD
- MCU

NetSim ensures the preservation of the dynamic performance of the control software, and is available in two levels: NetSim Basic and NetSim Advanced.

The **NetSim Basic** environment allows execution of the control software only. More detailed information about NetSim Basic can be found in product specification 03292.

NetSim Advanced also provides an interface to an external prime mover model to simulate entire system operation. More detailed information about NetSim Advanced can be found in product specification 03293.

Features

- PC-based for Windows 2000, XP, Vista, and 7 (32-bit).
- Run/Freeze/Single Time Step capabilities allow stepping through software one rate group time frame at a time to check software operation which saves time during complex testing.
- Stop complex control algorithms to evaluate the internal and external effects of a specific event.
- Save/Restore complex operating states and conditions to resume testing at any point within the software.
- Data logging (adjustable resolution).
- Communications to external devices with Serial Modbus® *, Ethernet Modbus (UDP & TCP), Ethernet OPC, and EGD.
- Drives dynamic "Monitor GAP".
- Tune/View control variables.
- Override hardware inputs and outputs.
- Runs multiple control instances simultaneously.
- Co-simulate between GAP / MATLAB® ** or other third-party tools.

Modeling & Analytical Services

Woodward provides modeling services in MATLAB / Simulink® **. Models are configured per customer requirements to interface with a Woodward control for testing or training needs. We can model and simulate the entire system or only a partial segment. Run-time-only versions are available as well.

Woodward also offers analytical help with complex control issues. Using the NetSim environment, we can assist your experts in solving difficult problems. We offer far more than just hardware, or just a programming tool, or just a modeling tool.

*—Modbus is a trademark of Schneider Automation Inc.

**—MATLAB and Simulink are trademarks of The MathWorks, Inc.



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