

# C O N T R O L

F O R T H E P R O C E S S I N D U S T R I E S  
T E C H N I C A L L Y S P E A K I N G

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## User-Friendly Advanced Control

**M**ost process plants could benefit greatly from improved loop control, but the holdup is the time and expertise required to make loops perform better.

An investment of time from highly skilled process and automation personnel is needed up front and on an ongoing basis to analyze loops, optimize performance, and maintain optimal operation. Additional time is needed from software professionals to learn the idiosyncrasies of

Emerson claims InSight excels here too. "InSight automatically learns your process by continuously evaluating plant performance, diagnosing control instrumentation and calculating process models based on normal day-to-day operations. These are used to benchmark control performance, diagnose problems, calculate controller tuning parameters, test control strategies, and estimate benefits," says Caldwell.



### Automatic configuration virtually eliminates the maintenance headaches associated with separate advanced control software applications.

the advanced process control (APC) software package, install the software, and link the new software to existing control systems.

An additional problem for many third party advanced control software applications is the volume of data that must be exchanged between the control system and the application. These data can overload communication bandwidth, and in some cases, the speed of communication is not sufficient to handle fast-acting control loops.

One way to fix this problem is to embed the APC software directly in the control system. This is what Emerson Process Systems ([www.emersonprocess.com](http://www.emersonprocess.com)) has done with its new DeltaV InSight advanced process control software, scheduled for release in November 2006. InSight provides control performance monitoring, loop diagnostics, and automatic tuning.

The InSight configuration is automatically updated each time a control loop is added, deleted or modified in the DeltaV control system. This automatic configuration eliminates the maintenance headaches associated with separate advanced control software applications. InSight also uses the standard DeltaV configuration database, historian, and user workstations to access information, making fewer new applications for customers to learn and maintain.

"Embedded calculations greatly reduce required system communication as compared with traditional OPC data access," according to John Caldwell, the DeltaV product manager for advanced control.

Embedding the advanced control software directly in the controller solves only part of the implementation problem. The more difficult problem is configuring the application to deliver effective control.

Any advanced control software application needs to observe dynamic operation in order to deliver improvements. Steady-state conditions don't reveal enough relevant information, so there must be a method for analyzing data during process changes. "InSight calculates process models based on normal changes made by the operator, or on automated procedures such as batch control sequences. Whenever there is a change, InSight captures the process input and output data and performs a calculation to identify process dynamics," reports Caldwell.

InSight provides diagnostics and tuning recommendations for both self-regulating and integrating processes; and for single, cascade, override, and split-range PID control strategies. Common PID features such as output tracking and feed-forward are accounted for without the need for external logic. Nonlinear filtering techniques are used when noise or load disturbances are present.

Models may be calculated for different regions of operation. This allows InSight to remember process characteristics and corresponding best tuning for different modes of operation. These models are also stored in a database so users can evaluate performance over time. Examination of these models can show potential process nonlinearities and degradations.

Emerson plans to make InSight available for use with other suppliers' controllers via a second release scheduled for 2007. The advantages of embedded operation and tight integration will be lost, but InSight's other advanced control features will be maintained. 

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