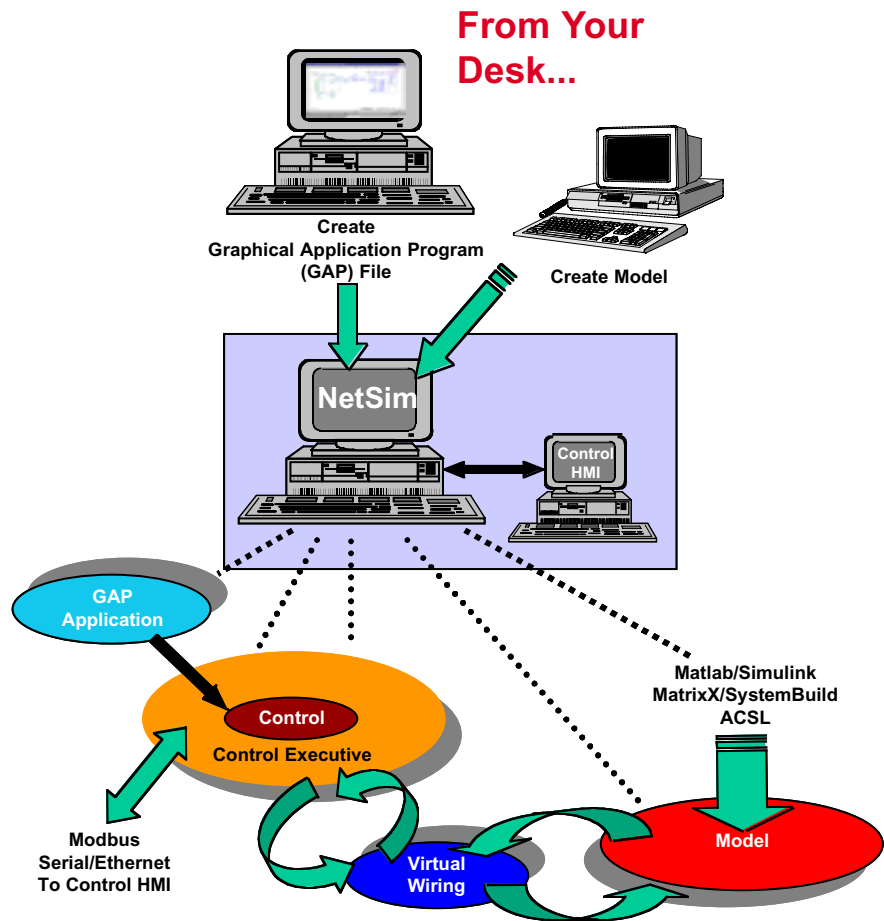
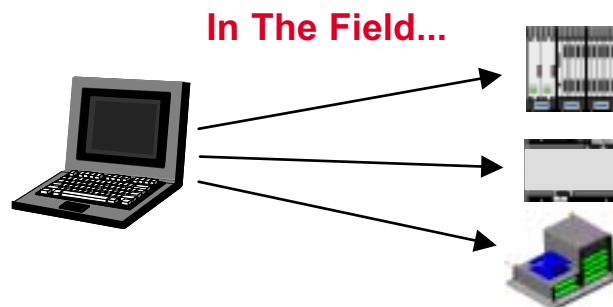


“Virtually Changing the Game”

Develop the control law and system logic. Develop the model. NetSim™ software brings the whole picture together. Test from your desk with complete confidence in the results.



Finally, know things will go smoothly in the field.



Target hardware behaves exactly as predicted by **NetSim.**



Overview. . .

NetSim provides a powerful simulation environment for Woodward's GAP software. NetSim produces a virtual test stand in the office or in the field. Without hardware in the loop, the engineer performs dynamically accurate simulations. "Time" is controlled by the modeling software, giving the user complete control of program execution to thoroughly test and analyze control code.

Testing with NetSim validates the control software. The GAP code executes on the control exactly the same as it does in simulation. With reasonably accurate models, NetSim slashes field-commissioning time of turbines and engines. When schedules are critical, NetSim is an obvious choice. Even with no commissioning pressure, NetSim finds problems early - when the cost of fixing is minimal. Testing with NetSim is two to three times faster than traditional hardware simulation with far greater coverage.

The Model. . .

NetSim supports several industry standard modeling languages to give maximum flexibility. Each modeling environment has its own attributes and features, so each engineer or OEM can decide which environment is best suited to its needs. Existing models can almost always be imported into one of the modeling environments. NetSim supports:

- MatLab/Simulink (The MathWorks Inc.)
- MatrixX/System Build (WindRiver, formerly ISI.)
- ACSL (MMS through Framatome Technologies Simulation Tool Kit) (ACSL through AEGIS Research, formerly MGA).

"Control software testing typically was sequential with availability of the actual control hardware and simulator test stand. NetSim has allowed us to separate the software testing from the hardware testing."

NetSim Simulation Environment. . .

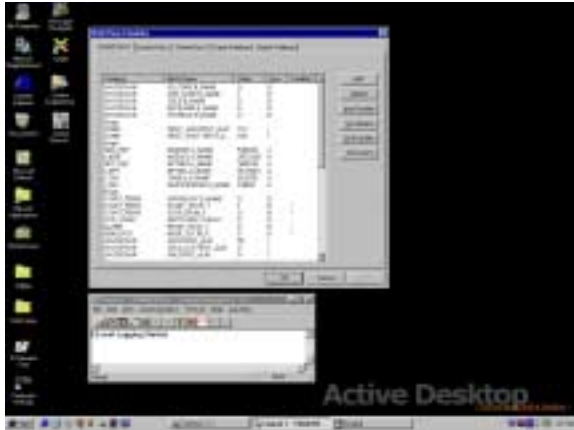
GAP is a pictures-to-code editor, which lets the control engineers concentrate on system level control, rather than software coding details. GAP supports Function Block Diagrams, Sequential Function Charts, Structured Text, and Ladder Logic. The NetSim environment brings the GAP-generated control software and the model together into the co-simulation.

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.

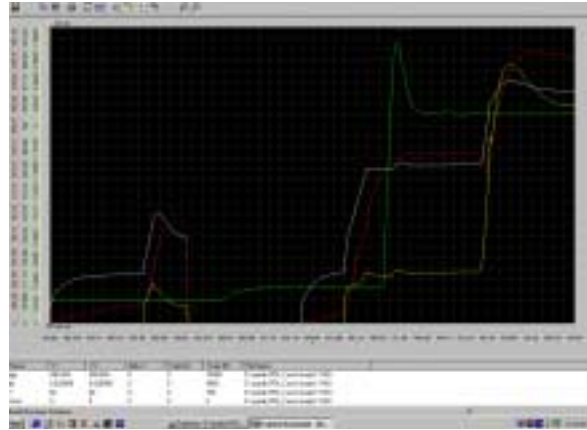
The Control Executive synchronizes time between the model and the control software so that rate group execution of the GAP is perfectly preserved. Because the model owns and controls "time," this co-simulation environment is ideal for testing. The simulation can be quickly advanced (faster than real 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.

**NetSim is two to three
times faster than traditional
hardware simulation.**





NetSim Utilities Simplify Troubleshooting.



Data Logs Produced For Analysis.

Target Hardware. . .

NetSim provides accurate control simulation for many Woodward hardware platforms. The GAP code is compiled for simulation or for the target control hardware in an identical manner. NetSim ensures the preservation of the dynamic performance from NetSim to actual target hardware. Supported target hardware includes:

- MicroNet and NetCon NT Platform (with Pentium Processor)
- MicroNet and NetCon Platform (with traditional Motorola Processor)
- Atlas PC Platform (Pentium Processor)
- Additional platforms will be added in the future

Communications. . .

NetSim supports communications to other computers. A separate computer is used for the HMI. By including the HMI in the test, yet another piece of the control system is verified and time in commissioning time is vastly reduced. Communications protocols supported:

- Ethernet OPC (Mid-2000)
- Ethernet ModBus
- Serial ModBus

"We developed an entirely new application for a customer, tested and debugged it with NetSim, took it out to the site and pushed the start-button. It all worked flawlessly."

Applications. . .

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. The extent and fidelity of a model is only limited by time and money.

Operator Training. . .

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.



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www.woodward.com/industrial

Specific questions about NetSim or analytical services? E-mail us.
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NetSim Products and Services. . .

- NetSim Control Executive and Utilities
These products are required to simulate with NetSim.
- Model Linking Kits
Each Modeling environment requires special tools to interface to NetSim. These kits are specific to the modeling language used.
- NetSim Training
Training can be provided at our location or yours. Learn how to make the most of the NetSim environment, whether for troubleshooting or personnel training.

"Being able to test your control software at 2-3 times real-time is a real time saver. I would never go back to a real-time hardware in the loop simulator again."

Modeling and Analytical Services. . .

Woodward provides modeling services in either Matlab/Simulink or ACSL. 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.

Woodward understands control of turbines and engines. It's what we do.