DeltaV™ Version 14
Safety Instrumented Systems Enhancements

DeltaV SIS v14 updates reduce complexity and schedule dependencies while improving project efficiency and protection against cyber security threats

EMERSON.

SIS Function Block Enhancements

DeltaV SIS v14 introduces two new function blocks to better handle large Cause and Effect matrices. The functionality on the existing CEM block was split between two new blocks: the monitor block and the effect block. By splitting the functionality in two blocks, we are increasing scalability and flexibility. The new blocks were specifically designed to cascade and accommodate large CEMs. Now creating a large CEM is just matter of combining a few blocks.

DeltaV SIS v14 features an easier method to switch logic direction. This allows DeltaV SIS to be more flexible with safety applications such as fire and gas requiring "energize to actuate" logic. Selecting the right type of logic is done with a single parameter within selected blocks.

Reduced Engineering Effort and Complexity

Increased CEM Scalability

Monitor Block
- Up to 8 outputs
- Up to 32 inputs
- First out functionality
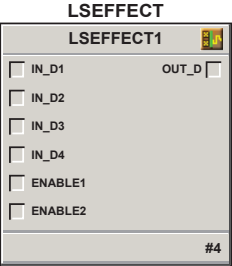
Effect Block
- Up to 4 inputs

Increased CEM Scalability

Parameter	Default
BYPASS_TIMEOUT	0
DESC1	
DESC2	
DESC3	
DETECT_TYPE	Greater Than
DEV_HYS	0
DEV_LIM	0
IN_SCALE	0.0 to 100.0
LOGIC_TYPE	Negative
NORMAL_DELAY	0
NUM_TO_TRIP	2

LOGIC_TYPE parameter in:
- Analog Voter Block
- Discrete Voter Block
- Monitor Block
- Effect Block

SIS Configuration

Safety Instrumented Systems (SIS) have traditional been configured manually using different source documents such as the Safety Requirement Specification (SRS), Cause and Effect matrices (CEM), Safety Integrity Level (SIL) calculations, and I/O definition among other information.
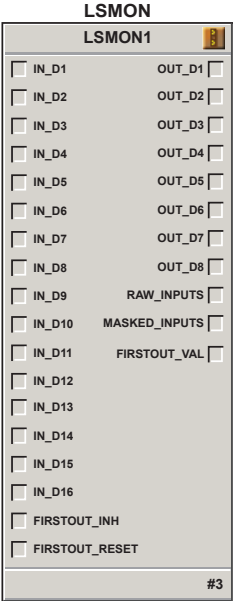
Emerson partnered with exida to deliver a database-centered solution that enables automatic configuration of safety logic based on information captured in exida's exSILentia software suite. One evident advantage of this approach is the reduced configuration effort. However, the real benefit is having a consistent configuration approach with less errors and less rework that is easily traceable back to the SRS.
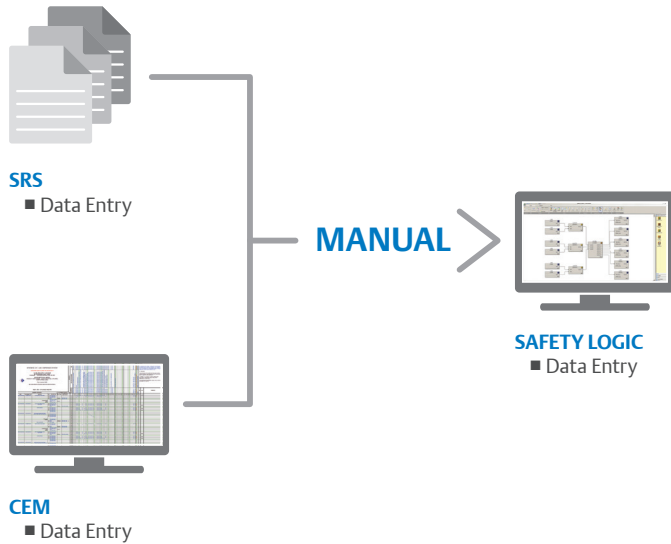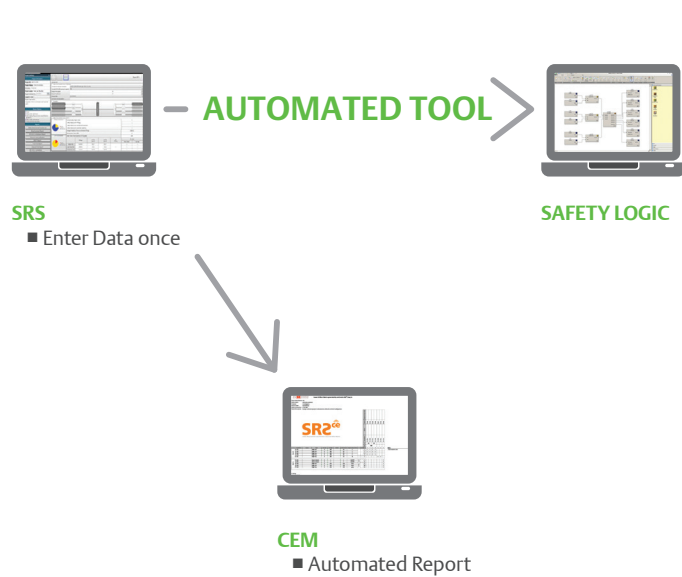
Some of the features of this approach are:
- Transfer design to safety logic configuration with minimal manual effort while eliminating errors
- Facilitate traceability between configuration and safety requirements
- Increase configuration consistency and reduce manual errors.

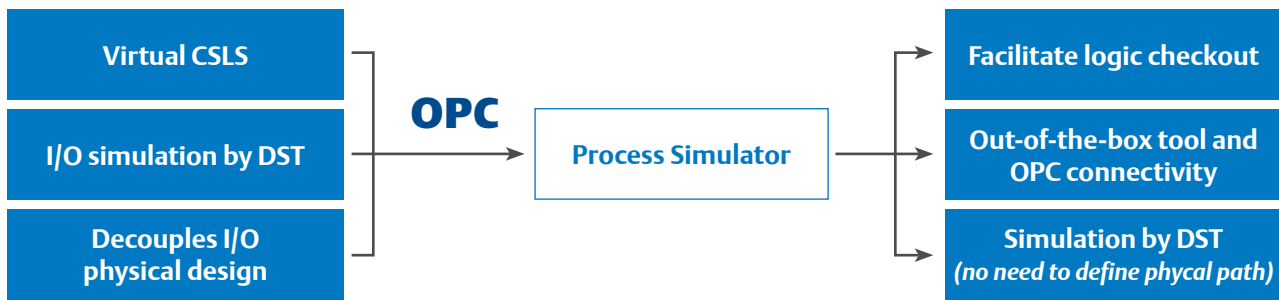## Traditional Approach   ## Modern Approach

SIS I/O Virtualization for Simulation

In v14, the manipulation of simulated I/O for testing the safety logic is even easier. Now, it is possible to simulate signal values either by using an out-of-the-box application or via OPC and even connect to a process simulator. I/O simulation is based on the Device Signal Tag. It is not necessary to know the physical location of the signal at this point. This effectively maintains the separation between I/O physical design and configuration design.

Effective manipulation of I/O on virtual CSLS

Virtual CSLS		
I/O simulation by DST	OPC → Process Simulator	Facilitate logic checkout
Decouples I/O physical design		Out-of-the-box tool and OPC connectivity
		Simulation by DST *(no need to define phycal path)*

Distributed LS CHARMs

Starting v14, a set of 12-CHARMs can be installed in separate boxes closer to field devices which increase the savings in field wiring. The smaller field enclosures can be connected either in a start topology or in a ring topology and the connection of a CHARM baseplate via ethernet.

MANHOUR SAVINGS

* As compared to traditional I/O

25% less manhours using CHARMs in the field *

32% less manhours distributing CHARMs closer to the I/O*

EMERSON™
DELTAV
12 CHARM I/O Junction Box

COST SAVINGS

31% less cost

60% less cost

traditional I/O   CHARMs in the field   distributing CHARMs closer to the I/O
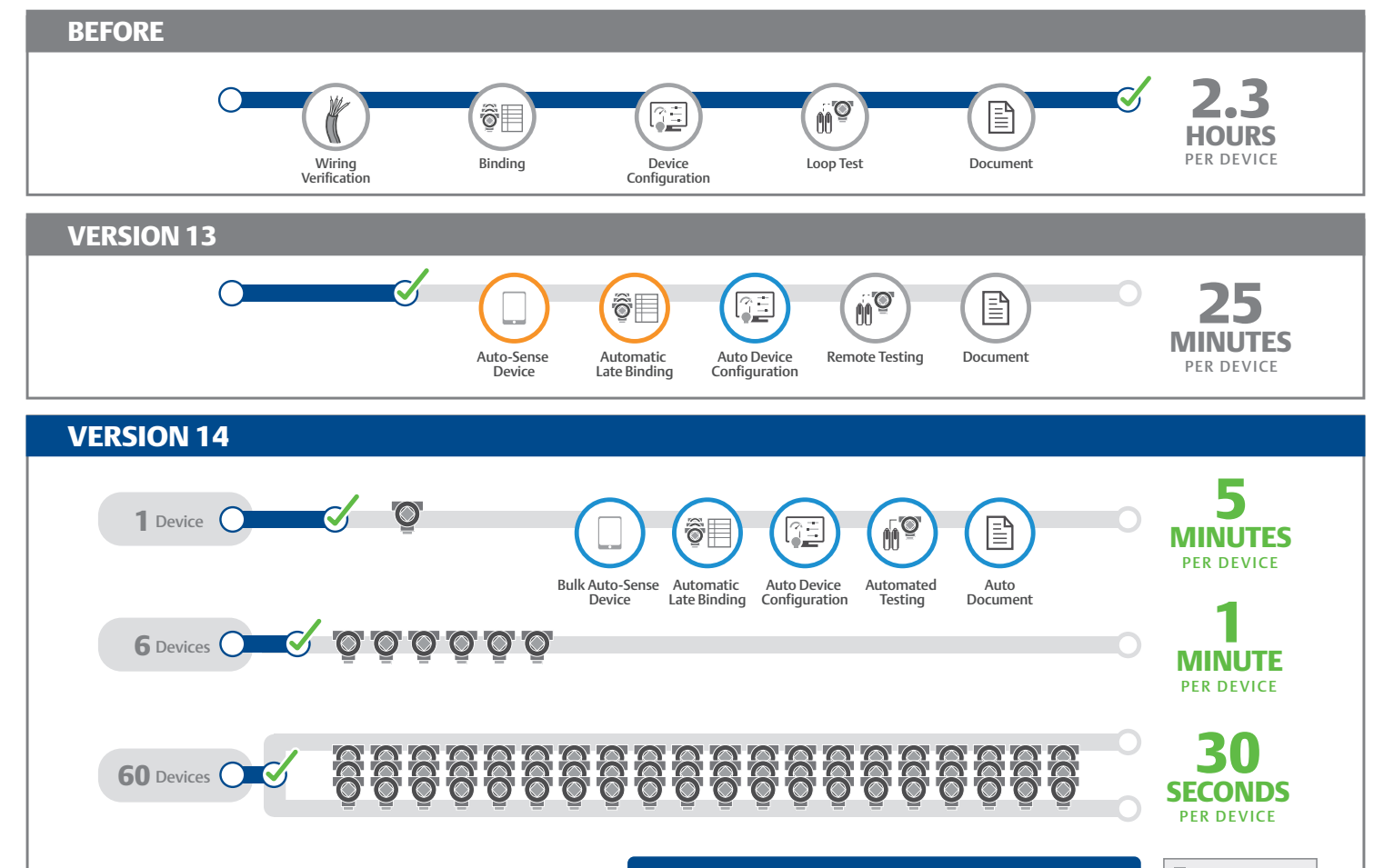
DeltaV PK Controller with SIS

The DeltaV PK controller is our most powerful and versatile controller ever built, and it can be used with SIS too. It acts as standalone system, or integrated into a DeltaV system. The PK Controller supports the use of the SLS1508 Smart Logic Solver, and it can communicate to an SZ controller in order to use CHARMS Smart Logic Solvers.

The PK Controller and associated logic solvers, can be configured in a standalone fashion, using the PK Controller engineering software on a laptop. Customers can choose to deploy a DeltaV Operator Panel for the local HMI needs, which will have all the great advantages of a traditional DeltaV system, such as DeltaV Live Operator Interface.

- Standalone or native DeltaV node on ACN

- Multilpe sizes (100, 300, 750, 1500 DSTs)

- Local HMI and laptop ports

- Small overall footprint

- Support BPCS I/O card for regular control applications in addition of SIS applications

- Modbus and OPC UA Connectivity

Smart Commissioning

The commissioning process starts for the whole CSLS instead of one device at a time. Also featured in v14 are automatic loop tests for HART input devices. A HART command is sent to the device to fix the device output to a pre-defined value and then verifies that the right value is read by the safety logic and repeated for different pre-defined values.

Since the loop test is performed from DeltaV, all the associated loop test documentation is available via automatic reports. Filling out a check list manually is a thing of the past.

Step Change in Device Commissioning

SMART COMMISSIONING 2.0

✓ Multiple Devices in Parallel

✓ Automatic Loop Tests from DeltaV

✓ Automatic Documentation

✓ New Software Applications *(Engineering and Field-Work)*

BEFORE

| Wiring Verification | Binding | Device Configuration | Loop Test | Document | **2.3 HOURS** PER DEVICE |

VERSION 13

| Auto-Sense Device | Automatic Late Binding | Auto Device Configuration | Remote Testing | Document | **25 MINUTES** PER DEVICE |

VERSION 14

1 Device — Bulk Auto-Sense Device, Automatic Late Binding, Auto Device Configuration, Automated Testing, Auto Document — **5 MINUTES** PER DEVICE

6 Devices — **1 MINUTE** PER DEVICE

60 Devices — **30 SECONDS** PER DEVICE

Times shown for 1 and 6 devices are for a single CIOC.
Time shown for 60 devices are for two CIOCs.

Version 14 can be batch processed and multiple CIOCs can be processed in parallel for additional time savings!

■ Manual
■ Automated
■ Bulk Processing

DeltaV SIS Alarm Groups

Aggregating data based on either physical or logical devices is very simple in v14 by grouping function blocks and user-defined parameters for the purpose of alarm reporting and without impacting the safety logic. For each group, you can define a unique name, a description, a faceplate, detail, and a primary control display. Defining the faceplate and primary control display enables easy and prompt navigation from the alarm group to the right place for responding to the alarm.
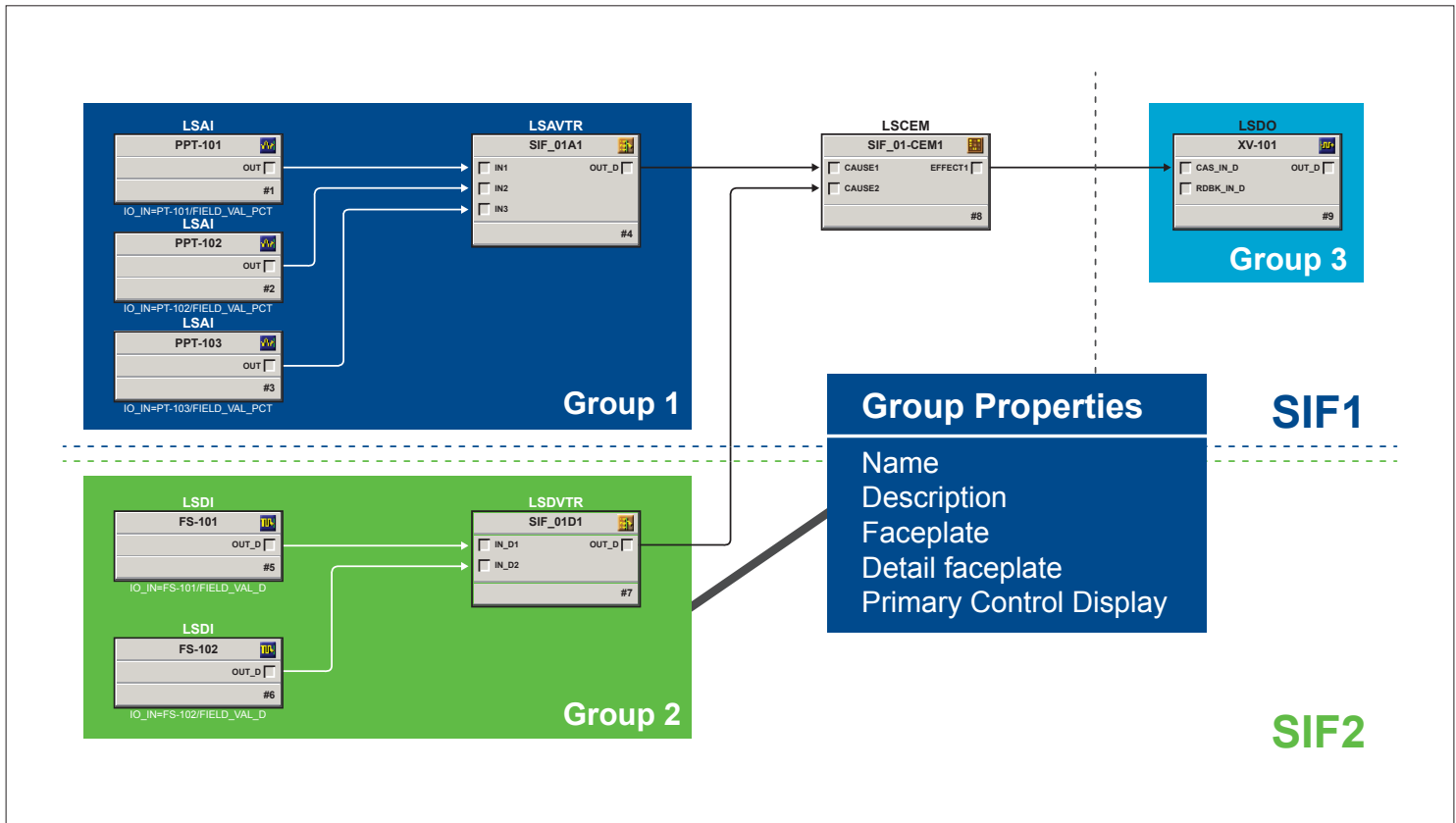
DeltaV Mobile and DeltaV Live Support

DeltaV Mobile provides easy, secure and read only access to information from the DeltaV safety system such as active bypasses or overdue proof tests. It requires no additional DeltaV SIS configuration. It uses all the work that was done when the system was originally configured. For example, if someone defined an alarm to notify about a bypass, that information is made available in the DeltaV Mobile application. You can receive custom notifications whenever you are. You can set up custom watch lists and custom alarm lists as well.

DeltaV Live provides a world-class operations experience, designed for today's high-performance operator requirements. The highly-customizable Human Machine Interface (HMI) is our first to natively support HTML5 - laying the foundation for universal, cross-platform graphics that are easy to design and configure.

DeltaV Mobile and DeltaV Live for SIS

DELTAV MOBILE

✓ Available for iOS and Andoid

MODERN HMI

✓ Scalable
✓ Zoomable
✓ Multiple Windows

Cybersecurity Improvements

DeltaV SIS v14 introduces the "timed-unlock-command" so the logic solver will be automatically locked after a defined period of time. We are enabling the single unlock command to avoid multiple trips to the logic solver for moving the physical key after an authorized change was performed.

To simplify the enforcement of the physical presence of logic solvers in the field, we are introducing the option to enable the physical key switch on the SZ controller to enforce physical presence from a central location before any CSLS in the Local Safety Network can be unlocked. DeltaV v14.3 will be release with ISASecure Level 1 certification which cover the whole system including SIS.

CSLS - Improvements in Lock Functionality	SZ Controller - Improvments in Lock Functuality	Certification
• Timed unlock • Single unlock • Unlock alarm	• Enforce physical presence for mulitiple CSLSs	• DeltaV v14.3 will be released with ISASecure SSA Level 1 certification!

Partial Stroke Test Enhancements

Enhancements improve the integration of Fisher DVC with DeltaV SIS focusing on two areas:

• Adding the ability to configure the existing Partial Stroke Test (PST) timeout value on the DeltaV DVC function block to allow the completion of PSTs on large valve assemblies

• Adding a visual indicator on the DeltaV DVC faceplate to display PST status provided in the new firmware version of Fisher DVC6200

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