New Web-based Plant Control
Siemens Launches SPPA-T3000 Controls for Power Plants
“SPPA-T3000 is the first truly Web based system on the market,” Speh continued. “Design was oriented around a three-tier architecture right from the start. In the data tier is where process data are received and processed. This is followed by the processing tier with the servers for data processing. And, at the very top, is the presentation tier, consisting simply of standard ‘off-the-shelf’ data terminals with a browser. This set-up mirrors the structure of the Internet.”

The SPPA-T3000 process control system has been developed based on the needs of today’s power plants with an integrated system architecture for all automation tasks, from engineering and commissioning to operation and diagnostics. This has been achieved through its object-based design called Embedded Component Services (ECS). All the data relevant to any process object is embedded into a single, but highly available, independent component. Any interaction with the process object, whether it is for operating, process control, diagnostics, or even just viewing data, is performed by this single component. This approach results in a homogenous system architecture that simplifies the system structure and eliminates the need for the required sub-systems as used in classic control systems.

With the ECS, the traditional separation between automation system, HMI, engineering system and diagnostic system disappears. The HMI, engineering, diagnostics, etc., are just different views of the system.

SPPA-T3000 also features an integrated platform with minimized system complexity. There is expanded use of standard materials, with all PCs using standard industrial hardware and standard operating systems. Reliable control functions are placed close to the origin of their process sources and run on industry proven, robust SIMATIC-CPU hardware, which is the world’s leading process controller, according to Siemens.

“Siemens is a pioneer in using Internet applications in power plants,” Speh said. “We have accumulated more than six years of experience. Our ‘Web4txp’ was, and still is, the trendsetter in this field.”
More than ever before power plants have to achieve the highest availability and safety levels, meet emission targets, optimize plant efficiency and be responsive to short notice dispatch demands. Power plant technology, as well as power plant instrumentation and controls, are constantly driven by these market forces. Seeking to maintain a primary technology role in the markets they serve, Siemens Power Generation last year launched its Siemens Power Plant Automation T3000 or SPPA-T3000. Since SPPA-T3000’s introduction in June 2005, around 20 orders have been booked from customers throughout the world.

“The positive feedback from our customers clearly indicates that we are on target with the SPPA-T3000 technology,” noted Dr. Rainer Speh, chief technology officer, Instrumentation & Controls Division for Siemens Power Generation. “A cogeneration plant in California is the first power plant in the U.S. to be equipped with SPPA-T3000. The system has been in operation with the expected high availability over the last 18 months and the customer is very pleased with it. The same is true for our European customers. In Zagreb in Croatia, SPPA-T3000 has been in service in the TE-TO power plant for nearly two years with extremely high reliability. And we’ve had the same experience with the first system in Germany, at RDK 7 in Karlsruhe.

“SPPA-T3000’s introduction to the U.S. market has been a success,” Speh continued. “Operating experience to date has been excellent, and we’re optimistic it will continue this way. We’ve set our sights high — both in the U.S. and throughout the world.”

The company recently announced that the SPPA-T3000 control system has been selected for the plant and turbine controls on four U.S. power plants. Three of the orders involve modernization projects for process optimization. One order is for a new plant that required a common control system for both the plant and turbine controls. The four gas-fired plants are owned by different power companies. The SPPA-T3000 is an advanced distributed control system (DCS), specifically designed to implement both the power plant and turbine control on a common control platform.
The Payne Creek generating station, owned and operated by Seminole Electric Cooperative (SECI), is located near Tampa, Florida. It is a 500 MW 2-on-1 combined cycle plant with two Siemens SGT6-5000F combustion turbine-generator sets, two heat recovery steam generators (HRSG), and one Westinghouse steam turbine-generator. SECI decided to upgrade its Payne Creek combustion turbines, which requires an increase of both control capacity and functionality to the existing control system. Instead of expanding the existing system, the customer ordered the SPPA-T3000 control system. The control system will perform turbine governor control functions for the combustion and steam turbines, as well as the plant control functions for the steam generators, and will also implement the auxiliary control systems.

The Reliant Energy Mandalay generating station, located near Los Angeles in Oxnard, California, has two gas-fired steam units rated at 215 MW each. Unit 1 has a boiler with a steam turbine-generator that began operation in 1959. Reliant’s desire to enhance plant performance, availability and market opportunity were drivers for the projects. The new SPPA-T3000 DCS is to control the boiler and plant systems and is to be the foundation for plant optimization packages to address new operating modes required to meet the local market requirements.

The Lake Side power plant is a new combined cycle power plant under construction in Vineyard, Utah, U.S.A. The plant features three Siemens SGT6-5000F combustion turbines, which are under contract for a scheduled upgrade. As part of Constellation’s upgrade program, the plant’s combustion turbine controls are to be upgraded to the SPPA-T3000 system, which also will serve as the basis for a process optimization package for the combined cycle plant.

Constellation Energy’s High Desert power plant is an 830 MW combined cycle power plant located in Victorville, California, U.S.A., and supplies power for Los Angeles and Southern California. The plant features three Siemens SGT6-5000F combustion turbines, which are under construction in Vineyard, Utah, U.S.A. The plant is a 534 MW combined cycle plant with two Siemens SGT6-5000F combustion turbines, two HRSGs and one Siemens SST6-5000 steam turbine. The plant is being developed by Summit Vineyard LLC and will be built by Siemens Power Generation, then owned and operated by PacifiCorp.

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SPPA-T3000 offers one single user interface for all engineering, configuration, commissioning, operation and diagnostic tasks. Every single automation object has all. There is no proprietary software, just a standard browser is required to view the status of the entire plant and to perform all automation activities. Windows-style dropdown menus, pop-up windows, multwindowing, an easy search function, point information and many other features make the activities of operators, maintenance personnel and engineers intuitive. This results in
an efficient engineering and operation mode that ensures sound decision making and flawless change implementation and change management. Nonrestricted concurrent workflow down to each single object offers flexibility for any type of controls-related task, a feature that further optimizes the engineering and operation processes.

"Let’s say you have a laptop and you’re in Germany or you’re in Romania," envisioned Ron Hitzel, global I&C integration manager for Siemens Power Generation, "and you have a high-speed Internet connection to my power plant located in California and you have log-in rights to the application server via the TCP/IP Internet connection. It’s going to be very fast, just like a high-speed Internet connection. Up will pop the plant project and you’ll be able to operate if you have rights to operate, do engineering, diagnostics. What I mean by diagnostics is that you can actually click down, drill down a couple clicks away and actually see the status of each of the individual I/O cards."

Orlando-based Hitzel continued, "We have interviewed customers throughout the American market on what they would like to see in the next generation control systems. We took that feedback and developed specifications for this new generation control system. So it was a process, a new control system developed from scratch, completely based on the Internet. It’s all Java and XML programming, so it’s a control system built from scratch. It’s not dependent on anything seen before as far as the application is concerned."

Speh reflected, "The United States is one of the most important markets for Siemens, with approximately one-fifth of Siemens AG’s worldwide business here. We have a large installed fleet in the U.S. — with one-third of the power generated in the U.S. generated from power plants supplied by Siemens. The Instrumentation & Controls division of Siemens can also build on that success. We are also particularly strong in European, Near and Middle Eastern, and in Asia Pacific markets. With our innovative I&C system we now want to strengthen our position in the U.S. market as well. Based on our installed fleet, the potential is great.

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