

## Emerson Brings DeltaV SIS into the Future with Version 11 Release

By Larry O'Brien

### Summary

Among the many new product introductions and revisions at the Emerson Global Users Exchange, the company announced Version 11 of the DeltaV SIS safety system. DeltaV SIS has now come into its own as a standalone safety system offering that can be sold independent of the DeltaV control system. Emerson designed DeltaV SIS to address the issues that face safety

Emerson designed DeltaV SIS to address the issues that face safety system end users today, from flexibility in design to increased reliability, increased visibility into the system, reduced complexity, and easier regulatory compliance.

system end users today, from flexibility in design to increased reliability, increased visibility into the system, reduced complexity, and easier regulatory compliance. The SIF-based architecture of DeltaV SIS means that the system can be highly modular. Version 11 now essentially eliminates any size restrictions on the system.

### Not Just a Safety System, A Safety Instrumented System

One of the primary goals behind Emerson's approach to DeltaV SIS is to increase safety system reliability by avoiding unnecessary plant shutdowns attributed to the SIS. Unplanned shutdowns can cost users plenty in terms of lost opportunities and profits. In some industries, a single unplanned shutdown can wipe out the entire plant profit for the year.

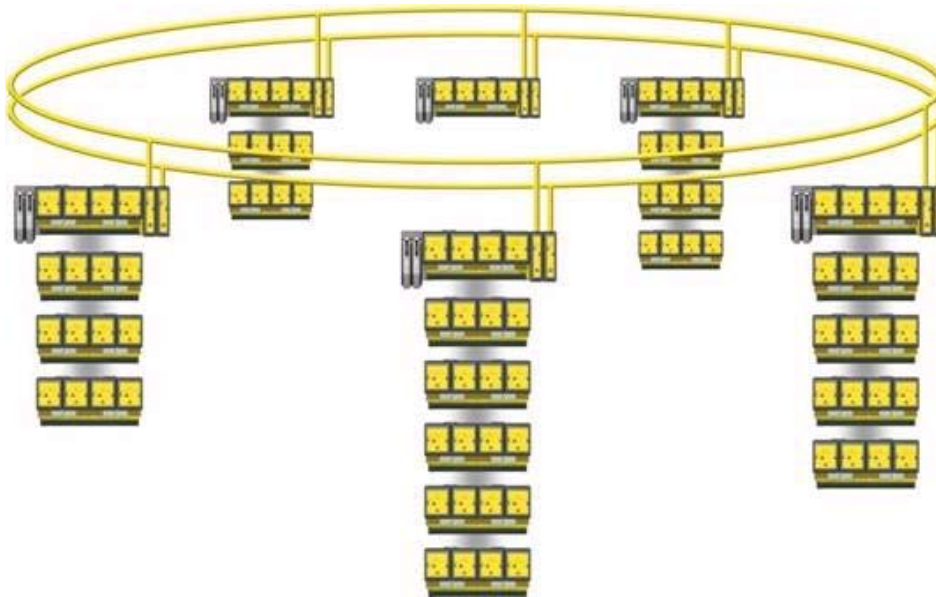
Emerson's approach with DeltaV SIS is really an extension of its PlantWeb approach, encompassing not just the safety system but also the field devices and control valves, plus integration with the process automation system, plant asset management system, and other aspects of plant automation. When it comes to safety system reliability, most failures are the result of a faulty valve or sensor. Emerson's recent enhancements to its 3051 S intelligent pressure transmitter for SIS applications include plugged impulse line detection. Emerson's DVC6000 SIS intelligent valve positioner for SIS applications includes partial stroke testing capabilities. Last year, the DVC6000 SIS was certified for use in SIL 3 applications with only a single 4-



20mA signal. Users can automatically initiate a partial stroke from the logic solver on a defined frequency, or the operator can initiate the proof test from the DVC faceplate in DeltaV Operate. The diagnostic results can be uploaded into Emerson's ValveLink software. Emerson also released HART Version 7 capability in Version 11, enabling software to be write-protected to prevent unauthorized configuration changes to transmitters by handheld communicators in the field.

### Flexibility from the Very Small to the Very Large

DeltaV SIS can support a simplex or redundant logic solver. Both are certified for SIL 3 applications. Each logic solver has 16 integrated I/O channels. These are software configurable, eliminating the need for separate I/O cards.



**The New Version of DeltaV SIS Is Modular, Distributed, and Highly Scalable**

SIS logic can be distributed geographically for distances up to 62 kilometers between nodes. This is particularly effective in oil & gas applications for distributed well-heads or long pipelines.

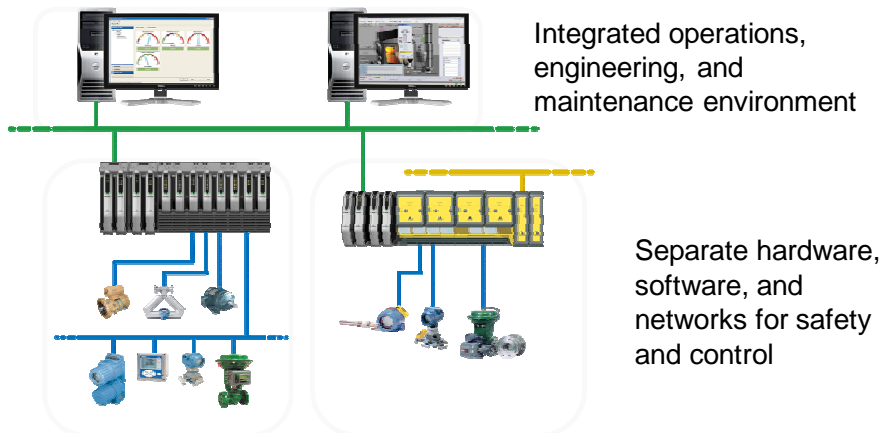
DeltaV SIS supports a safety instrumented function (SIF)-based approach to process safety. This means that certain functions are executed in the SIS and can be separated within the system into different functional areas. This allows users to deal with safety logic on a more modular level, allowing

DeltaV SIS features modular logic solving capabilities. This means that the logic can be distributed across the plant or facility, and also be done remotely over the SISNet network – a redundant, counter-rotating fiber optic ring network used only for SIL 3-rated communications between logic solvers.

users to add new configurations and new I/O without interrupting the system operation. If there is an incident in the plant, the SIF approach allows the user to shut down only the area of the plant that is affected. The SIF-based approach simplifies testing and management of change, allows flexible redundancy. A SIF-based approach eliminates a single point of failure and enables unit isolation for maintenance.

The modular approach allows users to wire inputs into separate logic solvers, while making the input data accessible to all logic solvers on the node. Users can execute voting in a single module, located on separate logic solver from where the inputs are wired. That way, they can implement larger cause and effects matrices that combine several SIFs together in a single module.

Emerson has also considerably increased the potential size of DeltaV SIS systems to the point where they can handle very large applications. The architecture can expand from a single 16-channel logic solver to 30,000 I/O. Up to 100 nodes can be installed on a SISNet ring in Version 11, versus the 32 nodes available in Version 10. In Version 11, users can also install up to 15 separate SISNet rings. They can be completely independent of each other,



**DeltaV Process Automation System and DeltaV SIS in an Integrated but Separate Architecture**

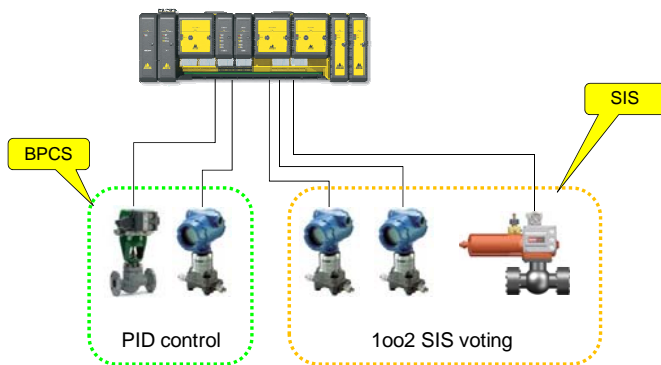
or connected together via a redundant Ethernet bridge for global communications between rings. Emerson has very large DeltaV SIS systems in place now, with one 5,000 I/O system installed in a polysilicon plant.

SISNet Domains further increase design flexibility, provide improved support

for large projects, easier expansion of existing systems, and easier isolation of separate SIS applications. Basically, this eliminates the capacity limits for DeltaV SIS. Emerson has about 260 DeltaV SIS systems running in the field today, with another 220 in progress. They range in size from a single logic solver to 5,000 I/O.

## Increasing Process Visibility

ARC has long talked about the advantages of “same, but separate” safety and automation systems. The different levels of safety system and process automation system integration range from totally separate systems based on different hardware platforms, to basic process control and safety functions running in the same controller. The Emerson approach to safety offers integration of the control and safety system in the operations, maintenance, and engineering environments, but provides complete physical separation of control and safety hardware, software, and communication networks. This separation of the basic process control system (BPCS) and



**DeltaV Process Automation System and DeltaV SIS Can Also Share the Same Backplane, Remaining Functionally Separated**

safety system hardware provides the independence necessary to eliminate the possibility of common mode failures.

Emerson can take this concept a step further, however. With DeltaV SIS logic solvers and I/O sharing the same backplane as DeltaV process automation controllers and I/O, safety instruments and valves can be dual- purposed for safety applications and process control applications. With PID control residing in

the process automation system and safety logic executed separately in the DeltaV SIS logic solver, nothing prevents SIS devices from being used in process control applications.

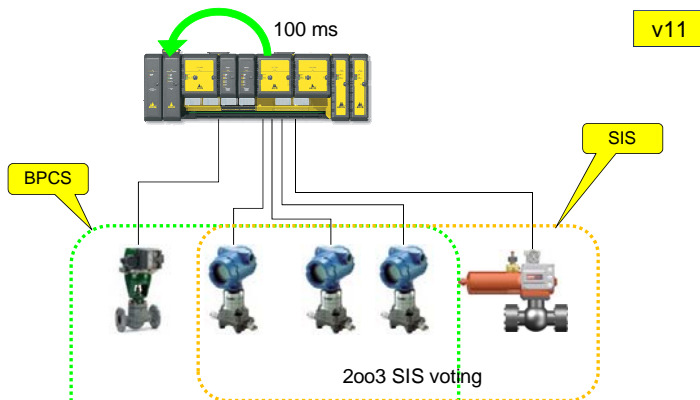
The real advantages of control system and safety system integration are reduced costs due to common HMI and software tools, and, more importantly, increased visibility into the process. The integrated architecture allows the user to see everything that happens in their SIS, including device diagnostics and alerts. It allows the user to take a proactive maintenance approach by addressing problems before they become incidents, such as through partial stroke testing and plugged impulse line detection.

## Reducing Complexity Through Predefined Function Blocks

To ease the safety system configuration process and implementation of complex functions, DeltaV SIS has predefined function blocks that are certified for IEC 61508. Version 11 includes predefined burner management system (BMS) function blocks that eliminate a considerable amount of cus-

tom programming. The user can implement an entire set of burner management system logic in a single DeltaV SIS module. Specific BMS configurations can be saved as templates that can be applied to other applications. For Version 11, the simulation capabilities of the DeltaV control system are also now available with DeltaV SIS.

Version 11 has also has a path to greater protection of internal safety system engineering standards. SIS templates created on a master system can be protected when distributed to systems at engineering centers in other locations.



**DeltaV SIS Controller Can Share Instrument Data with DeltaV Process Automation System, Allowing for Dual-Purpose SIS and Control Devices**

The protected SIS templates can only be unprotected by the master system, and SIS module references are tracked and reported.

### Easing Regulatory Compliance with Syncade Integration

Emerson recently introduced Syncade as its operations management layer for the DeltaV system. Syncade Suite extends Emerson's PlantWeb digital plant architecture by integrating real-time intelligent plant-floor data with procedural, off-line and transactional plant business processes, decisions, and asset management. The tight integration between Syncade and DeltaV provides a high data integrity solution for paperless manufacturing and electronic production records that improves overall cycle times and reduces manufacturing costs.

Now the same level of integration between the DeltaV control system and Syncade is available between Syncade and DeltaV SIS. This greatly eases the process of safety system validation, competency management, document management, and workflow management. The document management capability of Syncade can help users be sure they are doing things properly from one phase of the safety lifecycle to the next.

Emerson's recently announced partnership with Meridium also has implications for process safety. Under the alliance, the AMS Asset Portal will be built entirely on Meridium technology. This will enable measurement of key performance indicators such as overall equipment effectiveness (OEE). This also means that device failure data can be taken from AMS Asset Portal for use in process safety applications.

## Conclusion

Emerson's emerging strategy is to sell DeltaV SIS both for its ability to integrate with the DeltaV control system and as an effective standalone system. In ARC's view, Emerson is in a good position to do this now and is able to compete with any of the standalone safety systems on the market. Emerson's strength in the field device and control valve market has proven to be a key advantage for the company when it comes to integration of SIS devices and valves with the safety system, particularly with partial stroke testing and plugged impulse line detection.

The separate hardware architecture of DeltaV SIS, combined with the ability to share a common backplane with DeltaV control system hardware, gives Emerson a degree of flexibility with the safety system architecture that many suppliers do not have. The ability of SIS modules to communicate device data to the process control system on the same backplane also enables better fundamental process control, which is consistent with Emerson's message of better control from the "basement" level on up. The integration of Syncade capabilities into DeltaV SIS provides a component to ease validation component that can provide particular value for the regulated industries.

Future releases of DeltaV SIS will include Foundation Fieldbus Safety Instrumented Functions. Many major end user companies have long-anticipated FF-SIF functionality, which will provide a full scope Fieldbus solution from basic process control to safety.

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