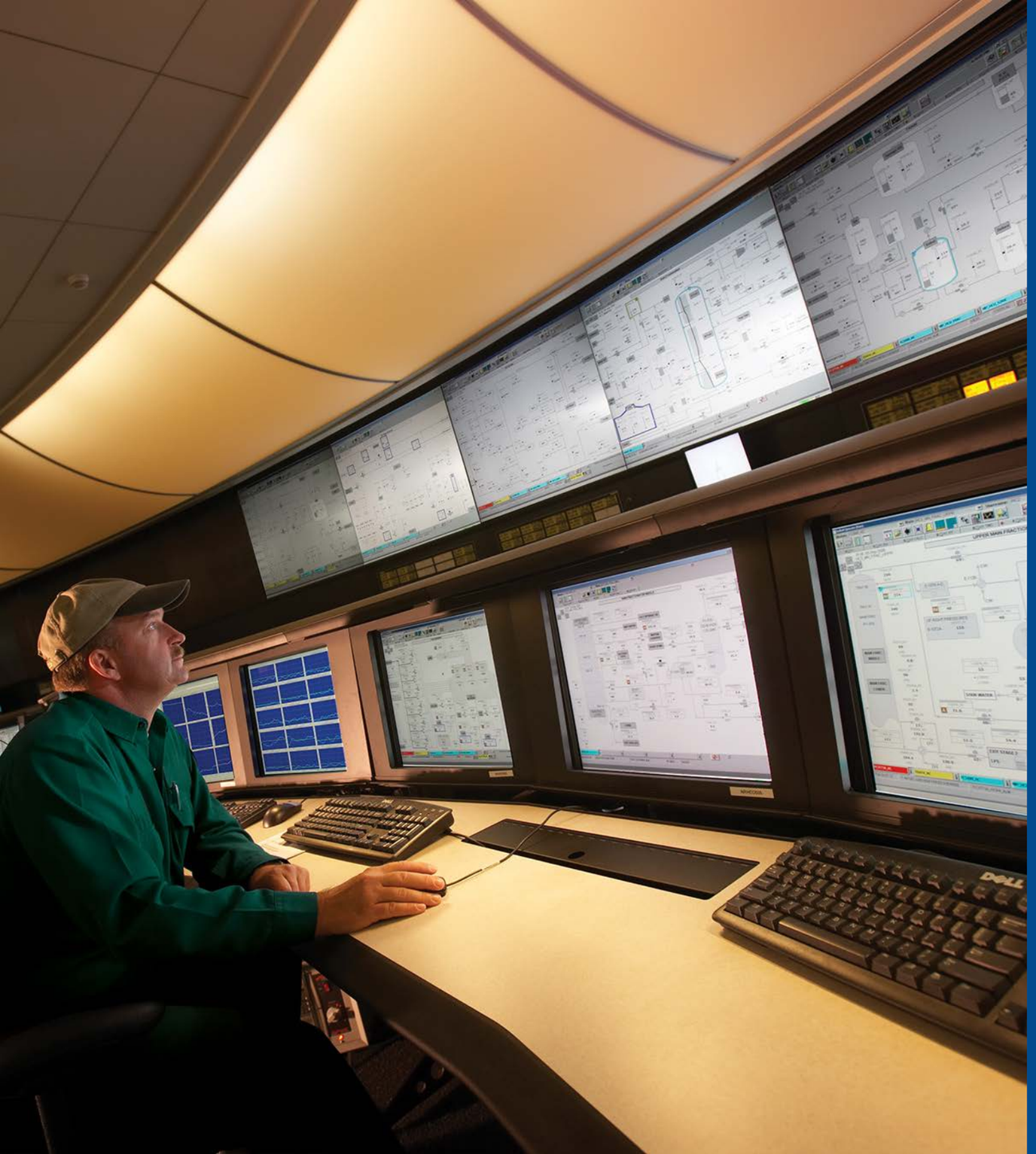


# DeltaV

**David Ascarza**

Responsable Comercial IBS

24-02-2016

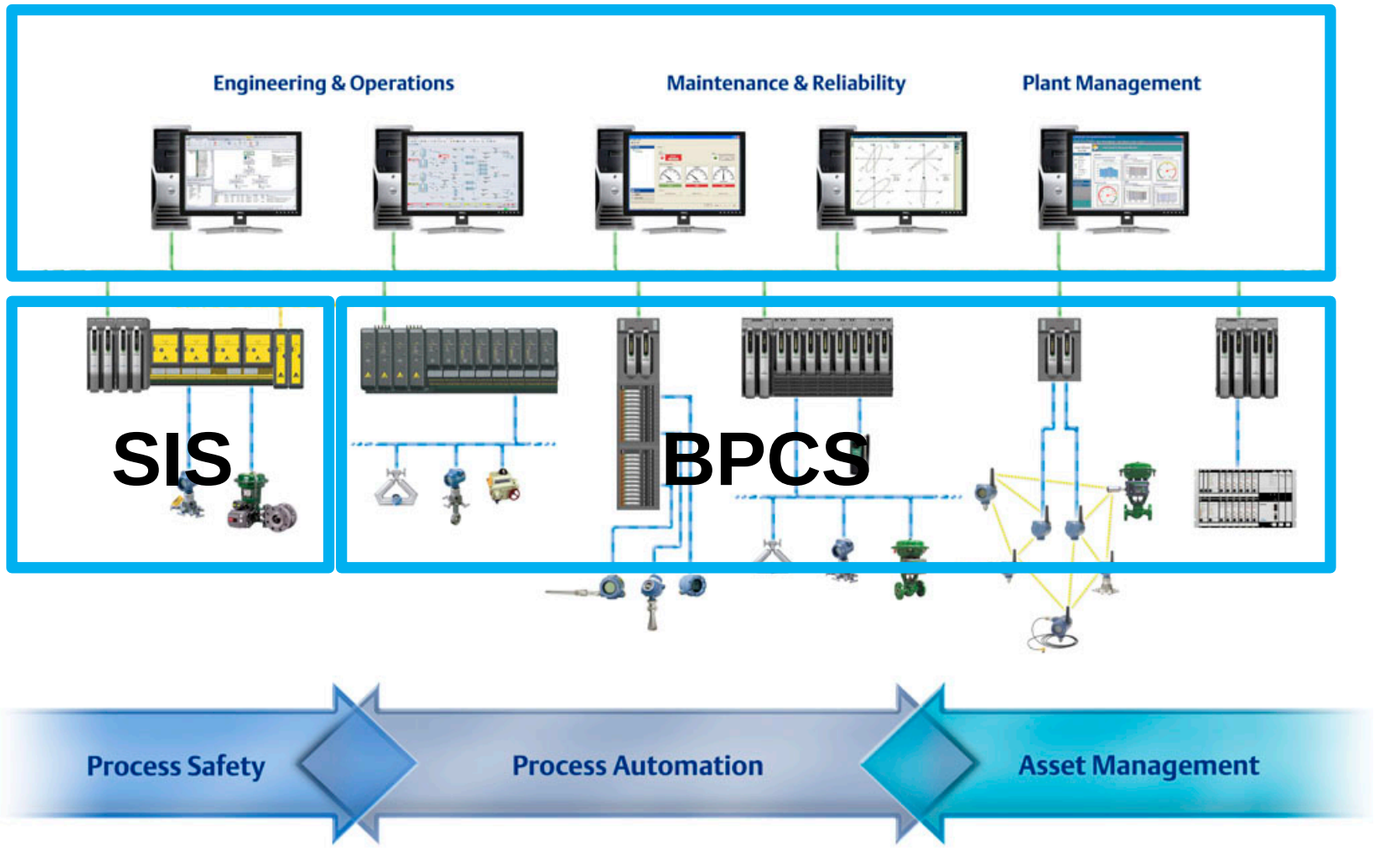
EMERSON
Process Management

# Agenda

- **Arquitectura DeltaV**
- **Alta eficiencia en proyectos. Marshalling Electrónico**
- **Herramientas de Ingeniería y Operación**
- **Ciclo de Vida**

# DeltaV Architecture

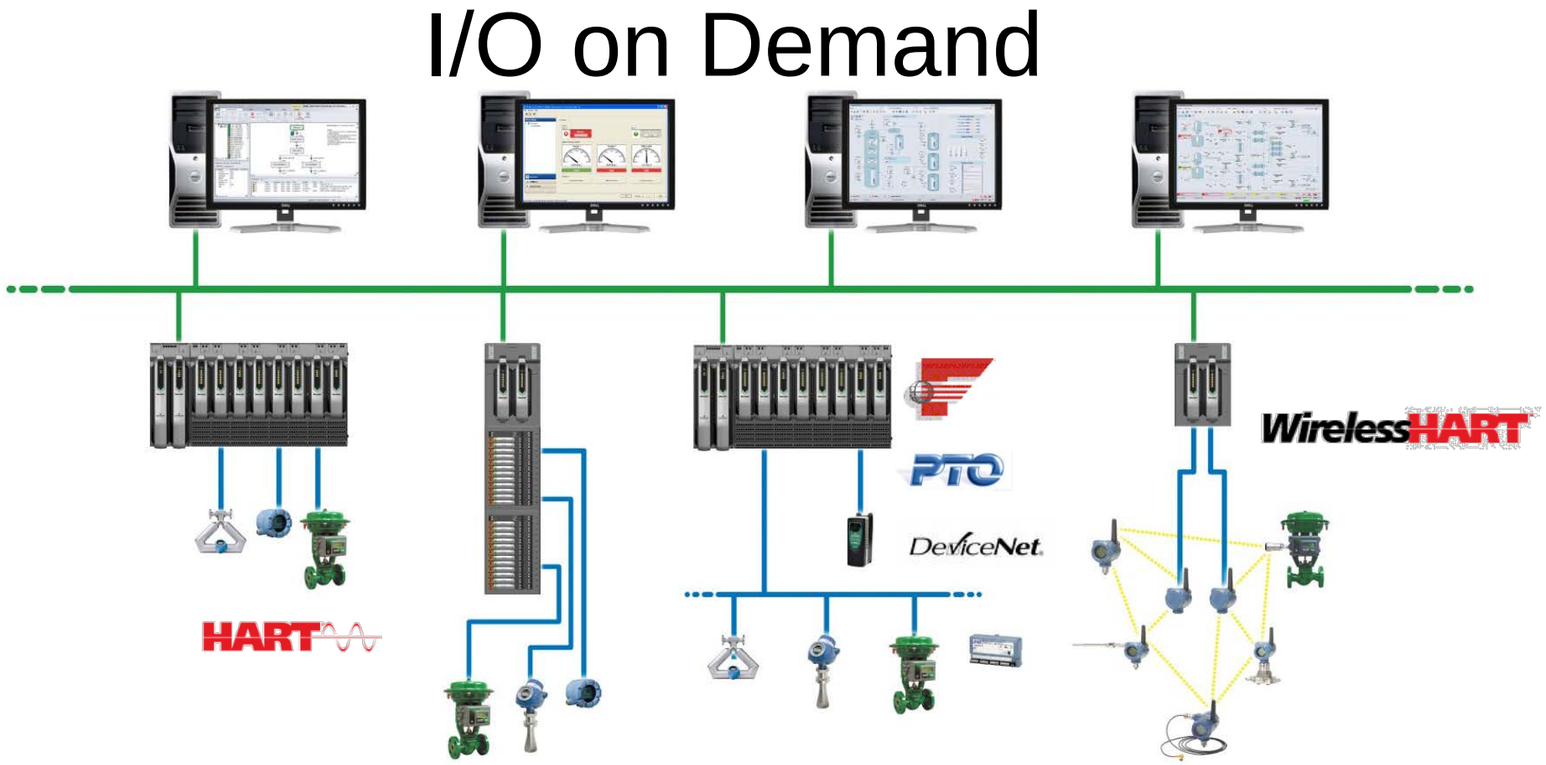
## Same Platform




- ICSS (Integrated Control and Safety System)
- Asset Management Integrated
- Plant Management

**Version 13 available**

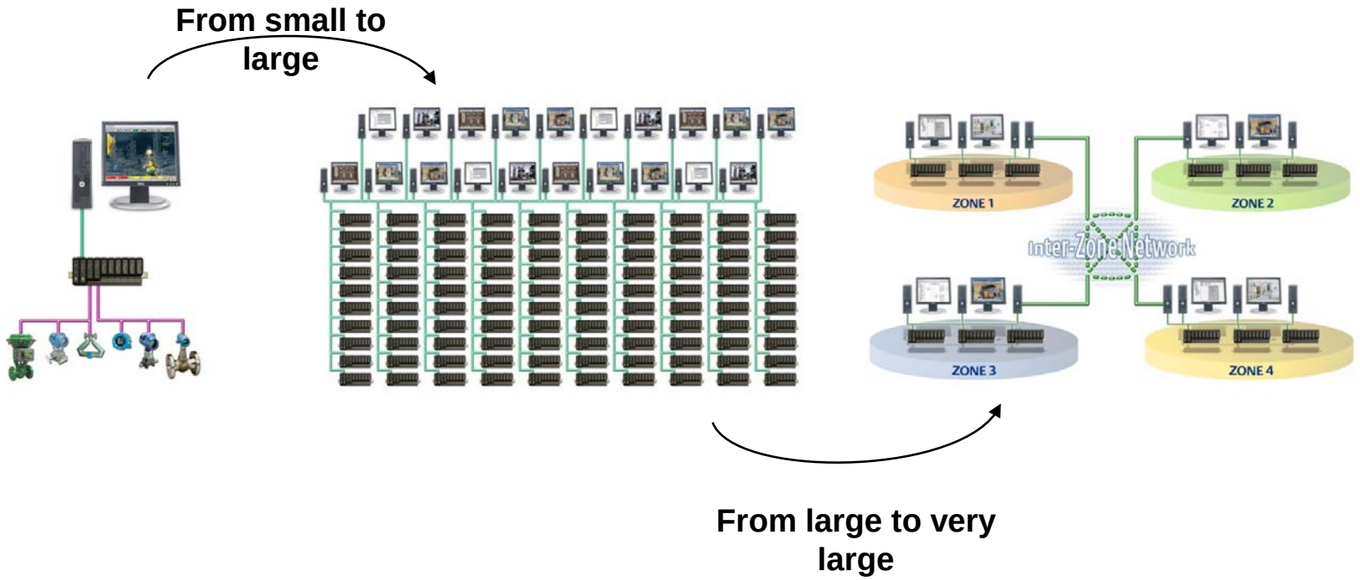
# Flexibility and adaptability




- Wired ( Classic I/O + EM)
- Bussed
- Wireless

# DeltaV Suite

# Leverage your investment as your system grows



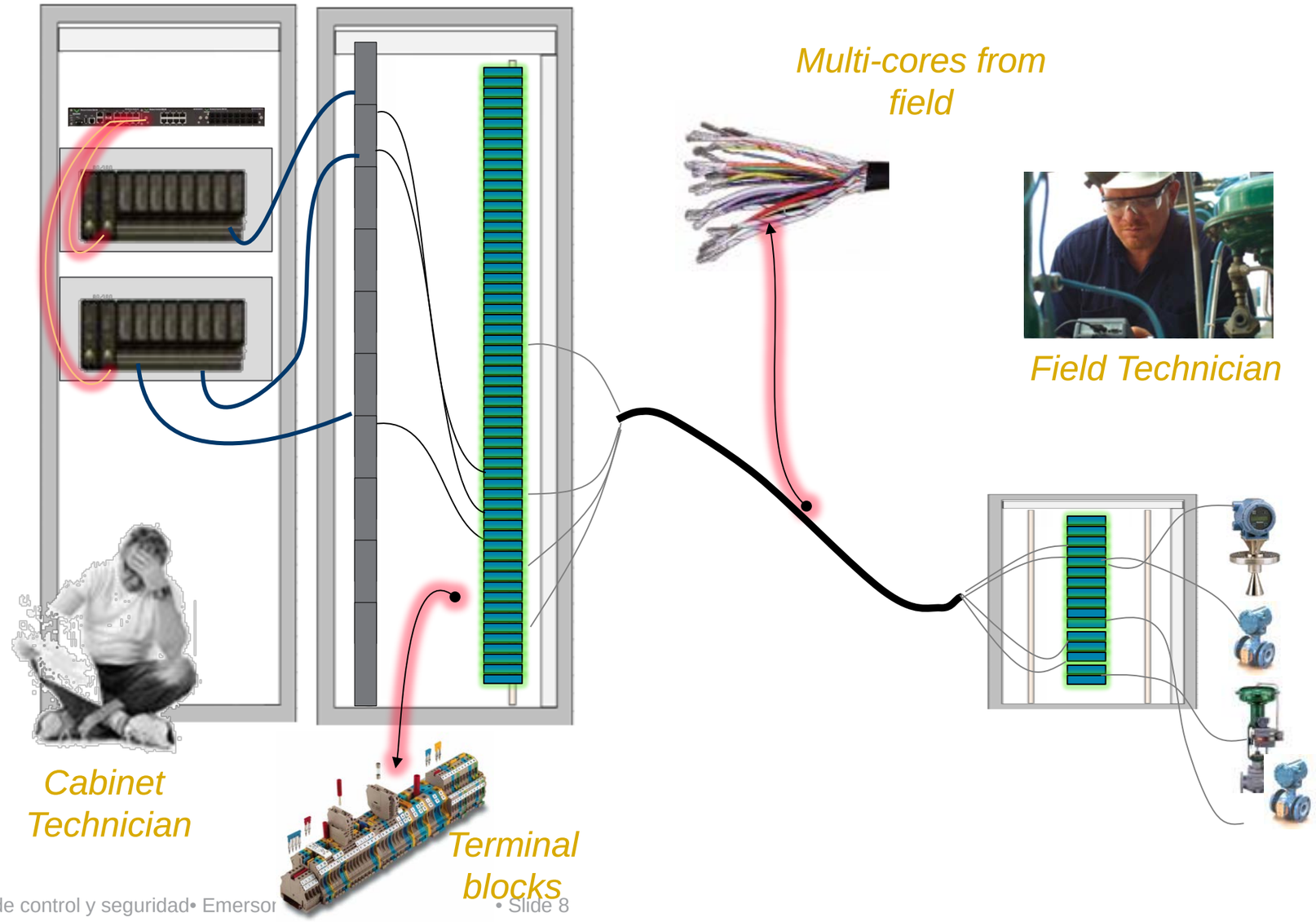

- From 25 to 32.000 TAGs
- 128 nodes
- Interzone Connection

**Inherent functionality regardless of size.**

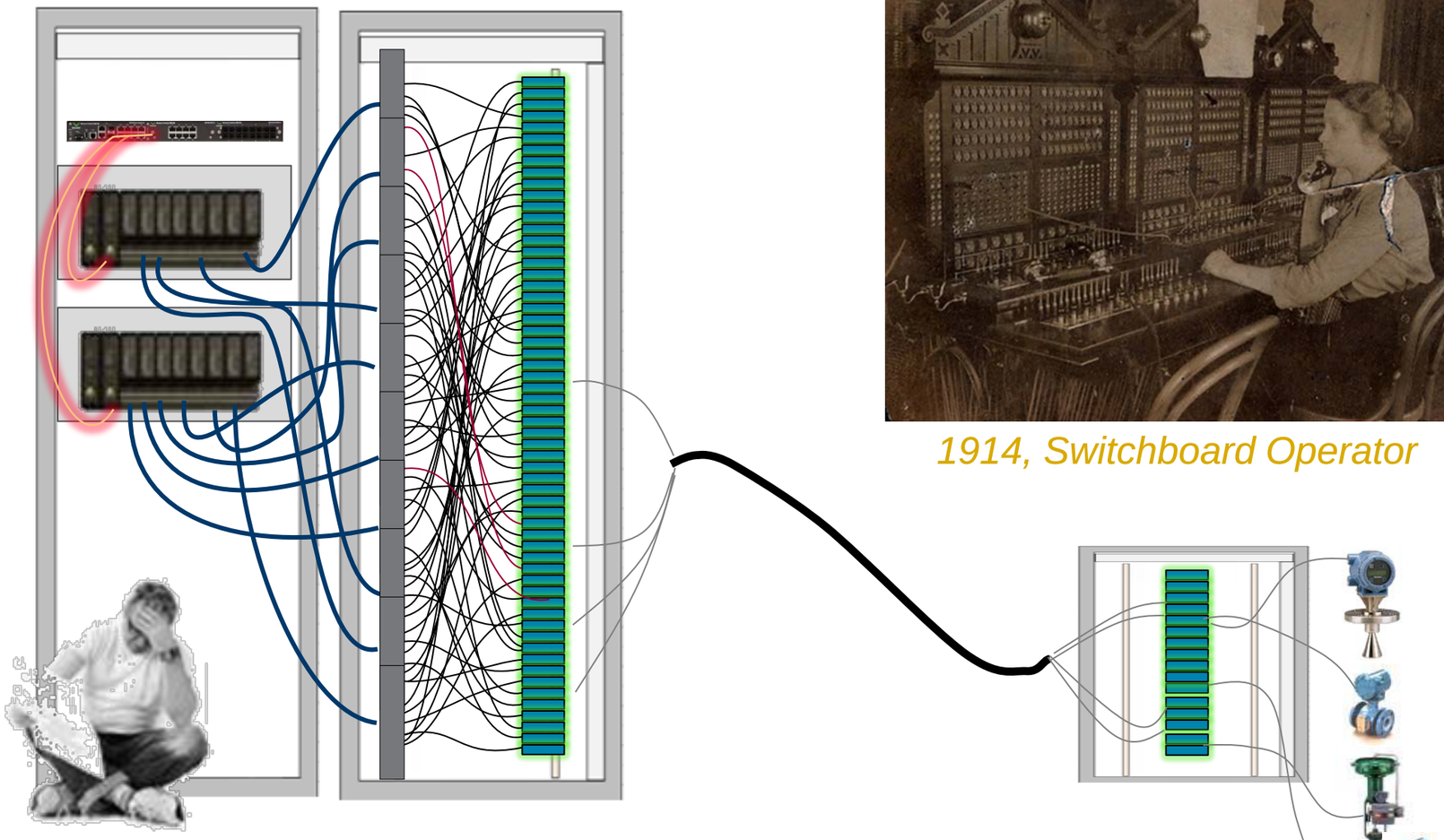
# Agenda

- Arquitectura DeltaV
- Alta eficiencia en proyectos. Marshalling Electrónico
- Herramientas de Ingeniería y Operación
- Ciclo de Vida

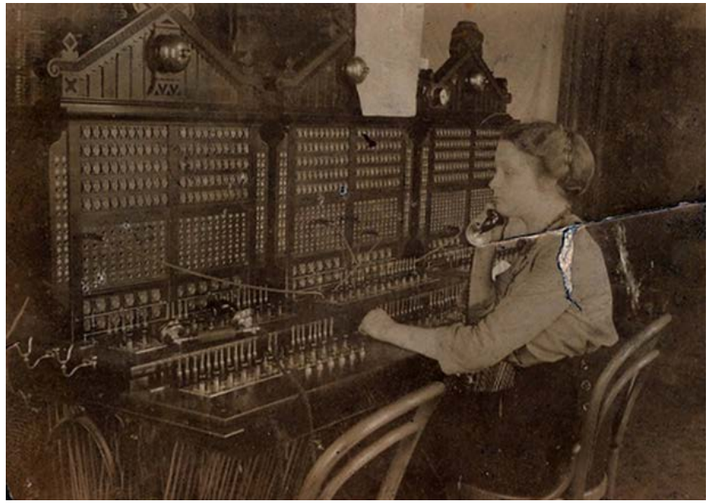
# Traditional Practice



# Traditional Practice

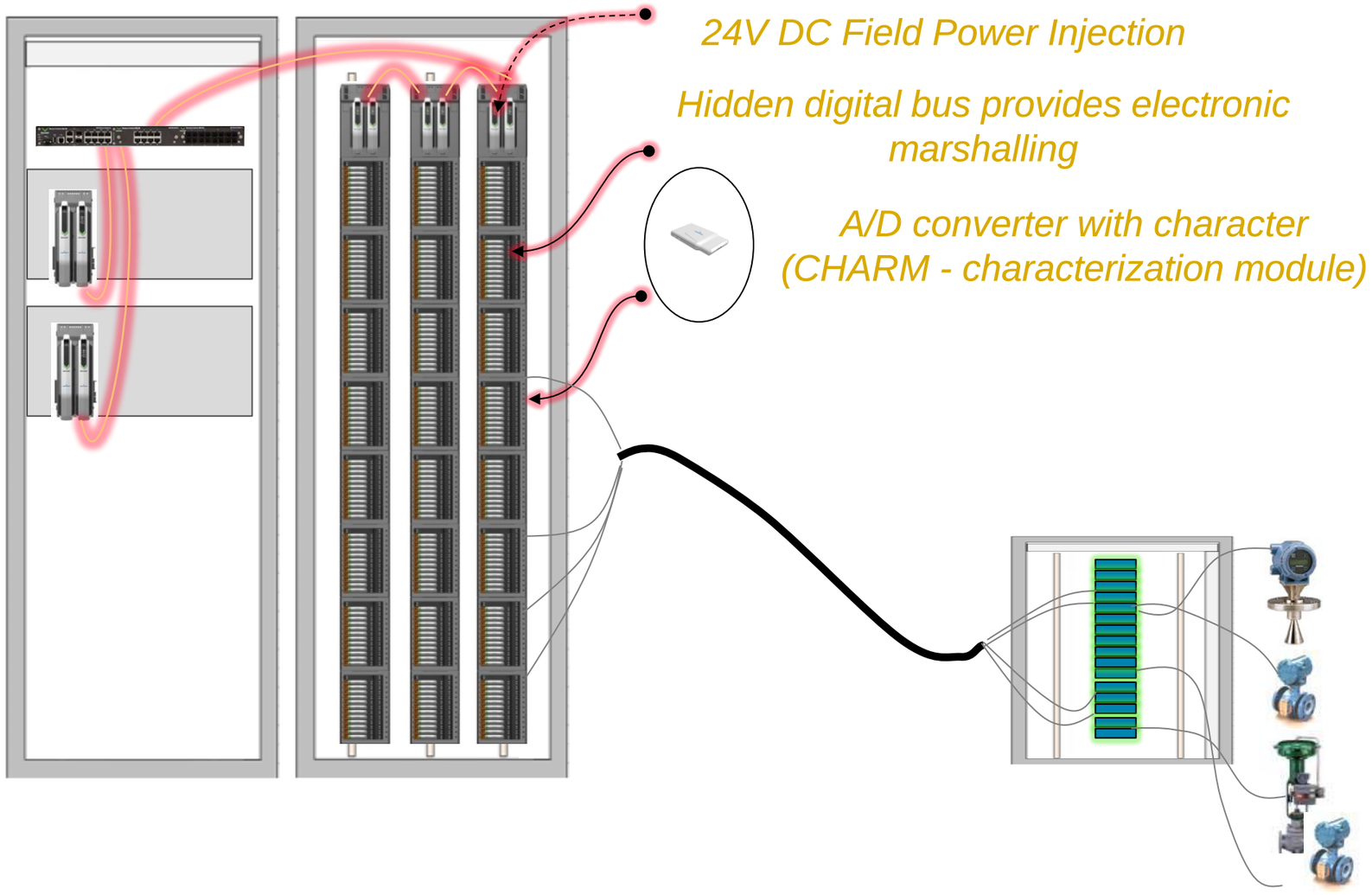


*Cabinet Technician*

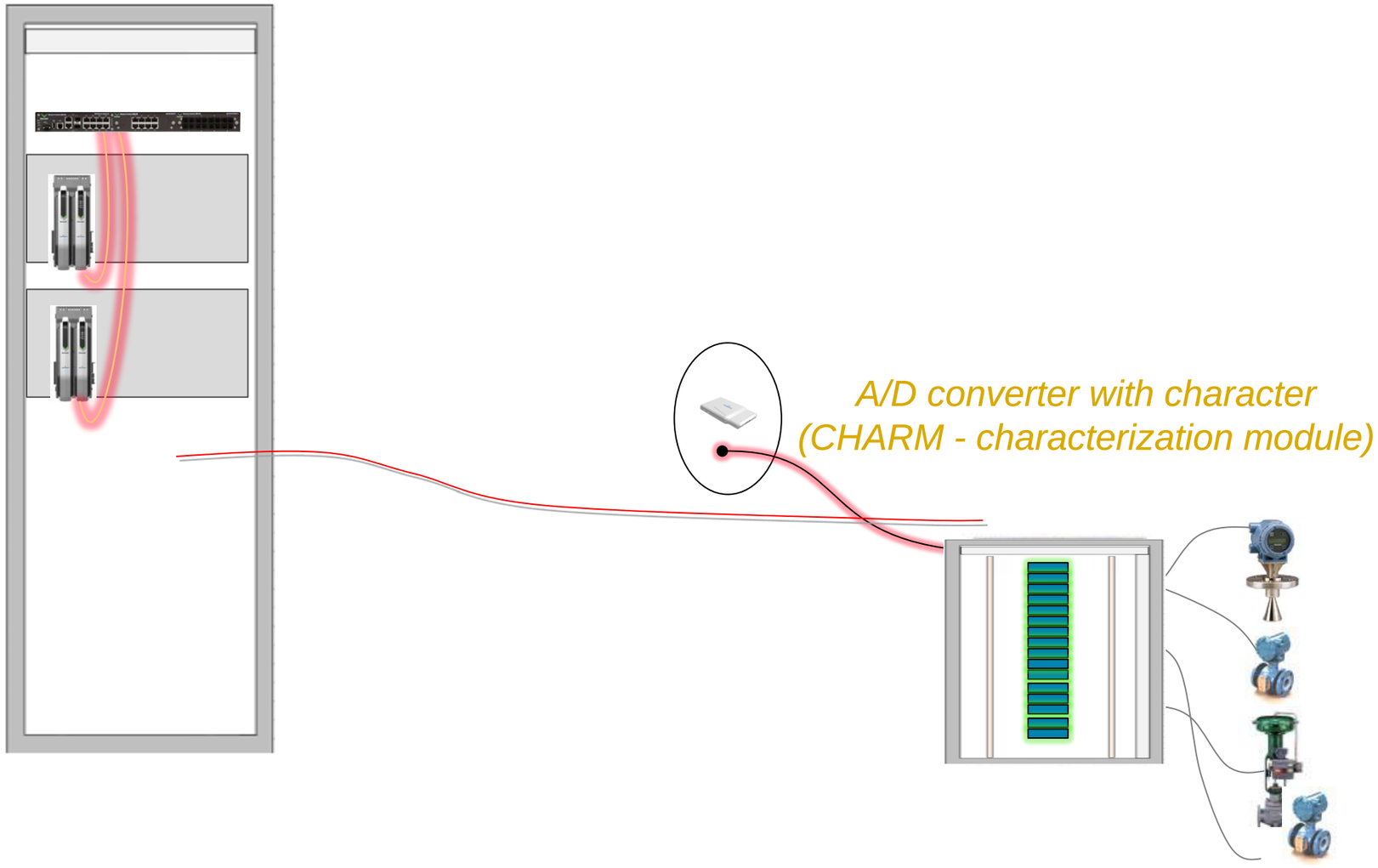


*1914, Switchboard Operator*

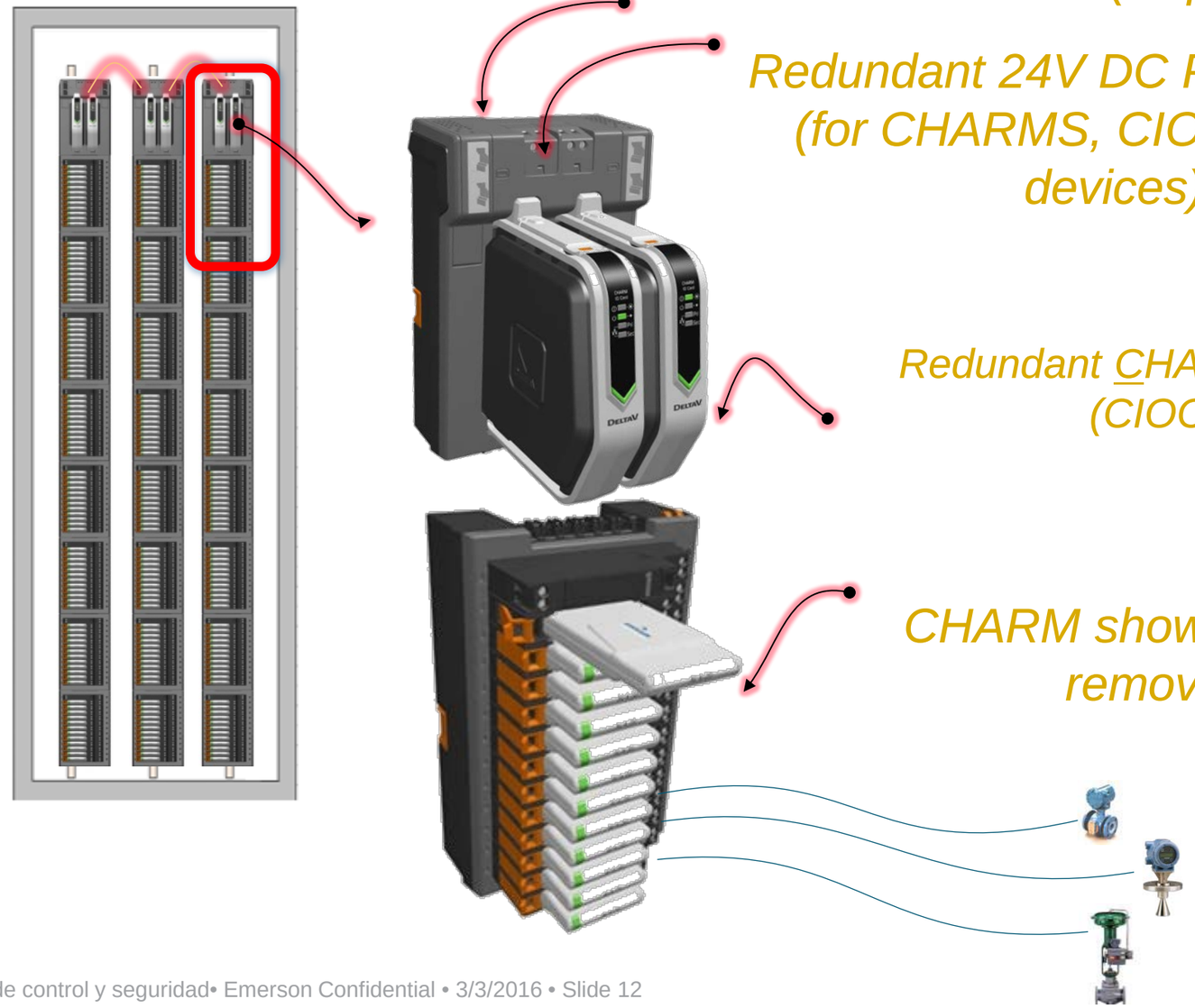
# Electronic Marshalling (Centralized Solution)



# Electronic Marshalling (Junction box Solution)



# Electronic Marshalling Details



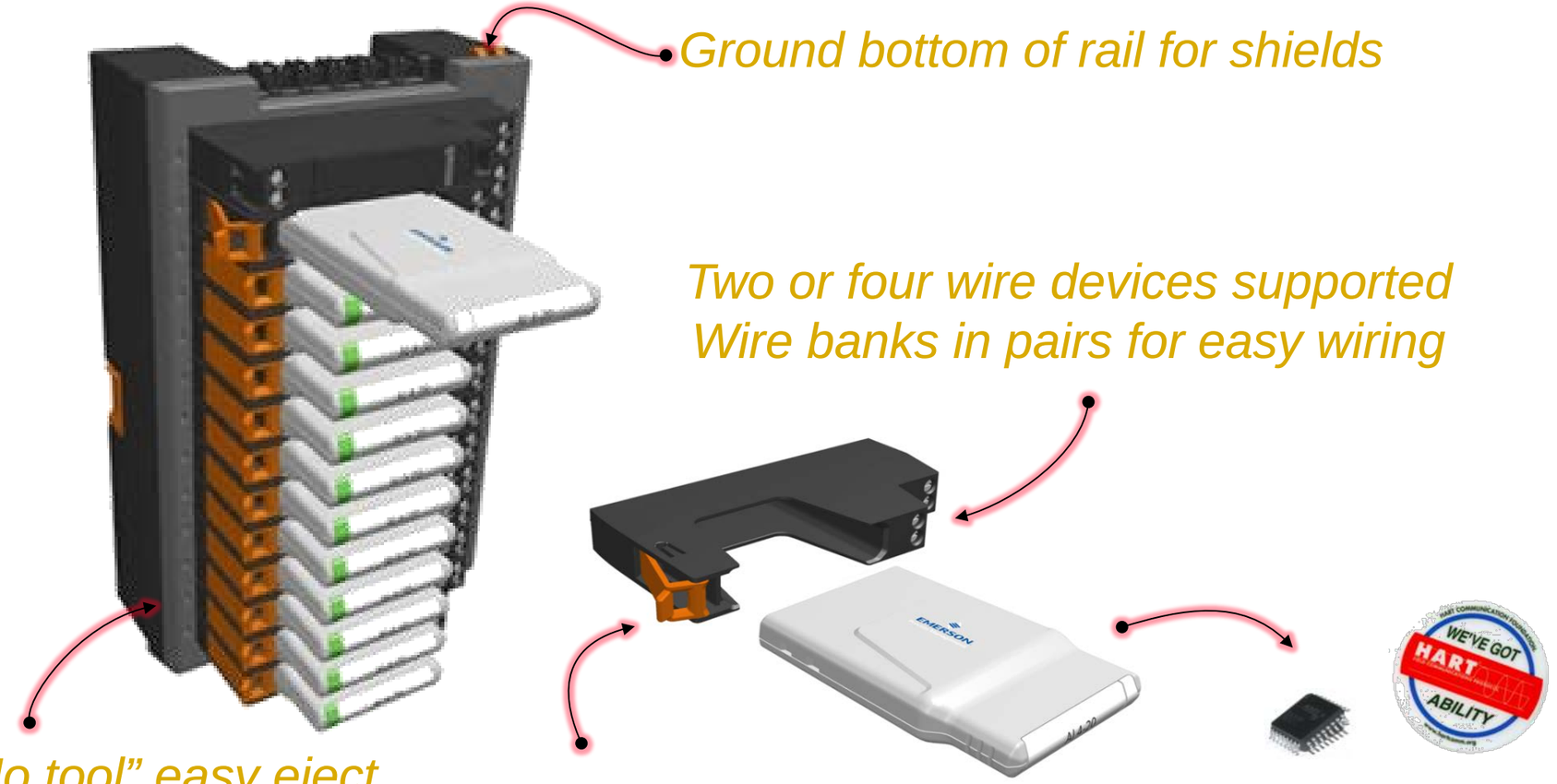
*Redundant Ethernet (Copper or fiber*)*

*Redundant 24V DC Power Supply (for CHARMS, CIOC and field devices)*

*Redundant CHARM IO Card (CIOC )*

*CHARM shown partially removed*

# Electronic Marshalling Details




*Ground bottom of rail for shields*

*Two or four wire devices supported*
*Wire banks in pairs for easy wiring*

*"No tool" easy eject mechanism to release CHARM terminal block*

*"No tool" easy eject mechanism to release CHARM for hot work*

*One HART v7 modem per channel for fast communications*

**CHARM Types:**

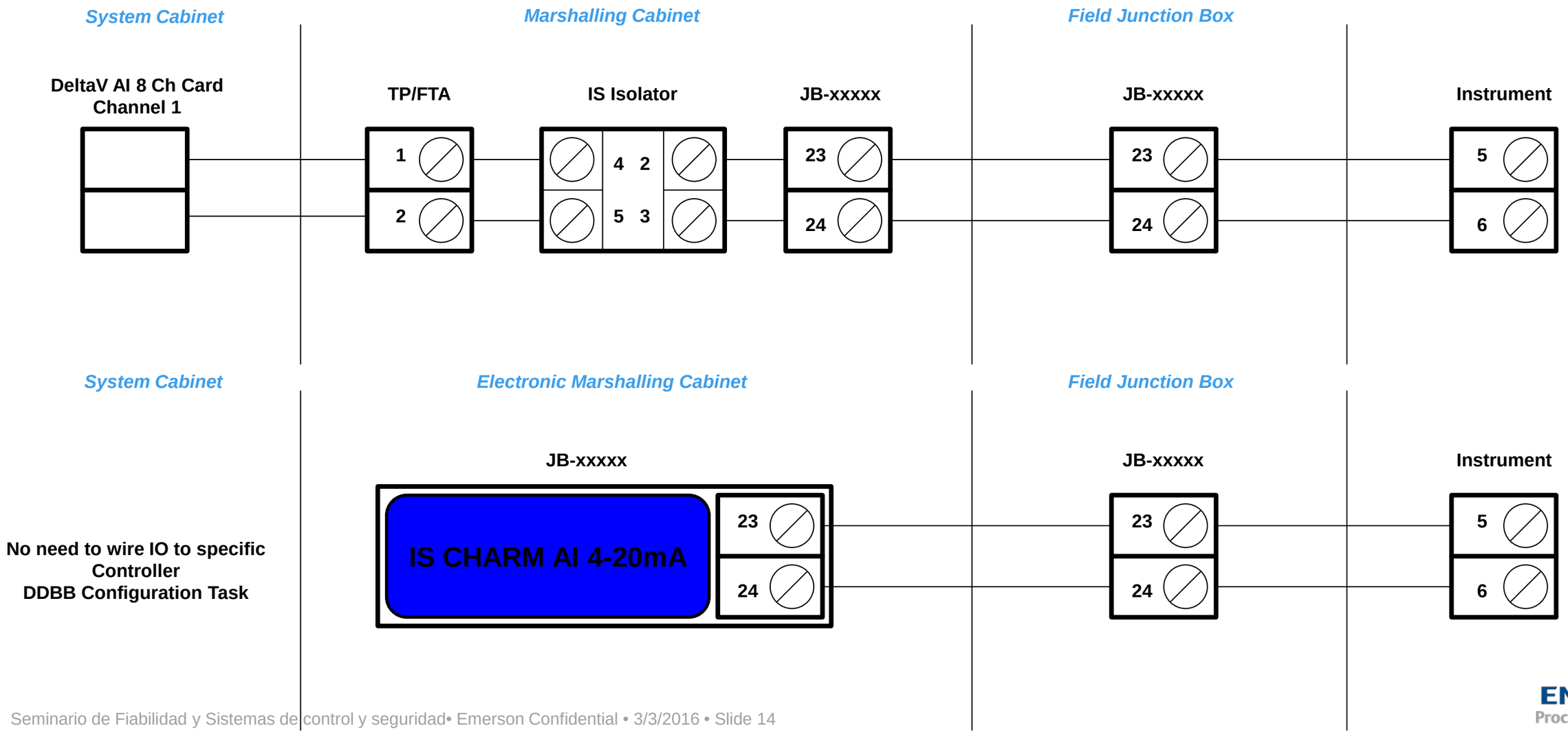
- AI 4-20mA 2/4W
- RTD
- Thermocouple/mV
- AI 0-10V isolated
- AO 4-20mA
- DI Namur
- DI 24VDC dry contact
- DI 24VDC isolated
- DO 24VDC High Side
- DO 100mA Energy Limited
- DO 24VDC Isolated
- 24VDC Power
- DI 120VAC Isolated
- DI 230VAC Isolated
- DO VAC Isolated

**I/O Terminal Blocks:**

- Standard Terminal Block
- Fused Injected Power TB
- 3-wire DI Fused Injected Power TB
- Relay Output TB
- Thermocouple mV TB

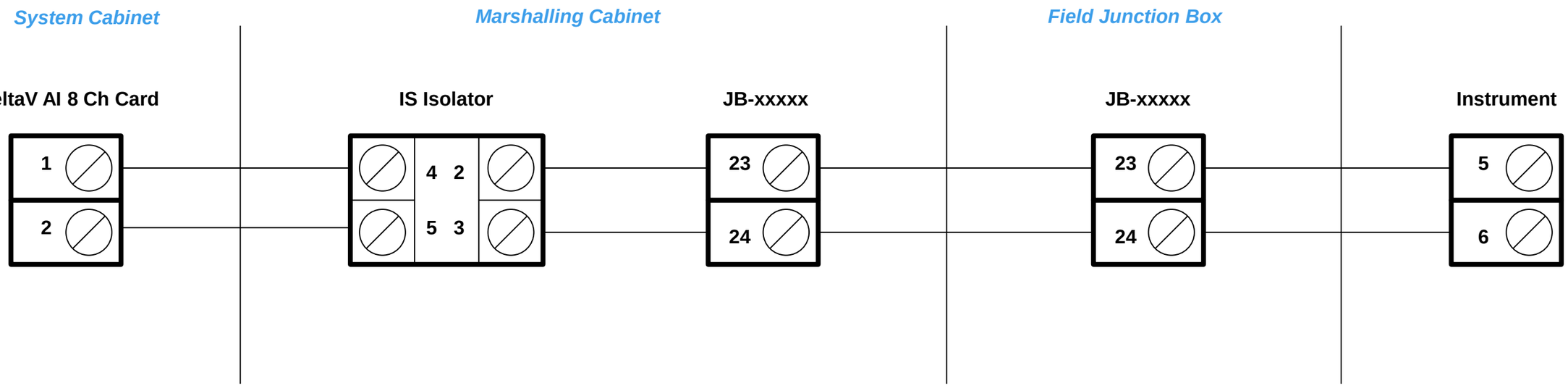
# Instrument Loop Diagram Examples

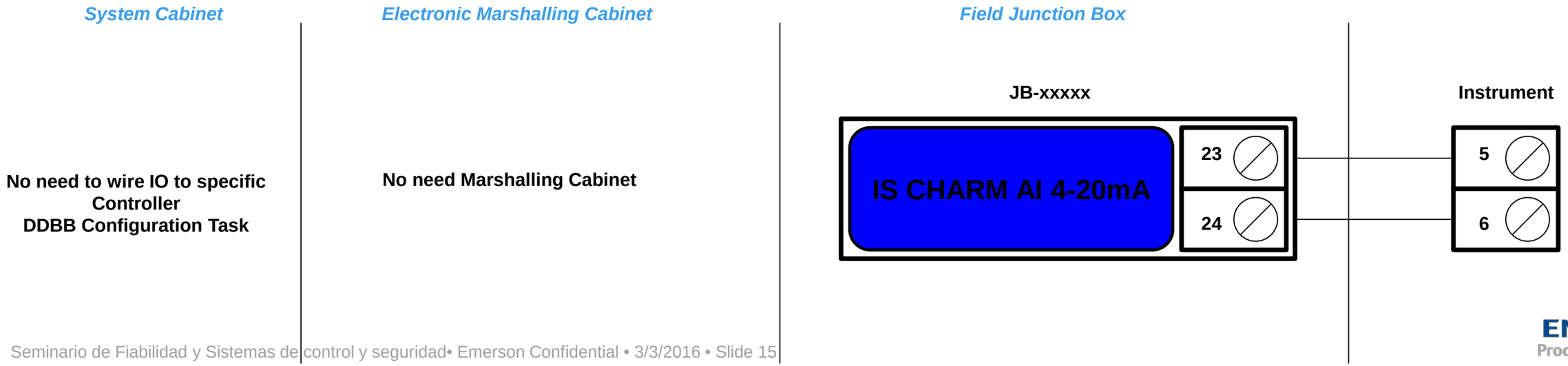
## Classic AI ILD Template



# Instrument Loop Diagram Examples

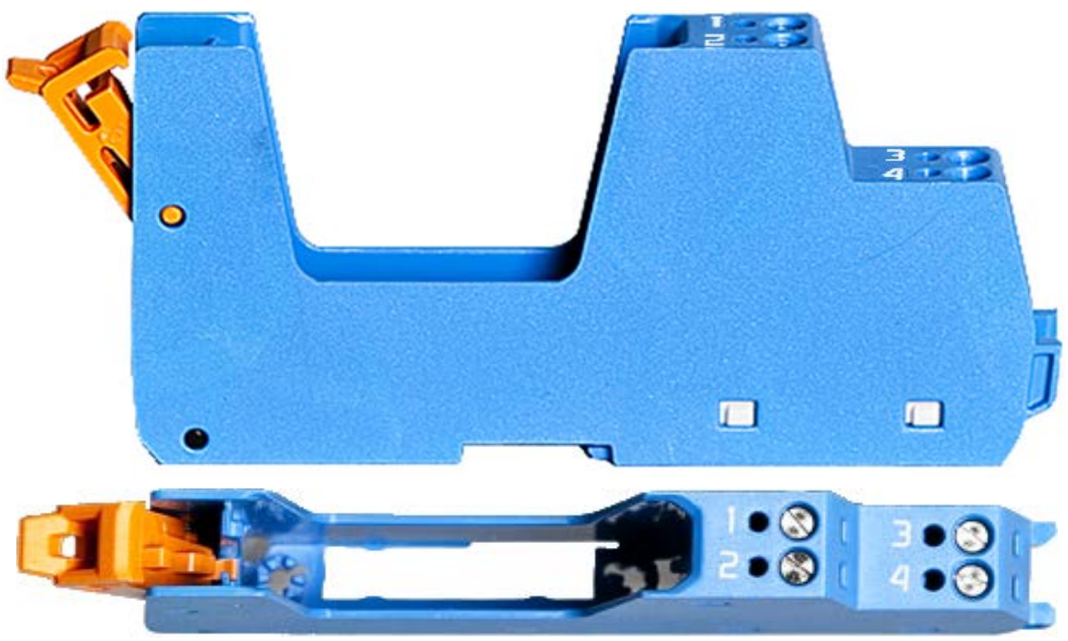
## Classic AI ILD Template



# I.S. Charms and I.S. Terminal Block

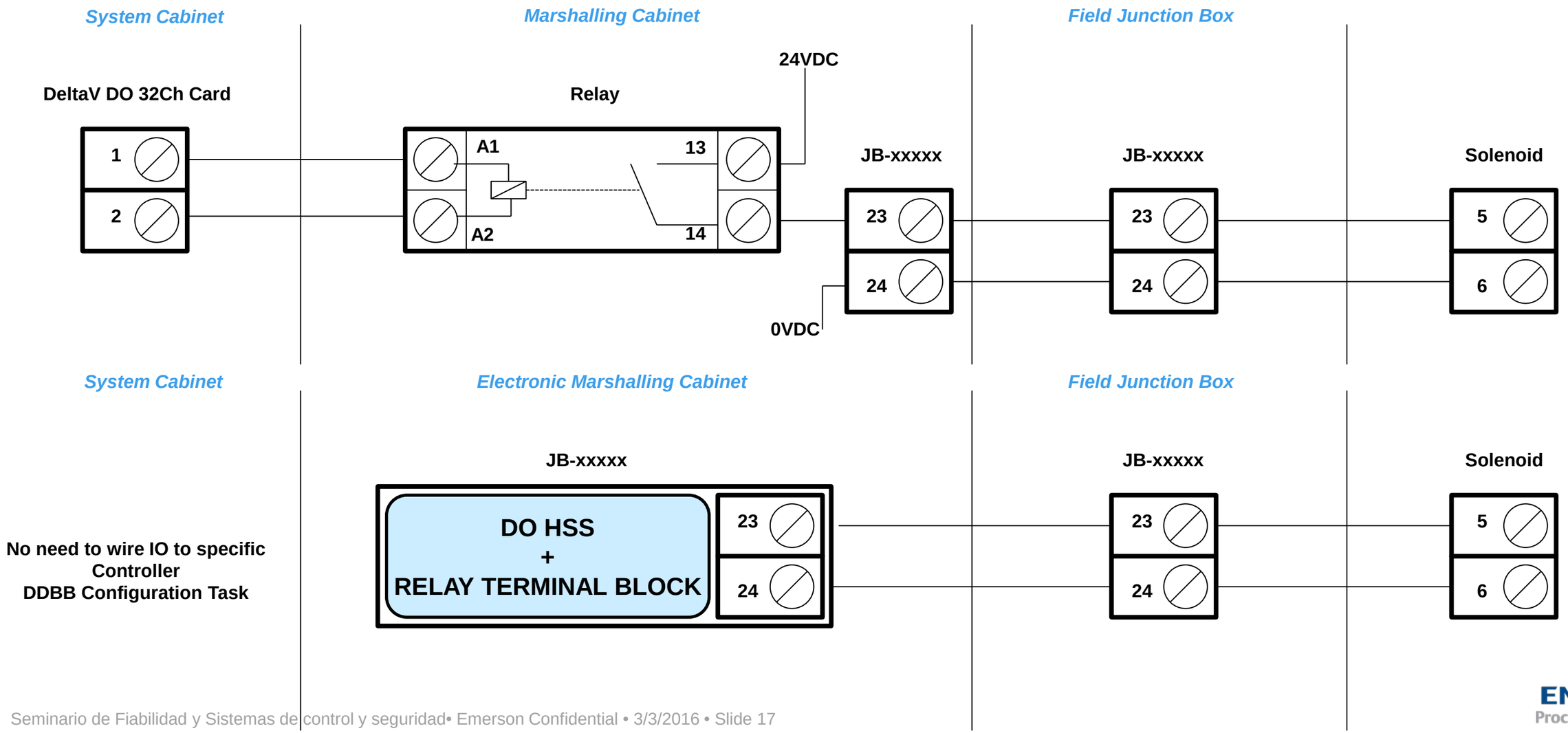
- IS CHARMS:
  - Hart Analog Input
  - Hart Analog Output
  - Discrete Input
  - Discrete Output
  - Thermocouple / mv
  - RTD



**IS Terminal Block Will Only Accept IS CHARMS!**

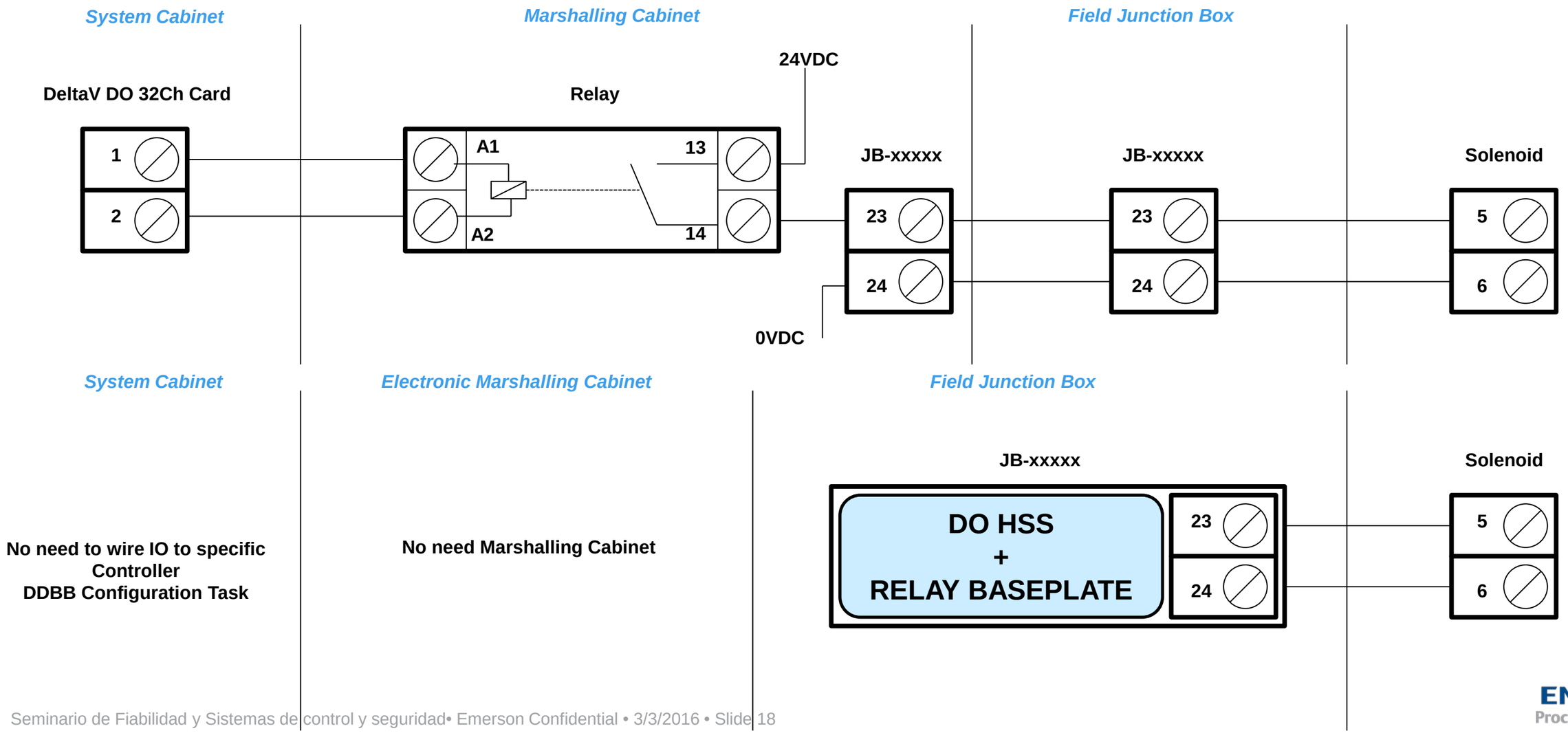
# Instrument Loop Diagram Examples

## Classic DO ILD Template



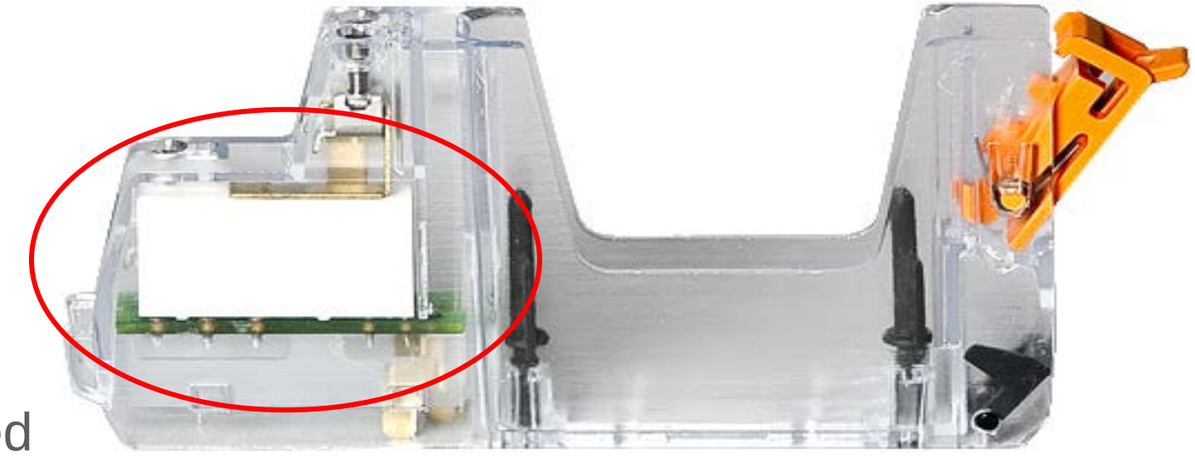
# Instrument Loop Diagram Examples

## Classic DO ILD Template



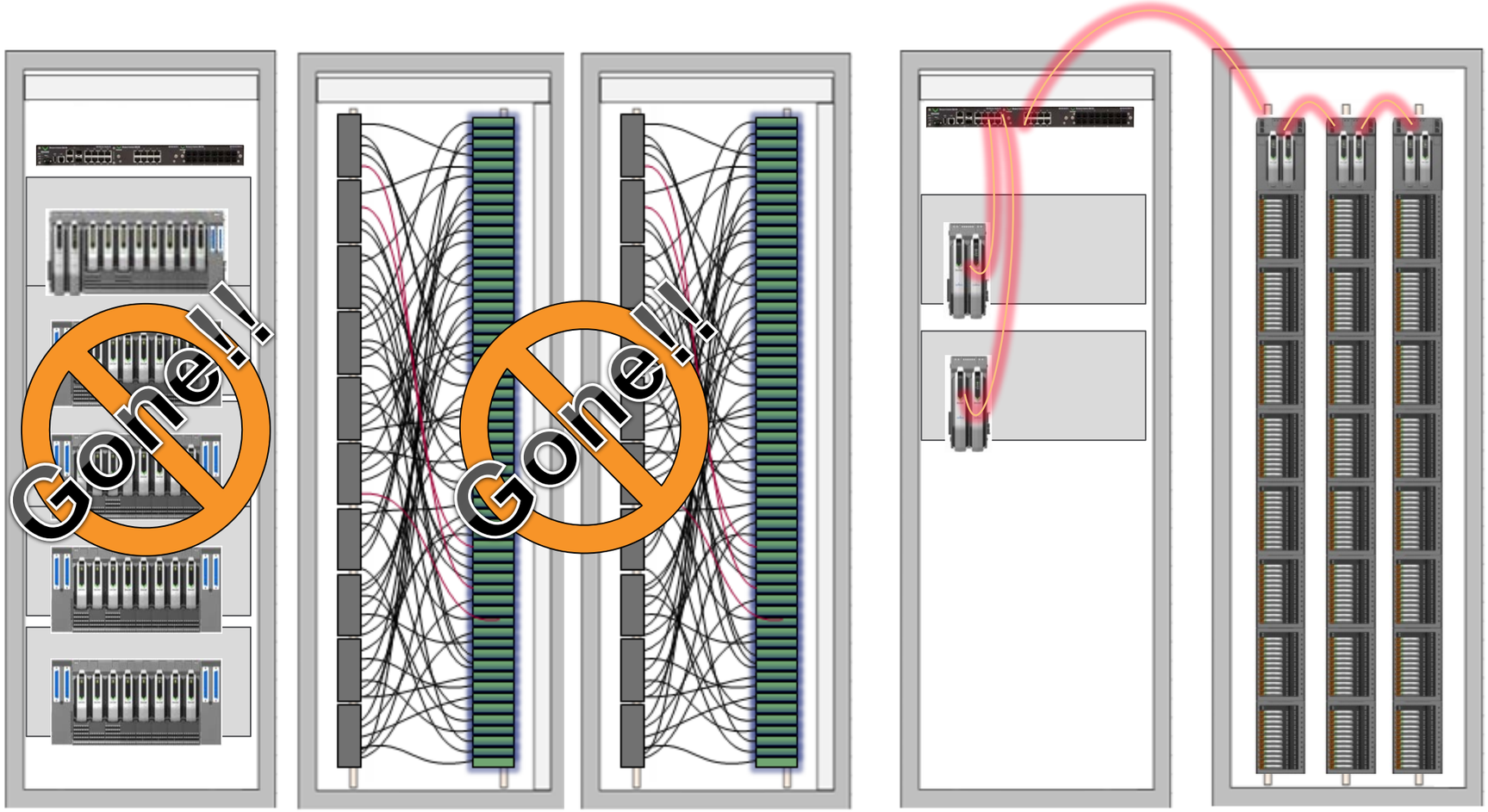
# Relay Output Terminal Block

- Relay is operated by standard DO 24 VDC High Side CHARM
- Provides Normally Open/Normally Closed contacts
- Field circuit power is provided separately



**Embedded Relay Provides Up to 6 A Continuous Power at Up to 250 VAC!**

# Electronic Marshalling Footprint



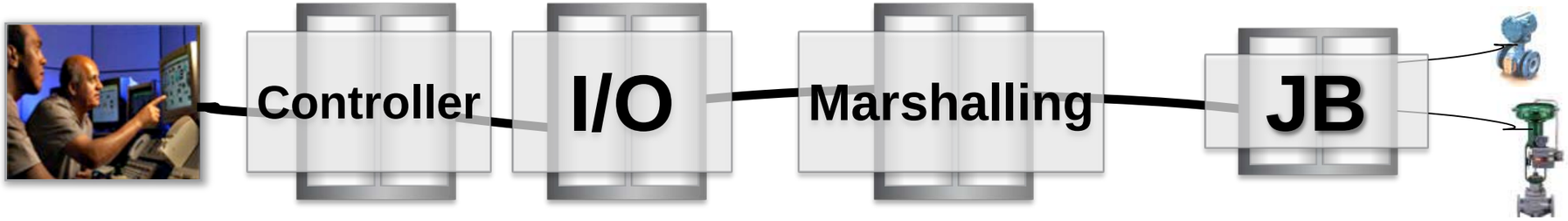

320 Classic Card IO with Wired Marshalling

600 Electronic Marshalled IO

**BEFORE**

**AFTER**

# Project Task Analysis - BEFORE




**Work**

- I/O lists & controller sizing
- Power, grounding & fusing design
- I/O design
- Spares sizing
- Cabinet design
- Conduit & cable layout
- P&IDs
- Process narratives
- Installation package

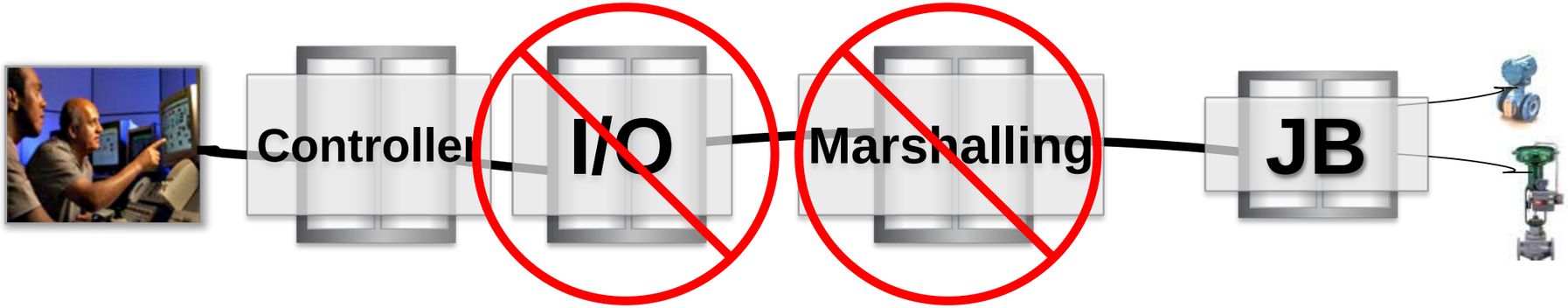
**Work**

- Cabinet design
- Jumpers & terminations
- Wiring diagrams
- Cable layout

**Work**

- JB design
- Jumpers & terminations
- Wiring diagrams
- Cable layout

# Project Task Analysis - NOW!




**Work**

- I/O lists & controller sizing
- Power, grounding & ~~fusing design~~
- ~~I/O design~~
- ~~Spares sizing~~
- ~~Cabinet design~~
- Conduit & cable layout
- P&IDs
- Process narratives
- Installation package

**Work**

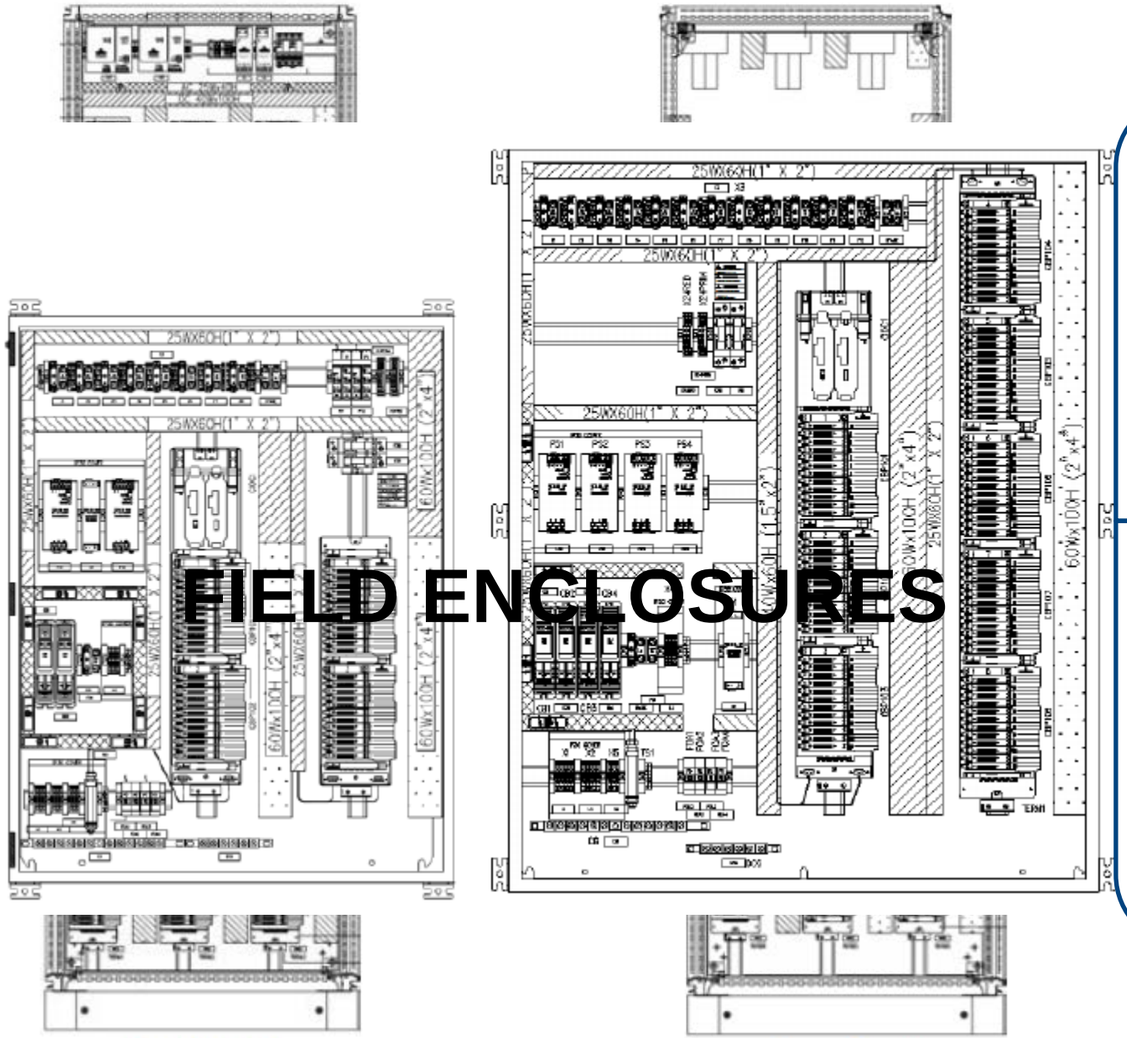
- ~~Cabinet design~~
- ~~Jumpers & terminations~~
- ~~Wiring diagrams~~
- ~~Cable layout~~

**Work**

- JB design
- Jumpers & terminations
- ~~Wiring diagrams~~
- Cable layout

As Built

# Cabinet Design ➔Configured To Order Cabinets




**CTO**

Fast Delivery
Reduce Footprint
PreDesigned
Fully Documented

Different World Areas standards and regulations (CE)
From 288 to 576 I/O (Charms)

Cabinet Specifications ready for Ordering
Drawings and Engineering Predesigned

Double 220VAC or 24VDC Power Supply
Non IS or IS
Grounding Bars
FO Patch Panels



EMERSON
Process Management

# Summary

**HW Availability**

- All cards are redundant
- Redundant Power Supply
- HART integrated as default

**CAPEX Projects**

- Reducing Costs and Complexity (HW design and tasks)
- Increase Flexibility on changes, delivering CTO Cabinets when you need ➔ Better Project Change Management

**OPEX Expansions**

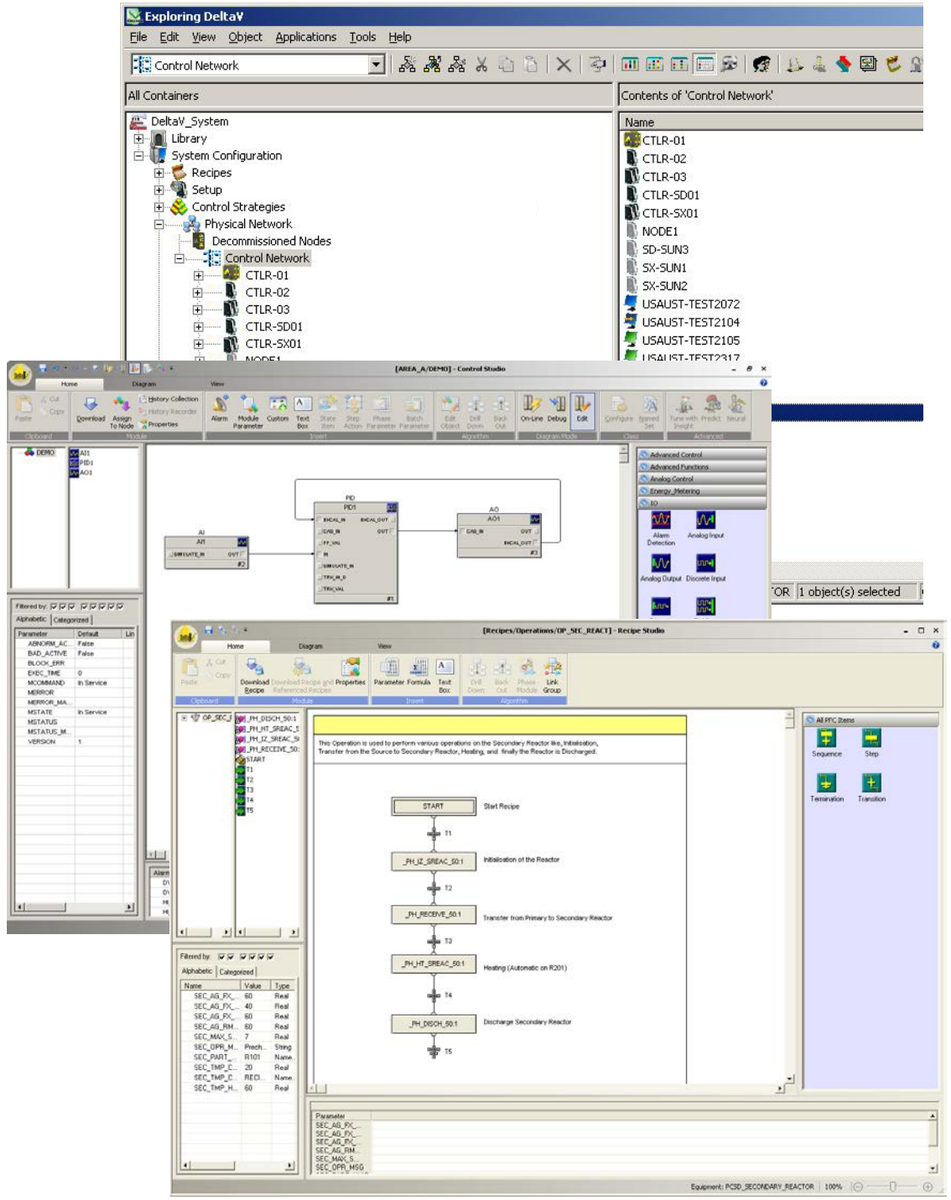
- Assigning signal typology for each Multicore pair as you need (AI, AO, DI, DO). Up to 27 different typologies
- Investing money granulary. Just buy what you need

# Agenda

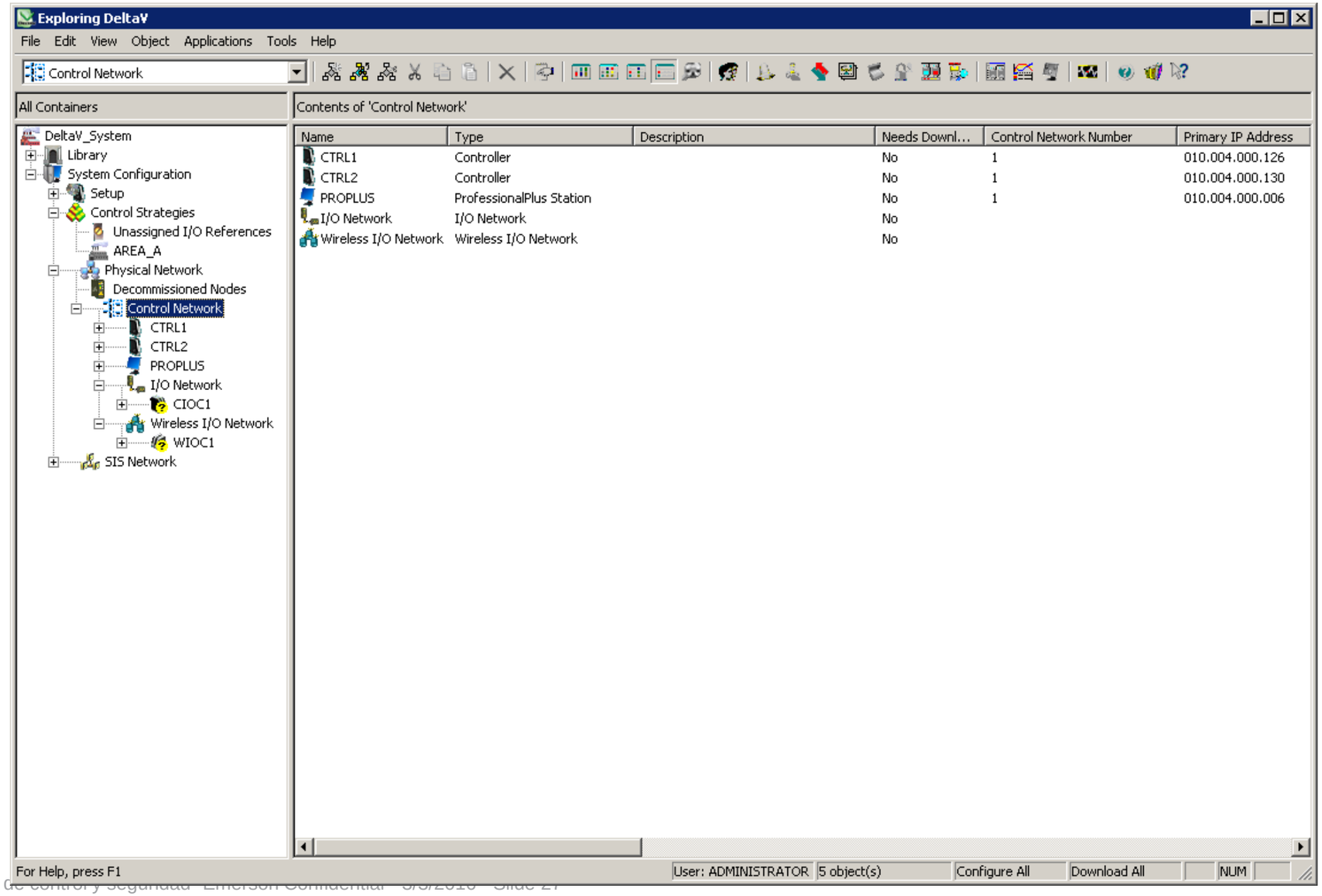
- Arquitectura DeltaV
- Alta eficiencia en proyectos. Marshalling Electrónico
- Herramientas de Ingeniería y Operación
- Ciclo de Vida

# DeltaV Configuration - Ease of Deployment

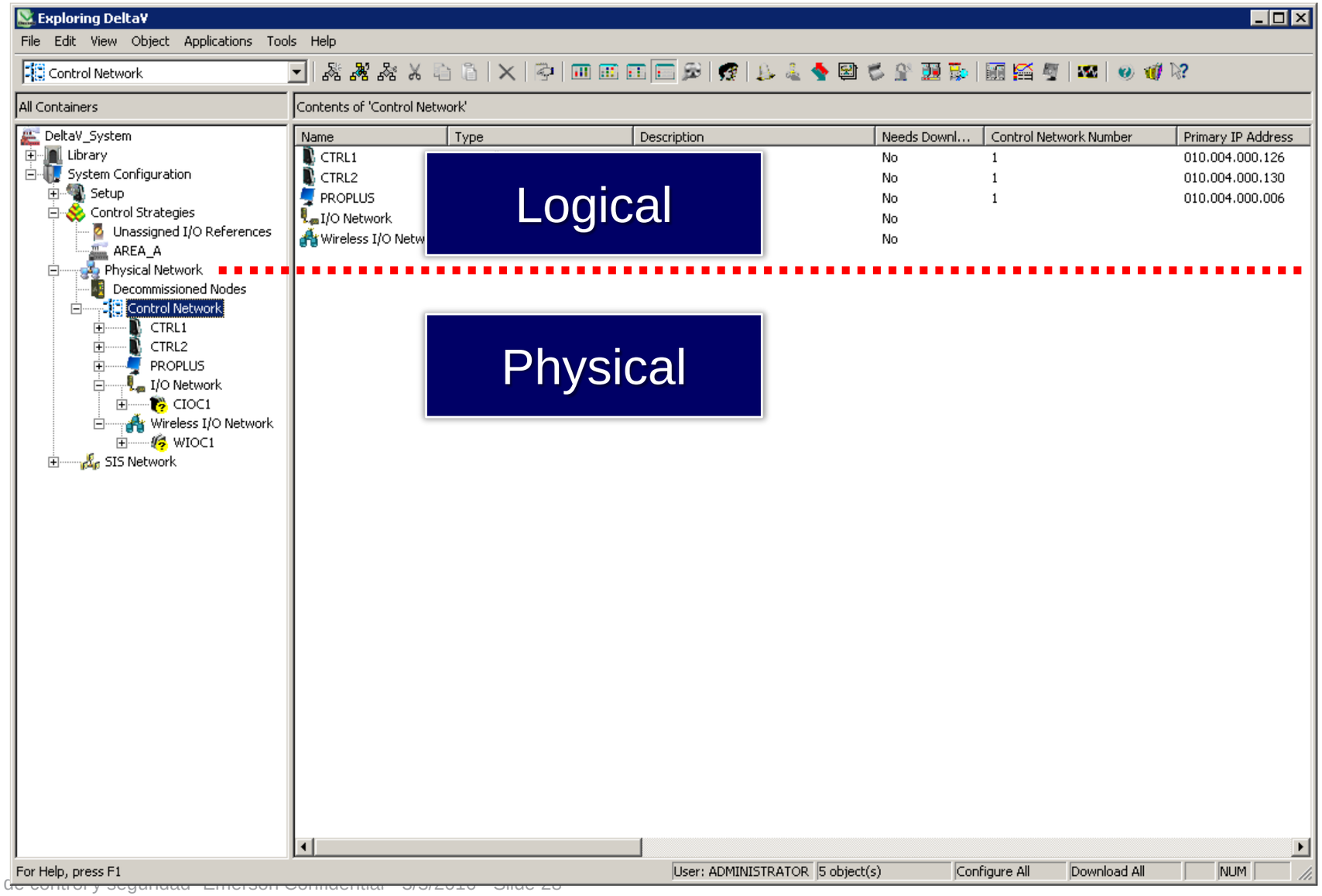
- ✓ Single, Integrated Automation System (ICSS)
- ✓ Single Database
- ✓ Object Oriented Configuration – Device to Display
- ✓ ISA S88 Standard
- ✓ Drag and Drop Engineering
- ✓ Standard or customized format file to import – export massive system information



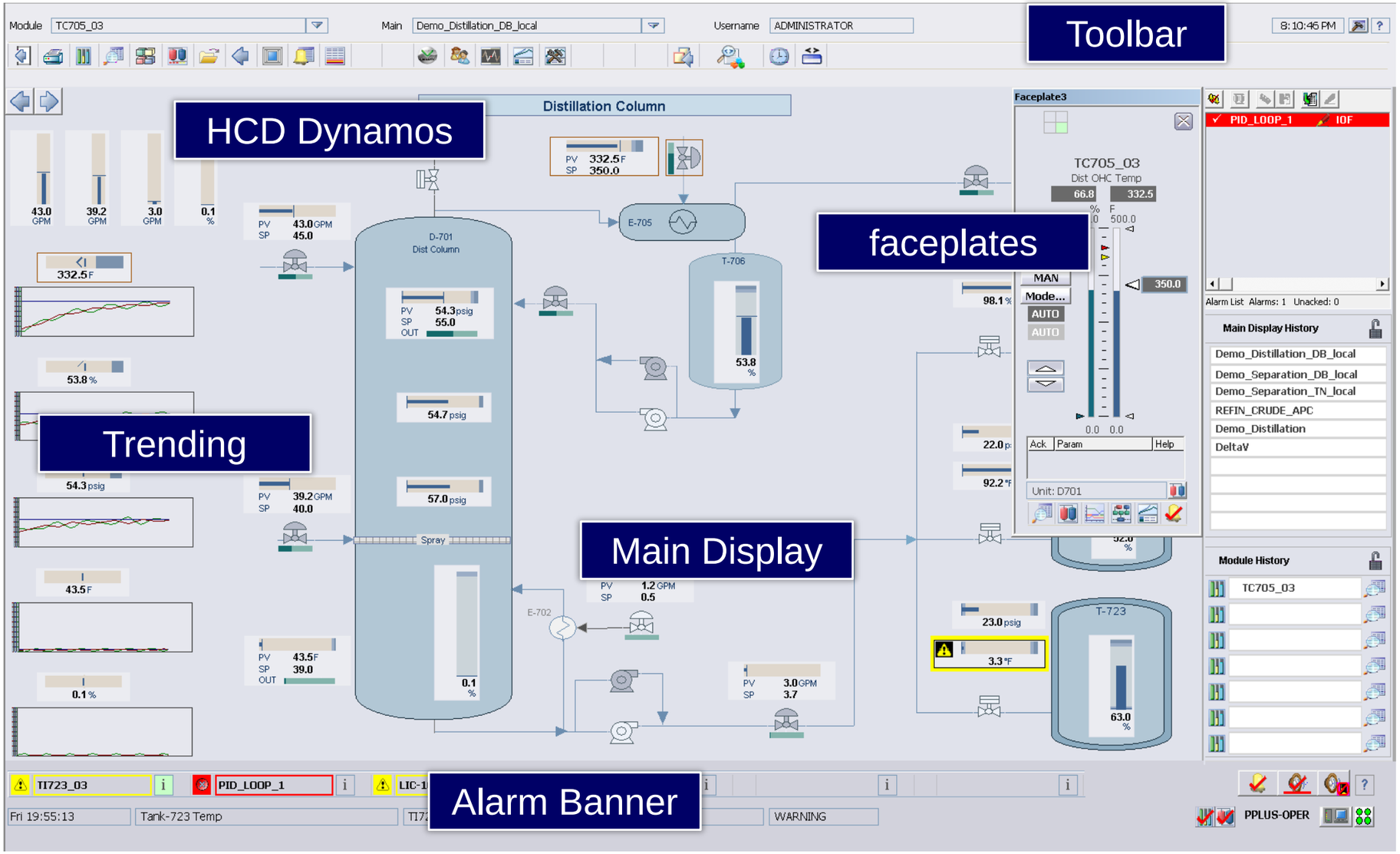
# DeltaV Configuration – DeltaV Explorer



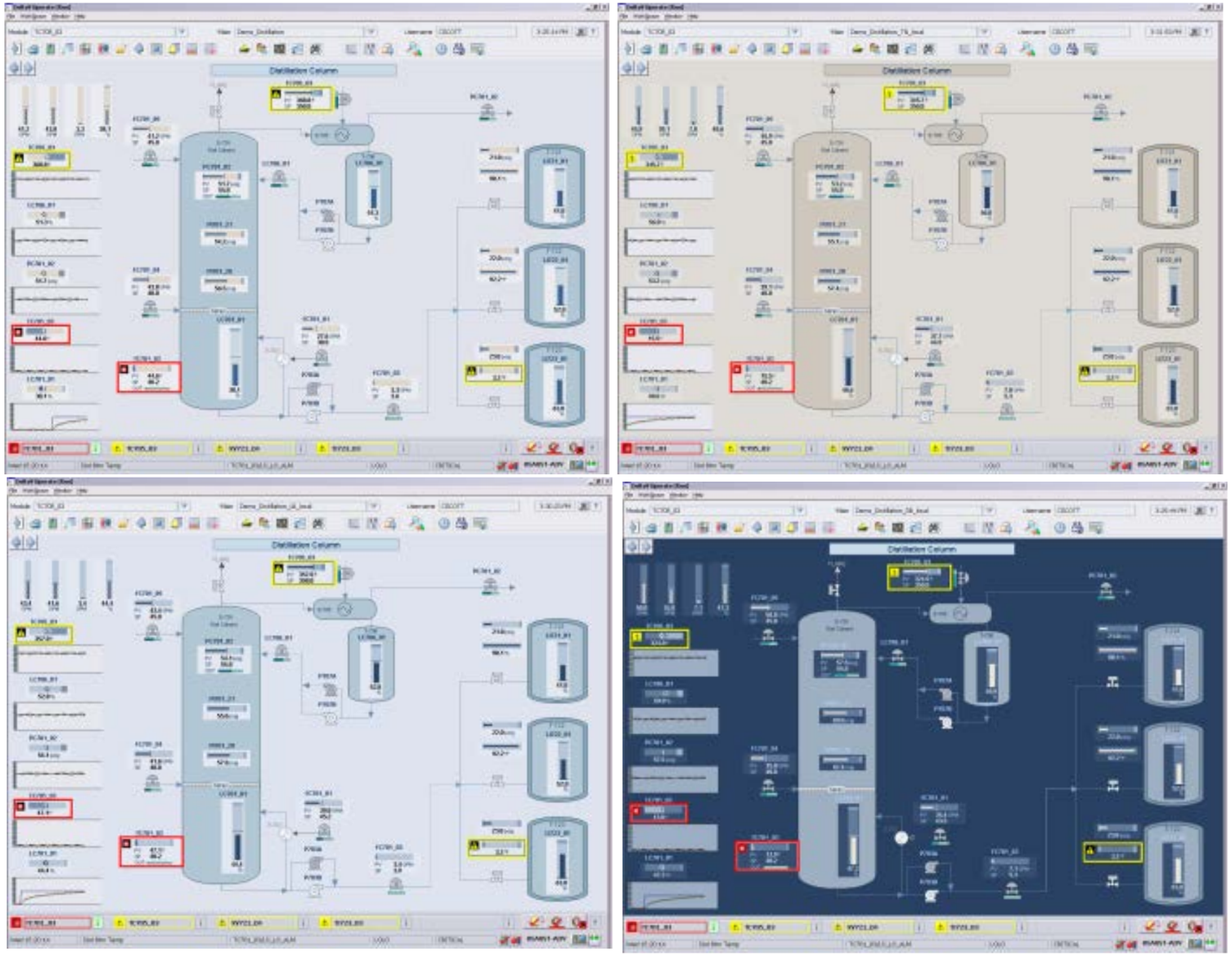
# DeltaV Configuration – DeltaV Explorer



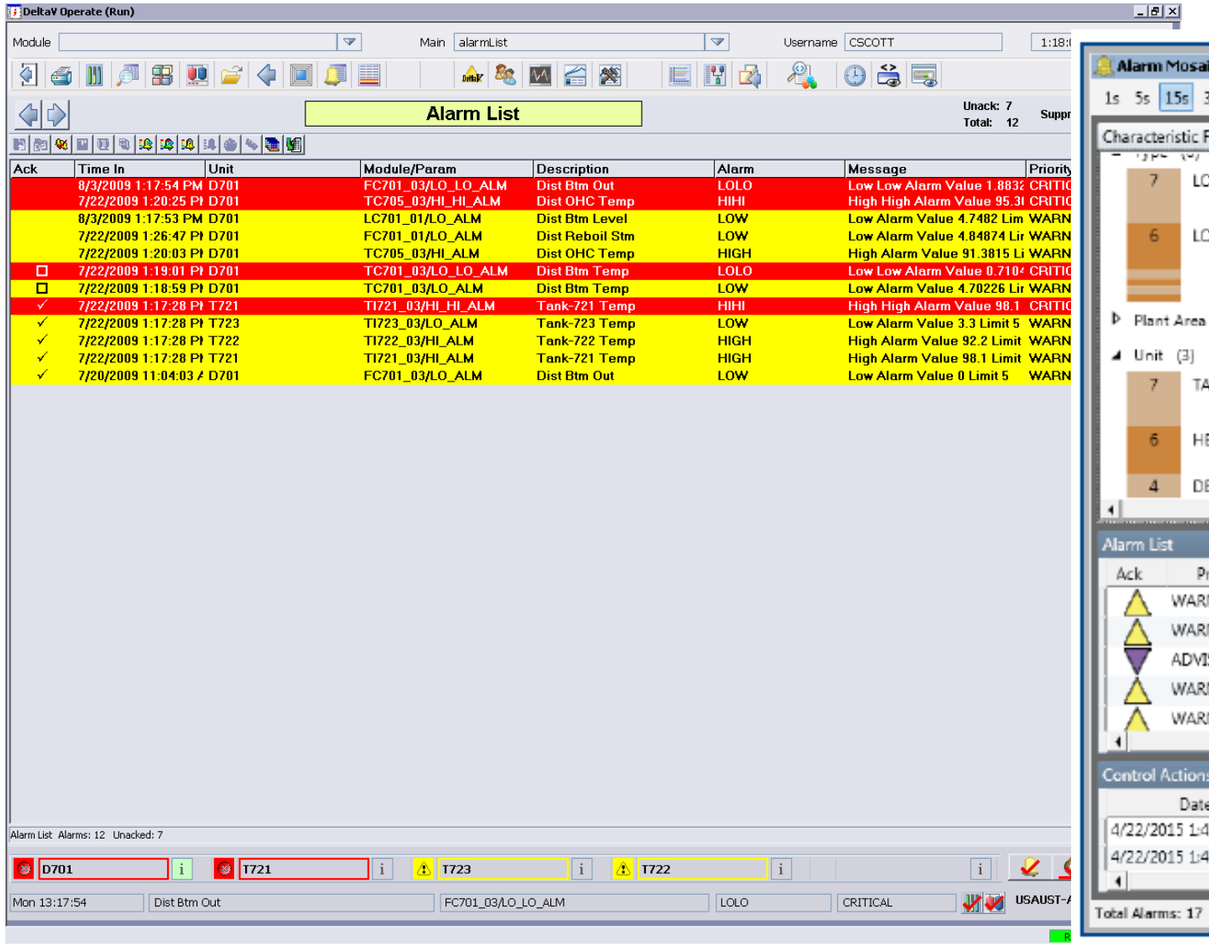
# Standard Operator Layout -Main display

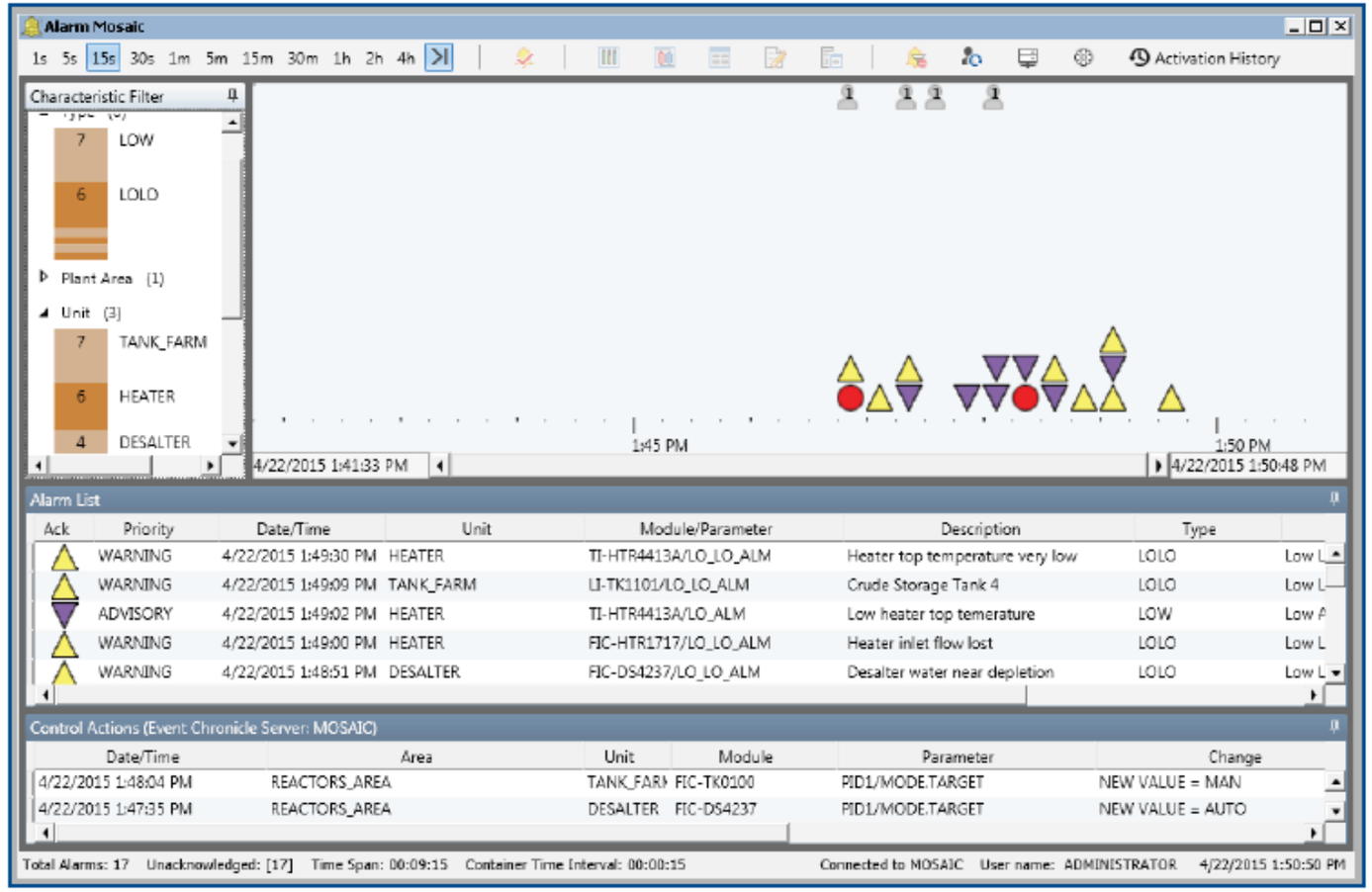


# Different Profiles (Themes) Are Available



# Alarms ( Classic or Mosaic View)

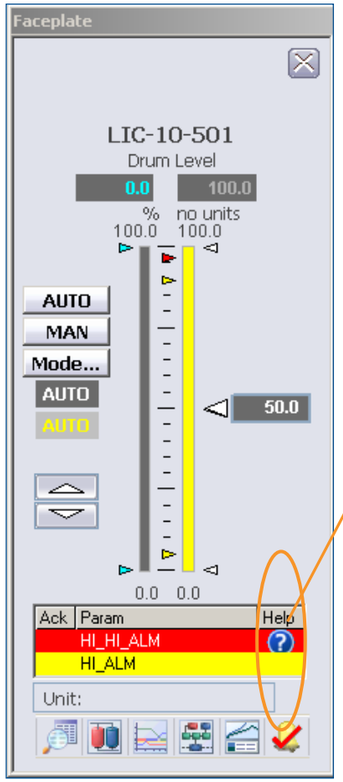


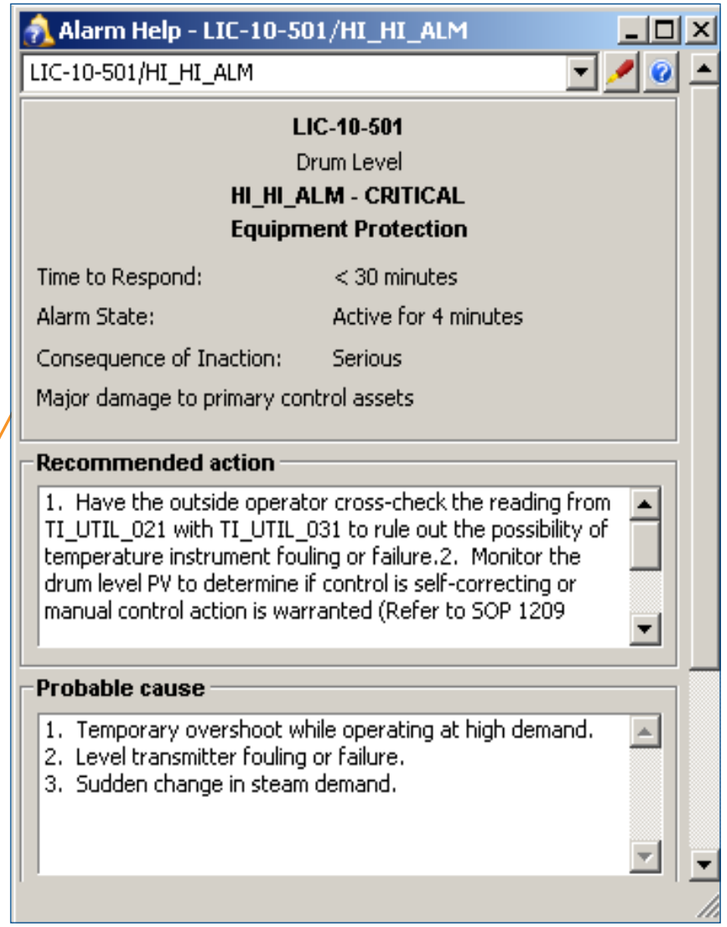



# Best Operator Experience

## Alarm Help

- Alarm lists and faceplates indicate if help exists
- Alarm help is in-context and persistent



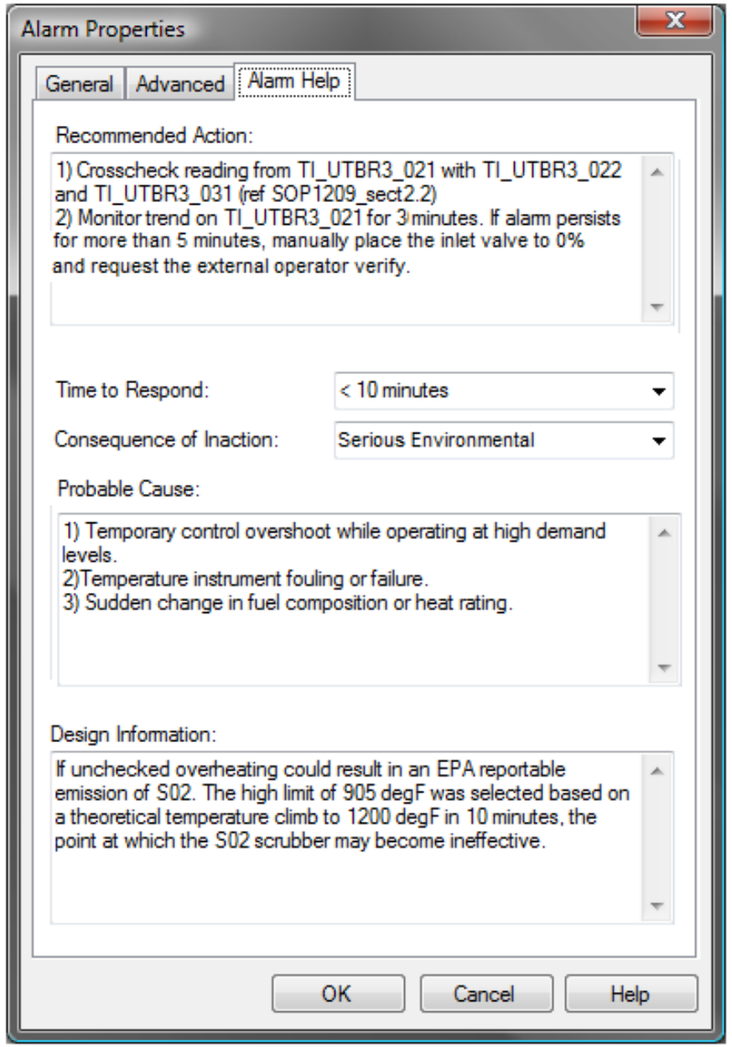



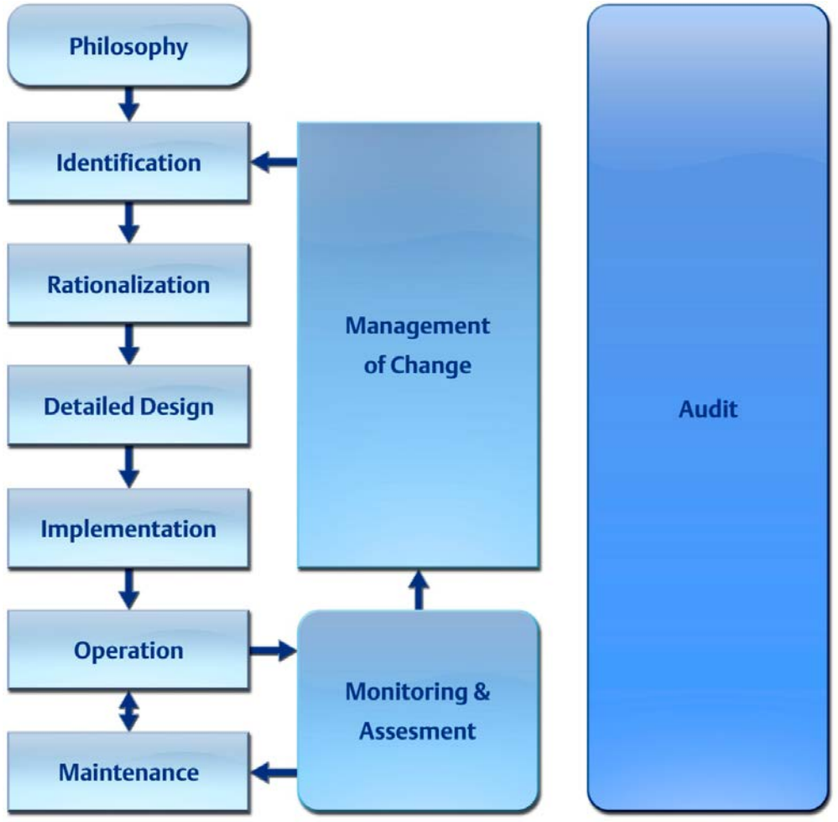

**"One click access to recommended action!**

# Easy To Engineer And Maintain

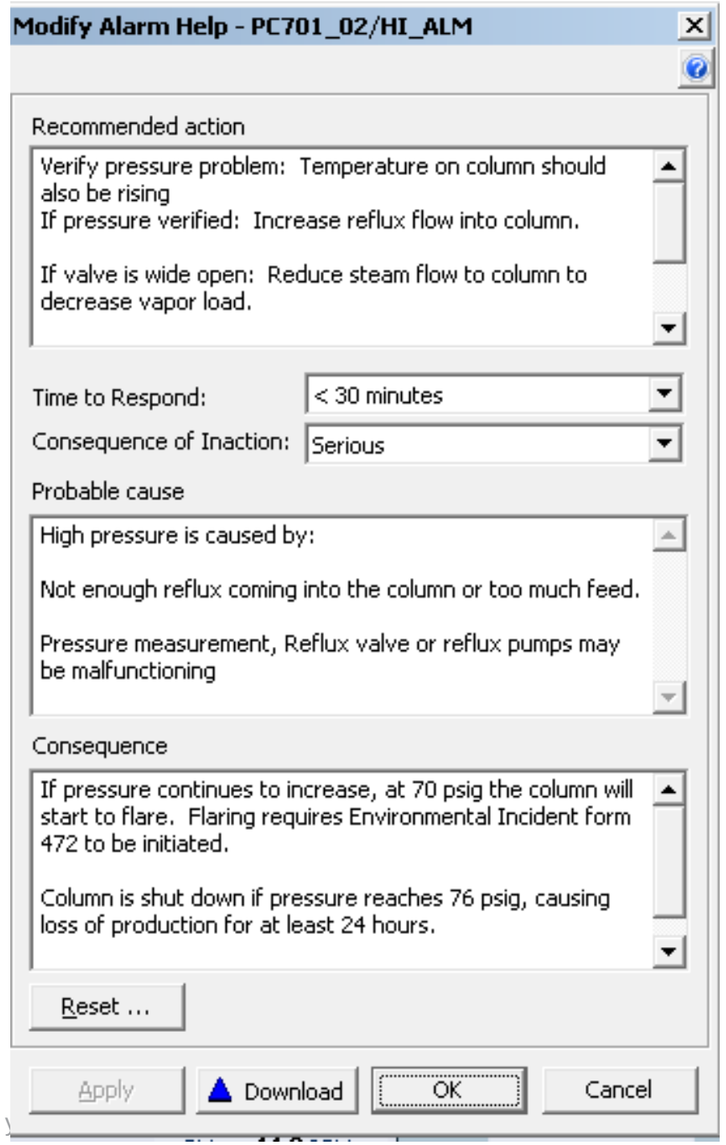
- Alarm properties include essentials for an ISA-18.2 compliant master alarm database
- Provides ISA-18.2 alarm rationalization, documentation and management of change.

**No special tools or applications required!**



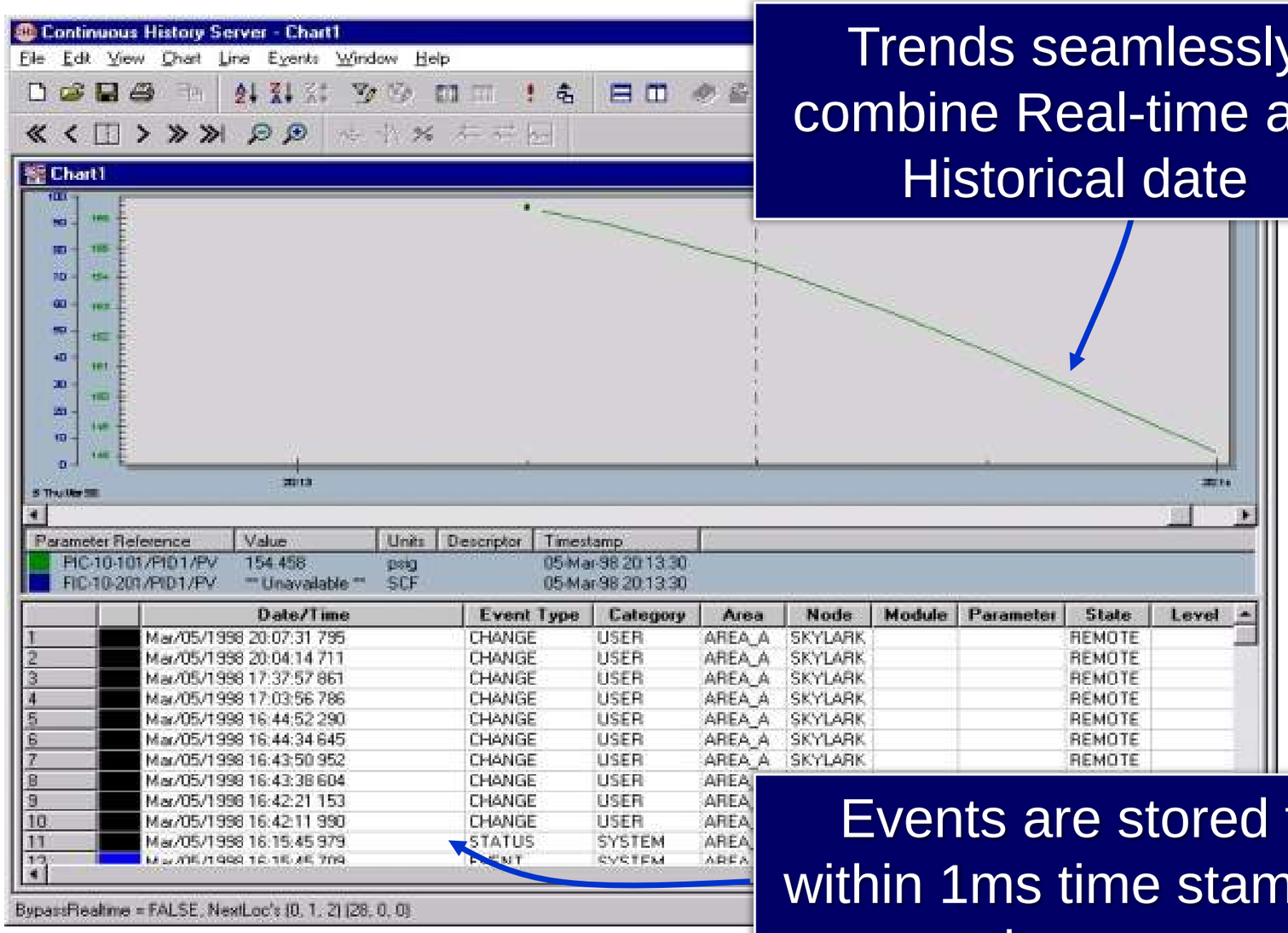



# Operators Can Add Knowledge




**Authorized Operators can modify the alarm help at the operator station!**

# DeltaV Continuous Historian

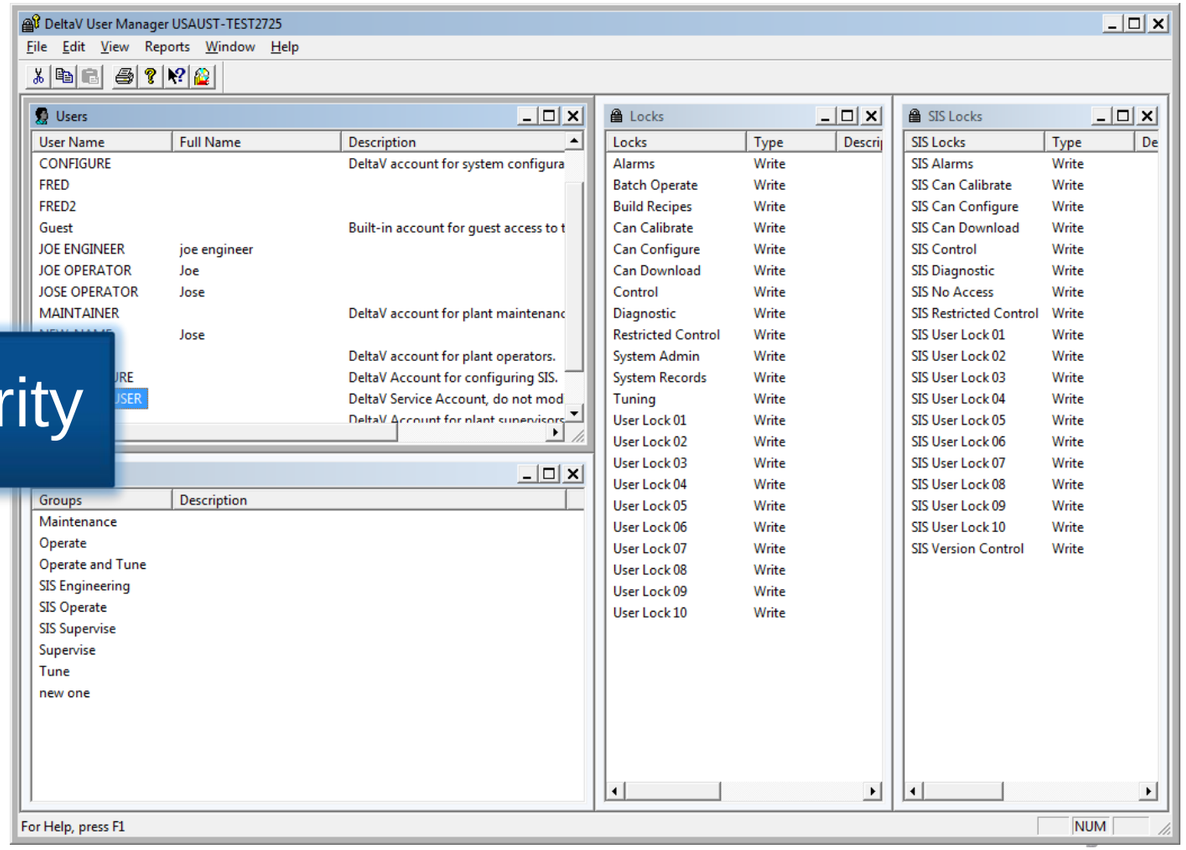



Trends seamlessly combine Real-time and Historical date

Events are stored to within 1ms time stamped at the source

# User Security

- Define your own security philosophy
  - New operators?  Minimize what they can do
  - Experienced operators? Give them more responsibility




User defined security

# DeltaV InSight

Poor control costs your company money. DeltaV InSight provides a cost effective way to improve control performance:

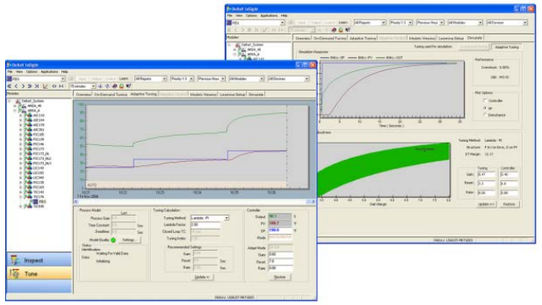

- Easily identify control problems
  - Performance monitoring and reporting
  - Device diagnostics
- Quickly tune loops for improved control
  - On-demand and adaptive tuning
  - Test tuning with simulation
  - Closed loop adaptive control
- Gain insight with embedded learning
- Easy to Use – Out of the Box
  - No Configuration Required
  - Adapts to system configuration changes

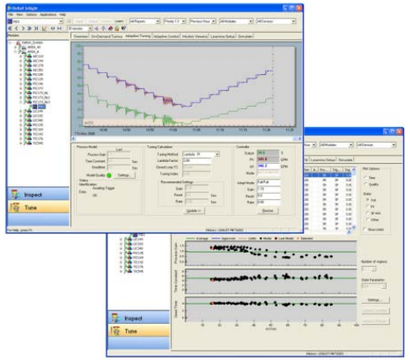
**Benefits:**

- Better control can increase plant profitability up to 5%
- Predictive intelligence can decrease maintenance costs by up to 20%

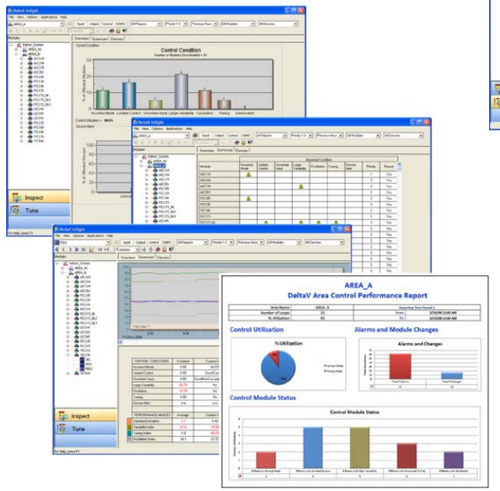
# DeltaV InSight – A Control Performance Suite

**Intelligent Controller Tuning "Tune with InSight"**

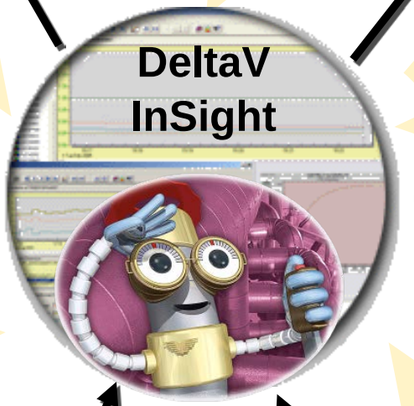


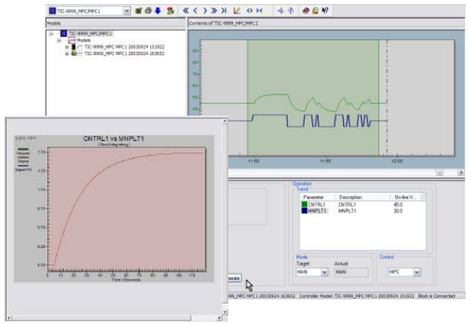


**Adaptive Control (Adapt) "Control with InSight"**



**Intelligent Performance Monitoring "Inspect with InSight"**

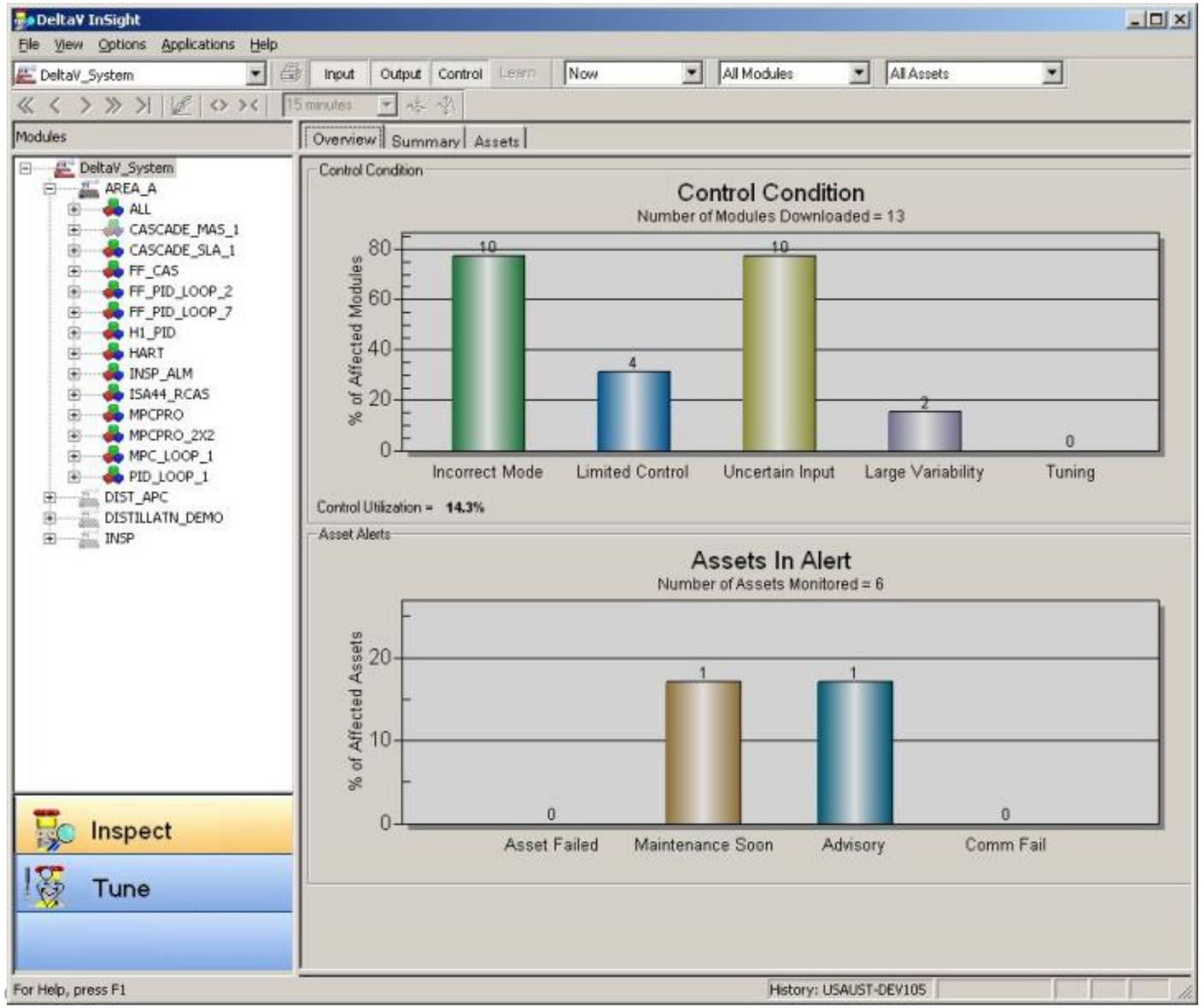


**Advanced Control Predict / Neural / Fuzzy**

**Process Model Calculations**

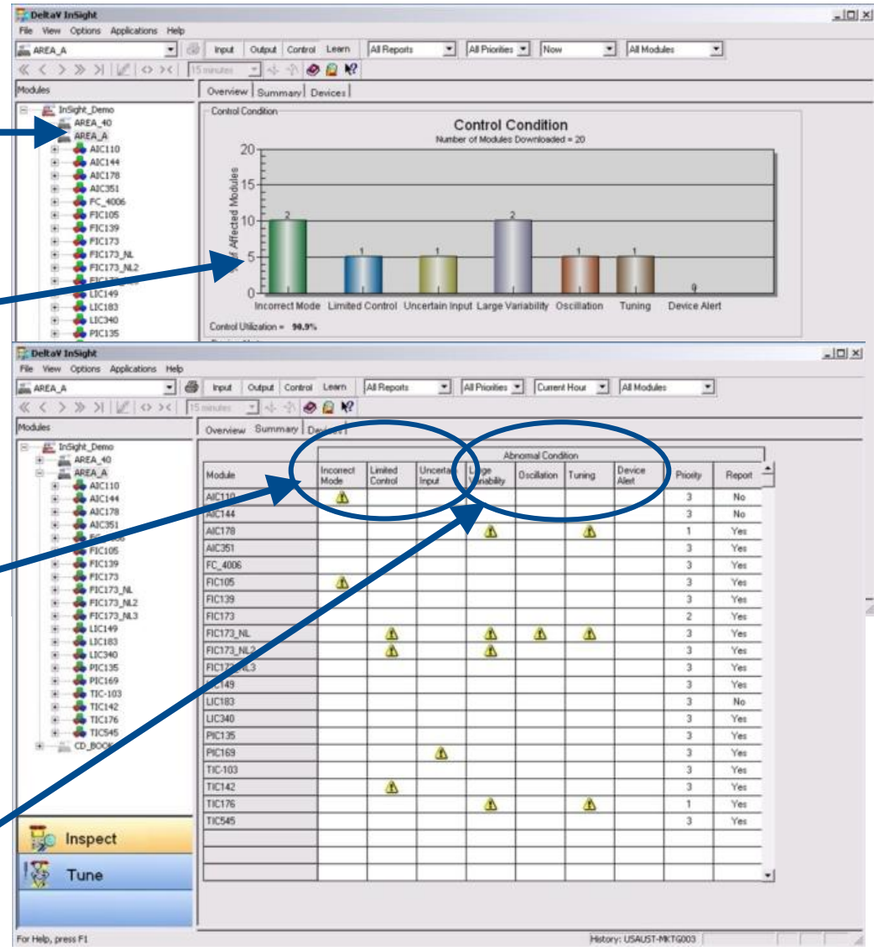
# DeltaV InSight – Integrated User Interface



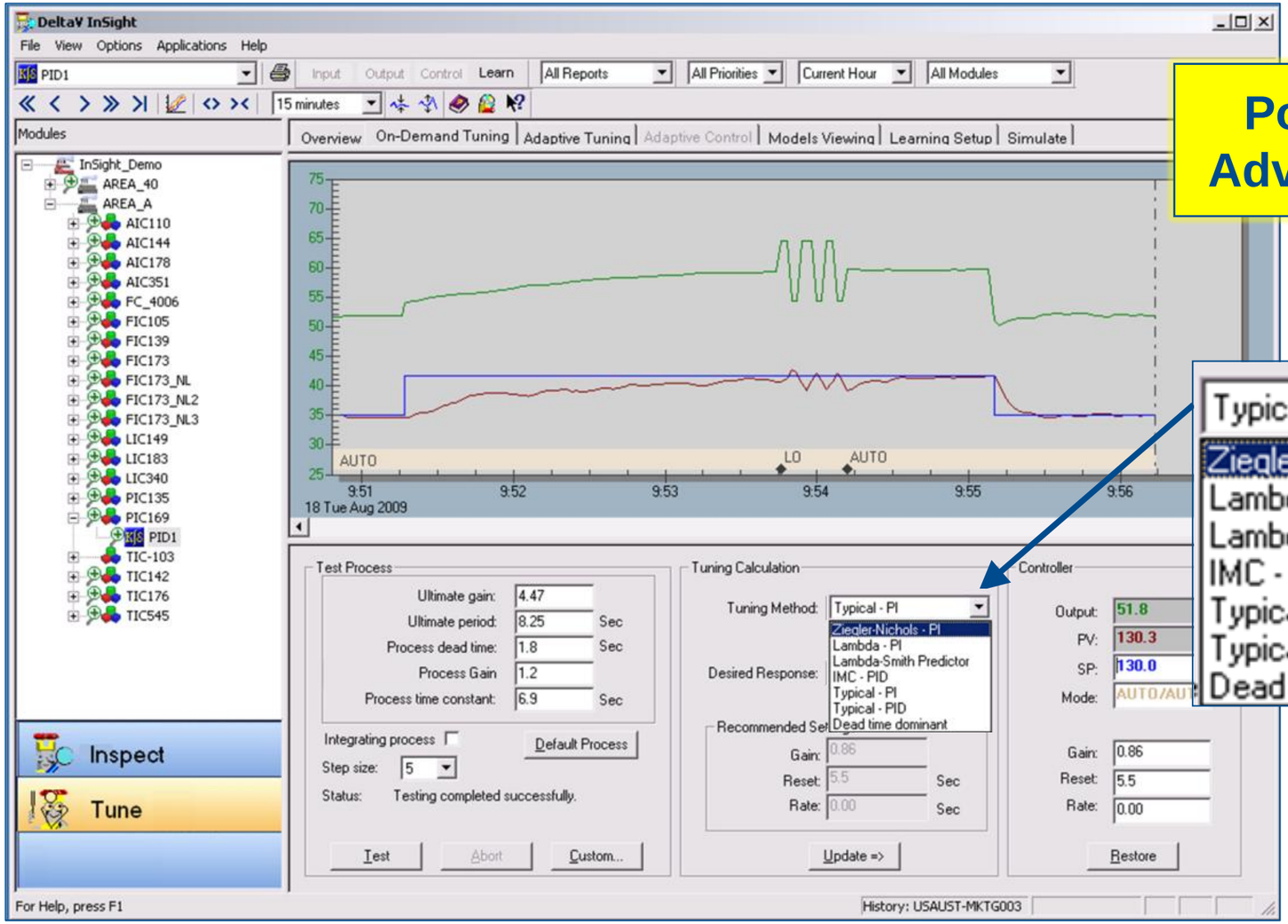
# Control Performance Monitoring

## “Inspect with InSight”

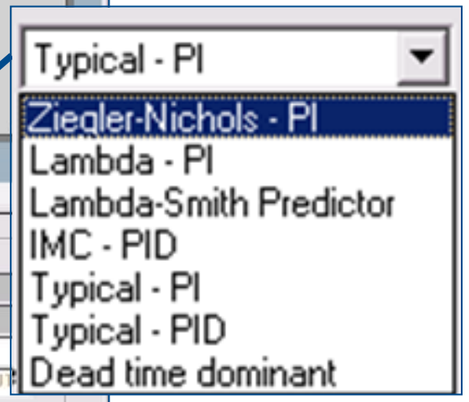
- Explorer tree allows easy navigation of control hierarchy
- Overview display summarizes performance for System, Area, Units and Modules
- Abnormal Control Conditions indicated for Problem Loops:
  - Control Service Status:
    - Incorrect mode
    - Limited control output
    - Bad/Uncertain input
  - Control Performance Status:
    - Standard Deviation
    - Variability Index
    - Oscillation Index
    - Tuning Index
  - Device and Valve Diagnostics



# On-Demand Tuning - Options for the Expert

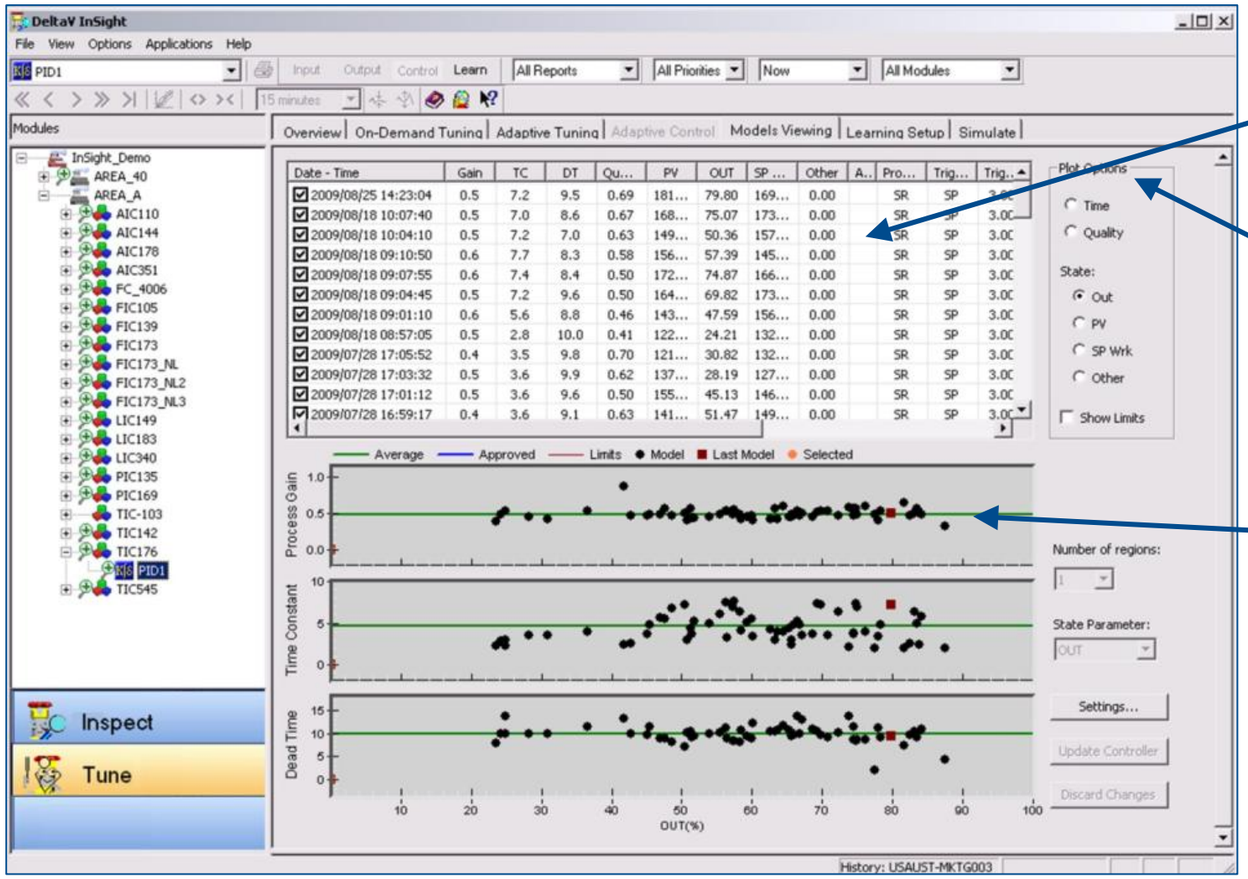



**Power for the Advanced User !**



# DeltaV InSight - Model Analysis

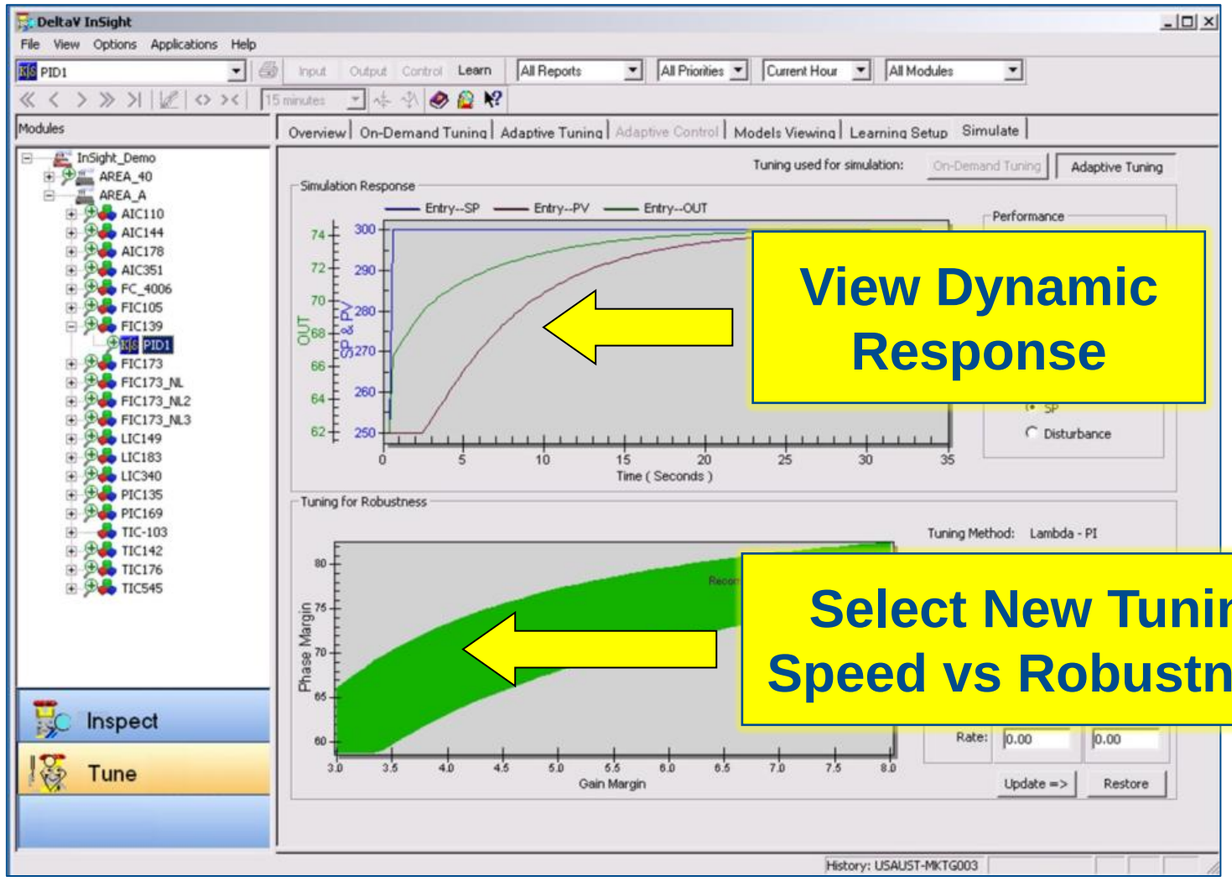
## Gain Process Insight with Model Analysis




- Models automatically stored in a model database
- Various plot options to analyze impact of operating conditions on process models
- Average of selected models may be utilized to establish the recommended tuning

# DeltaV InSight - Control Simulation

## Test your tuning with Dynamic Simulation




**View Dynamic Response**

**Select New Tuning Speed vs Robustness**

- Closed loop simulation of setpoint and disturbance changes for recommended tuning
- Simulation for both Adaptive and On-demand Tuning

# Agenda

- Arquitectura DeltaV
- Alta eficiencia en proyectos. Marshalling Electrónico
- Herramientas de Ingeniería y Operación
- Ciclo de Vida

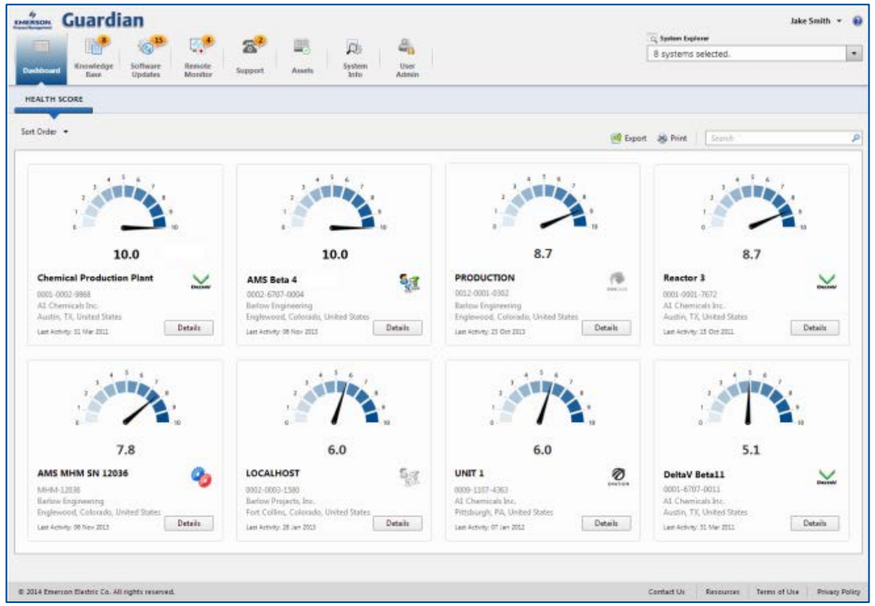
# Life Cycle Care

# Guardian Support

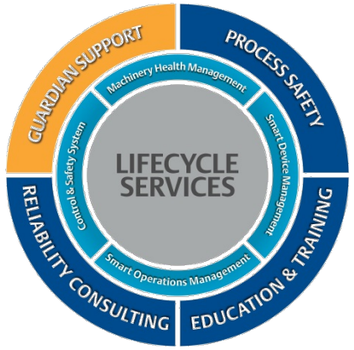
Reliability Performance Maintenance

**Real-time visualization and proactive management of lifecycle requirements**

GUARDIAN




- User-personalized, actionable information enables **better decision making**
- **Improved staff productivity** through global collaboration
- Shift to predictive and proactive maintenance results **in lower costs**
- Access to experts and remote system diagnosis **increases operating performance**
- Increased investment life means **improved capital efficiency**



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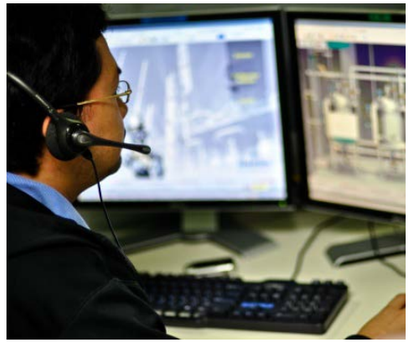
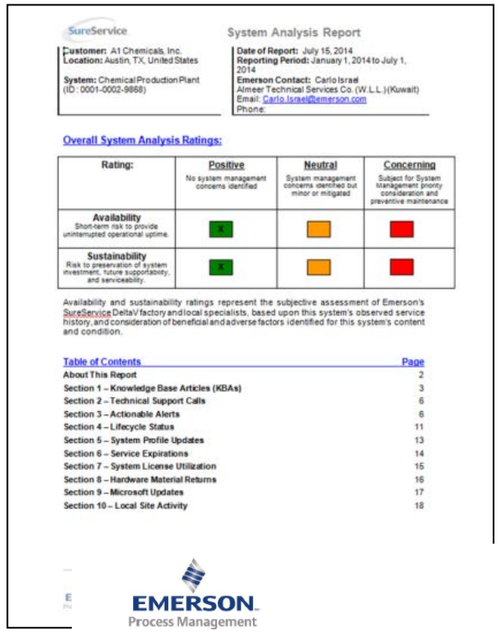
# Guardian Support

- **Guardian Support Key Features**
  - Remote System Diagnosis
  - Services Engineers Onsite presence
  - DeltaV Suite Updated
  - Dedicated Website
  - Software Update Delivery Service
  - Automated E-mail Service Notification
  - System Analysis Report
  - Local 24x7x365 Expert Technical Phone Support
  - Assistance 24 hours after problem detected
  - Preventive Maintenance
  - Hours Bank for Services
  - Evergreen Program
  - Spare Stock
  - Total Cost OwnerShip





SureService

System Analysis Report

**Customer:** A1 Chemicals, Inc.
**Location:** Austin, TX, United States

**System:** Chemical Production Plant
(ID : 0001-0002-9868)

**Date of Report:** July 15, 2014
**Reporting Period:** January 1, 2014 to July 1, 2014
**Emerson Contact:** Carlo Israel
Almeer Technical Services Co. (W.L.L.)(Kuwait)
Email: Carlo.Israel@emerson.com
Phone:

Overall System Analysis Ratings:

| Rating: | Positive<br>No system management concerns identified | Neutral<br>System management concerns identified but minor or mitigated | Concerning<br>Subject for System Management priority consideration and preventive maintenance |
|---|---|---|---|
| **Availability**<br>Short-term risk to provide uninterrupted operational uptime. | X | | |
| **Sustainability**<br>Risk to preservation of system investment, future supportability, and serviceability. | X | | |

Availability and sustainability ratings represent the subjective assessment of Emerson's SureService, DeltaV factory and local specialists, based upon this system's observed service history, and consideration of beneficial and adverse factors identified for this system's content and condition.

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SureService

Emerson Process Management

NOMBRE DEL CLIENTE

CSC-0-2016 A

OFERTA CONTRATO MANTENIMIENTO 2016

DeltaV — AMS Suite

| Sistema | ID del Sistema |
|---|---|
| DELTAV | XXXX-XXXX-XXXX |
| AMS | XXXX-XXXX-XXXX |

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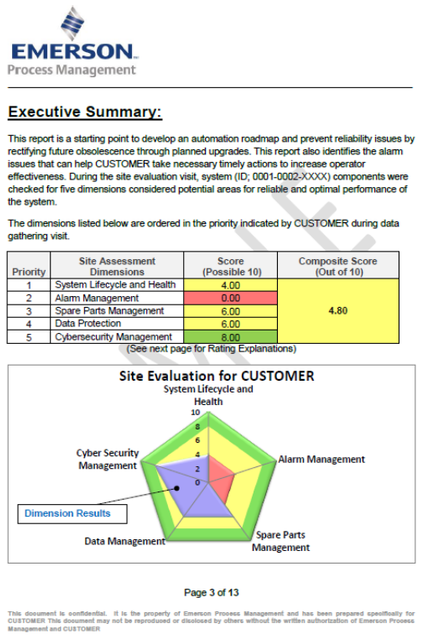

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Executive Summary:

This report is a starting point to develop an automation roadmap and prevent reliability issues by rectifying future obsolescence through planned upgrades. This report also identifies the alarm issues that can help CUSTOMER take necessary timely actions to increase operator effectiveness. During the site evaluation visit, system (ID; 0001-0002-XXXX) components were checked for five dimensions considered potential areas for reliable and optimal performance of the system.

The dimensions listed below are ordered in the priority indicated by CUSTOMER during data gathering visit.

| Priority | Site Assessment Dimensions | Score (Possible 10) | Composite Score (Out of 10) |
|---|---|---|---|
| 1 | System Lifecycle and Health | 4.00 | 4.80 |
| 2 | Alarm Management | 0.00 | |
| 3 | Spare Parts Management | 6.00 | |
| 4 | Data Protection | 6.00 | |
| 5 | Cybersecurity Management | 8.00 | |

(See next page for Rating Explanations)

Site Evaluation for CUSTOMER



Page 3 of 13

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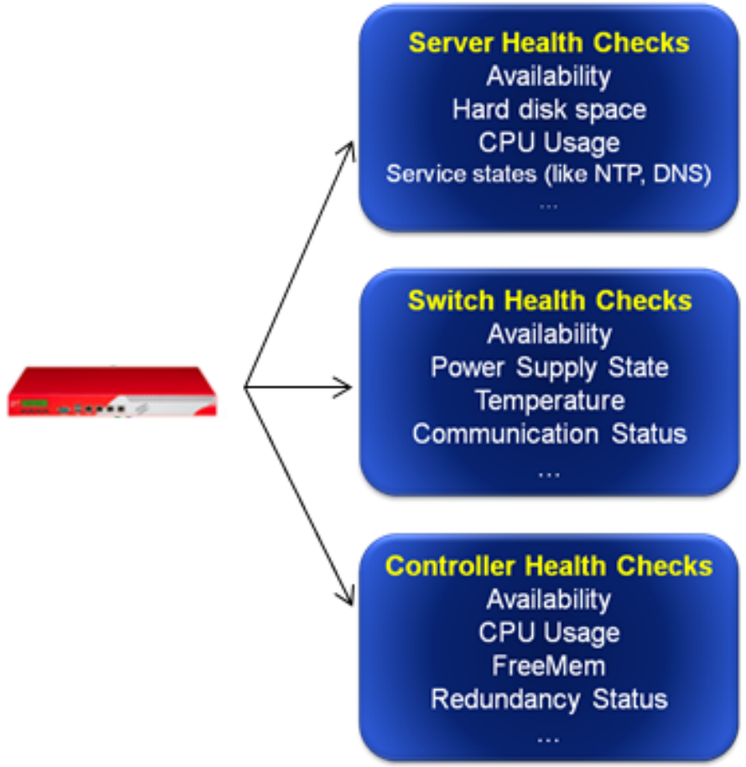
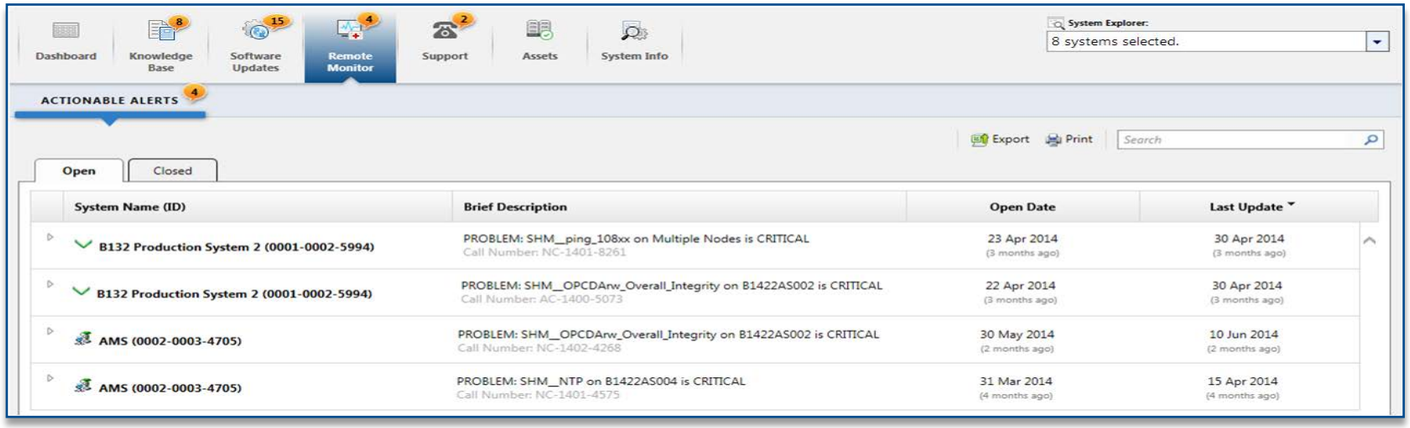
# Guardian Support

## *System Health Monitoring: Tool Example*

Reliability Performance Maintenance

- System Health Monitoring
  - Key Performance Indicators for system management
  - SHM Events are presented (like CTS Calls)
  - Automated Notification and SHM Section in SAR



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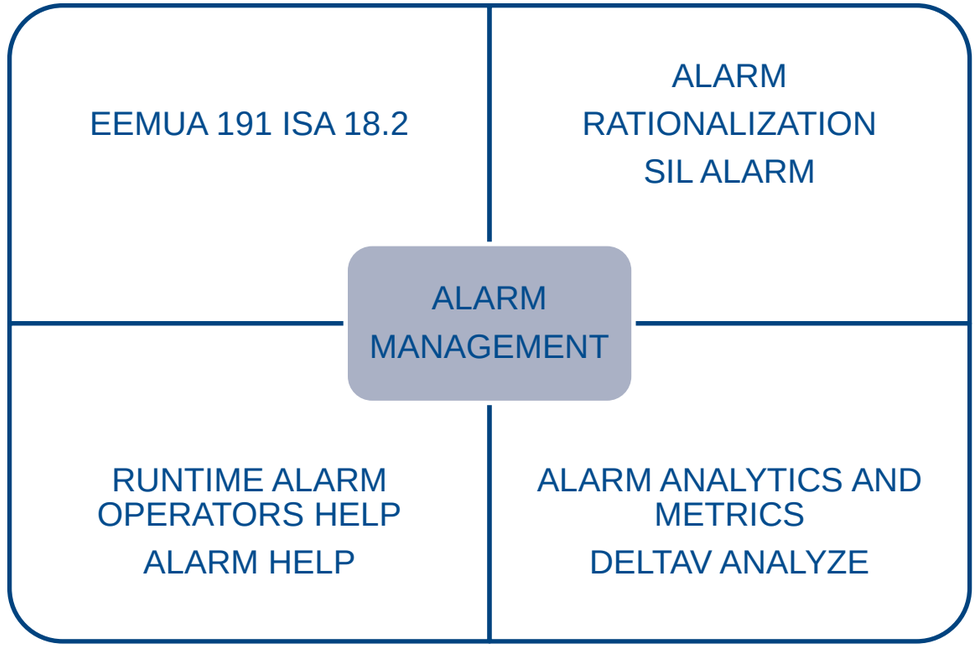
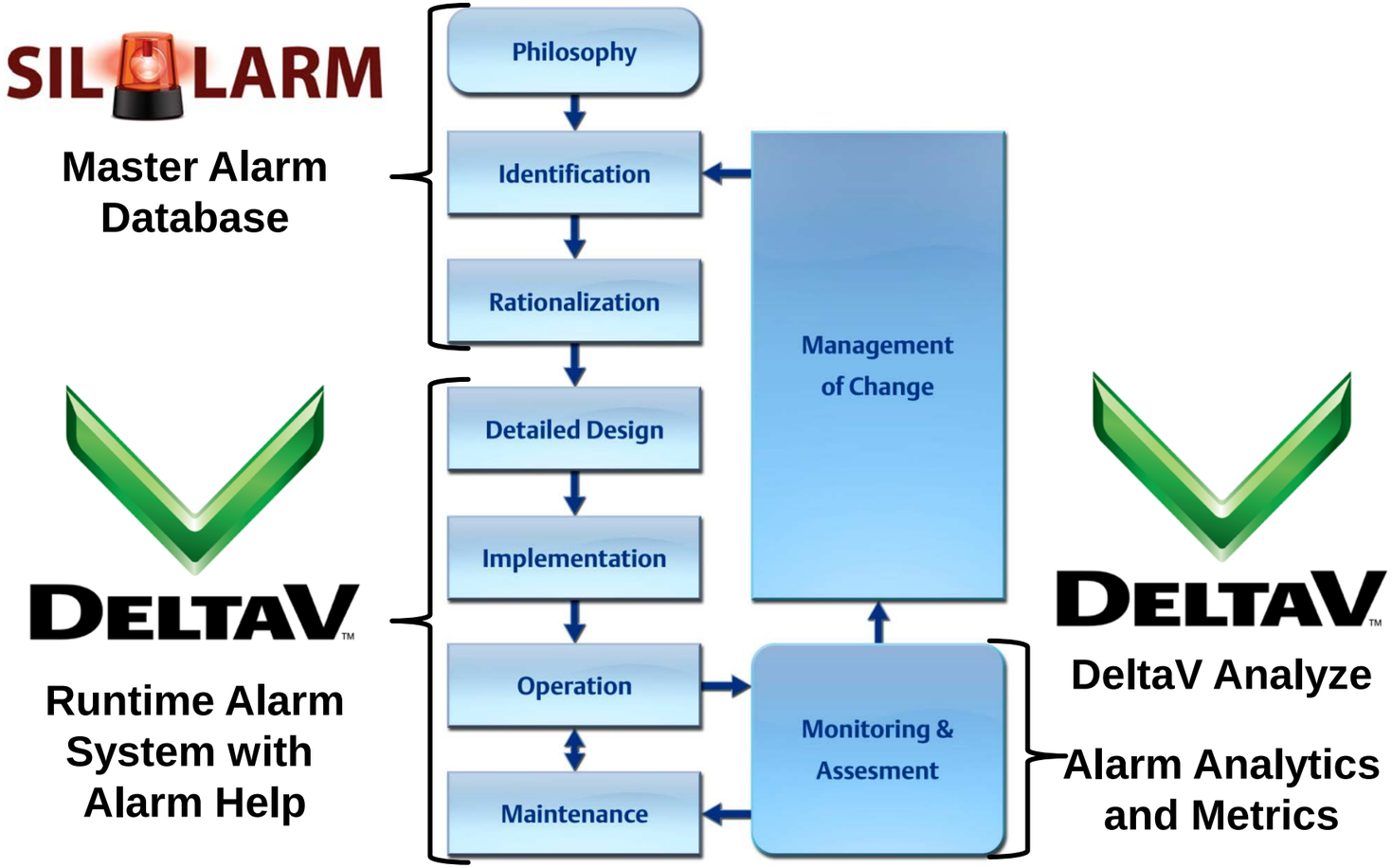
# Life Cycle Care Services: Alarm Management

Reliability Performance Maintenance



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A problem has been detected and windows has been shut down to prevent damage to your computer.

The problem seems to be caused by the following file: SPCMDCON.SYS

PAGE_FAULT_IN_NONPAGED_AREA

If this is the first time you've seen this Stop error screen, restart your computer. If this screen appears again, follow these steps:

Check to make sure any new hardware or software is properly installed. If this is a new installation, ask your hardware or software manufacturer for any windows updates you might need.

If problems continue, disable or remove any newly installed hardware or software. Disable BIOS memory options such as caching or shadowing. If you need to use Safe Mode to remove or disable components, restart your computer, press F8 to select Advanced Startup Options, and then select Safe Mode.

Technical information:

*** STOP: 0x00000050 (0xFD3094C2,0x00000001,0xFBFE7617,0x00000000)

*** SPCMDCON.SYS - Address FBFE7617 base at FBFE5000, DateStamp 3d6dd67c

# Life Cycle Care Services: Backup and Recovery

Reliability Performance Maintenance

SINGLE SOLUTION FOR DATA PROTECTION AND DISASTER RECOVERY

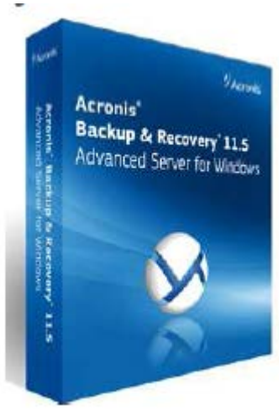
STANDARDIZATION BACKUP PROCESS

BAKCUP & RECOVERY

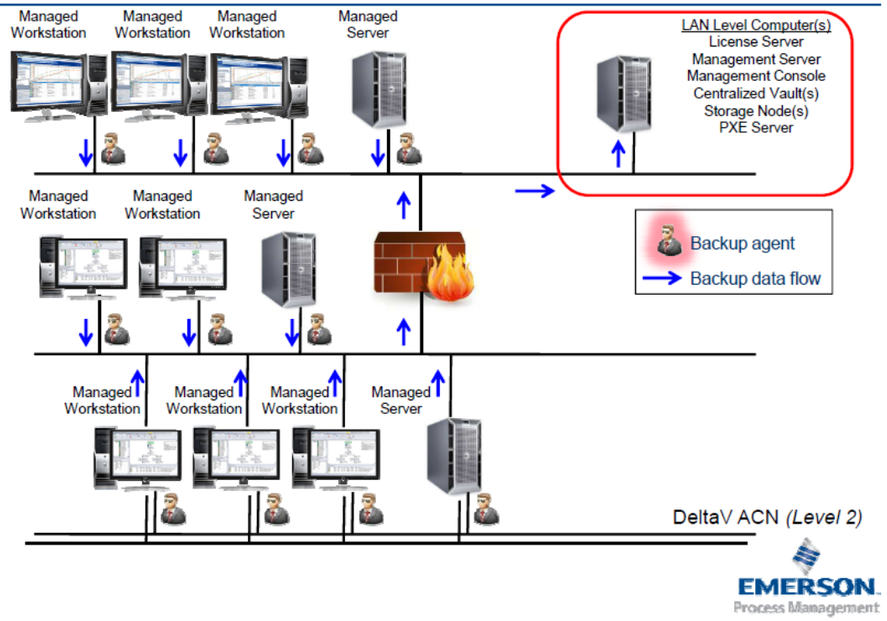
THIRD PARTY SYSTEM INTEGRATION

BASED ON ACRONIX-EMERSON PARTENRING

PERSONALIZED SOLUTION FOR ECAH CUSTOMER




## Option 3: Management Server On L3 Network

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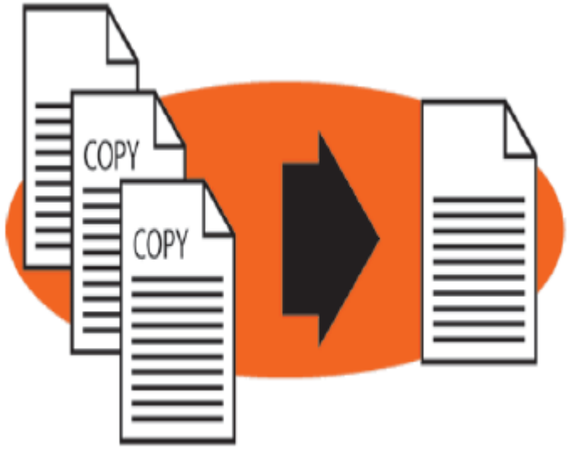




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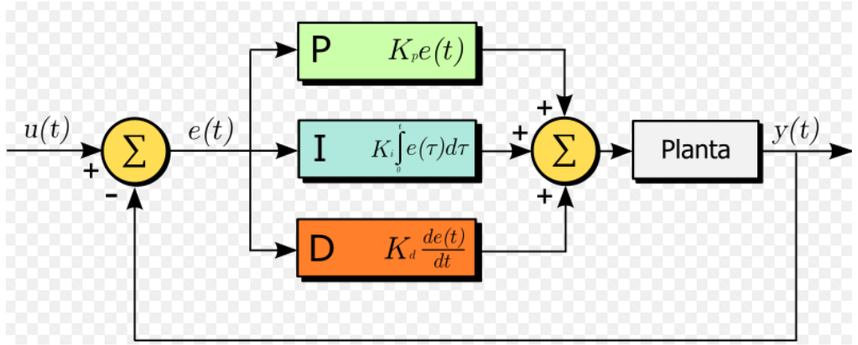
# Life Cycle Care Services: More…

Reliability Performance Maintenance

- Patch Management:
  - Automatic Software Updates
  - Applied right updates
- Cyber Security:
  - Capable to define ICSS connection between different layers and IT Dpt.
  - Capable to install and maintain FireWalls
  - DeltaV guarentees itself
- Advanced Process Control:
  - Improving existing Control Strategy making an holistic approach
  - Defining APC Applications totally system integrated



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# Embedded APC Tools – What's new?

- ***NO** extra databases*
  - ***NO** database synchronization issues*
- ***NO** watchdog timers*
- ***NO** fail/shed logic design*
  - ***NO** custom DCS programming*
    - ***NO** interface programming*
- ***NO** operator interface development*

***Traditional Advanced Control***

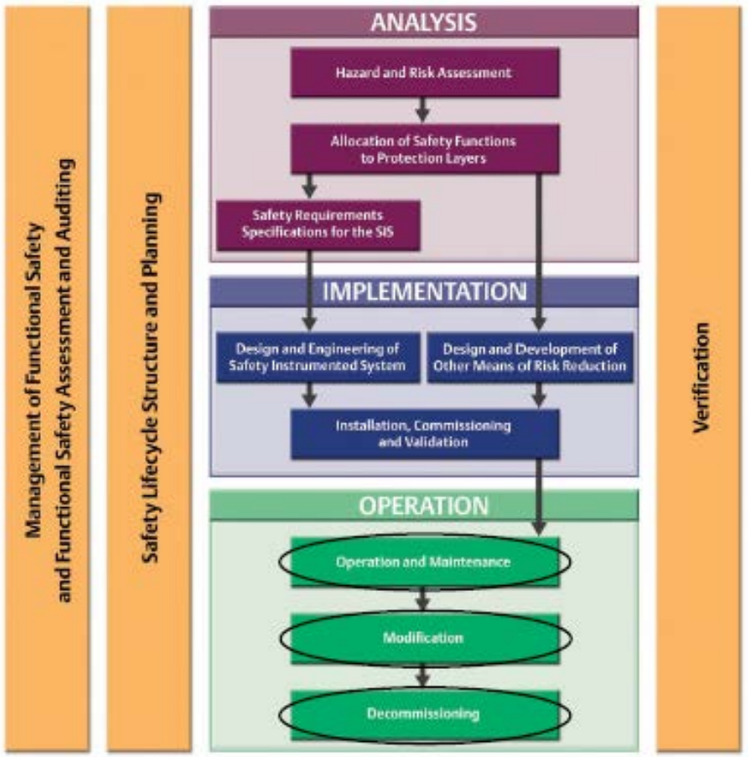
***Embedded APC:***

- Can run in DCS controllers
- Redundant and fast (1/sec)
- Integrated operator user interface
- Configuration through standard Control Studio
- Automated step testing and Model ID
- Off-line simulation and training

# Life Cycle Care Services: More…

Reliability Performance Maintenance

- Site Support Services:
  - Ensure SIS is up to date
  - Provide verification for all modification keeping SIL assigned
  - Project and System audited trail
  - Comply with IEC65511 requirements




*SIS Site Support Services address IEC61511 during the Operation, Modification, and Decommissioning phases of the Safety Lifecycle.*



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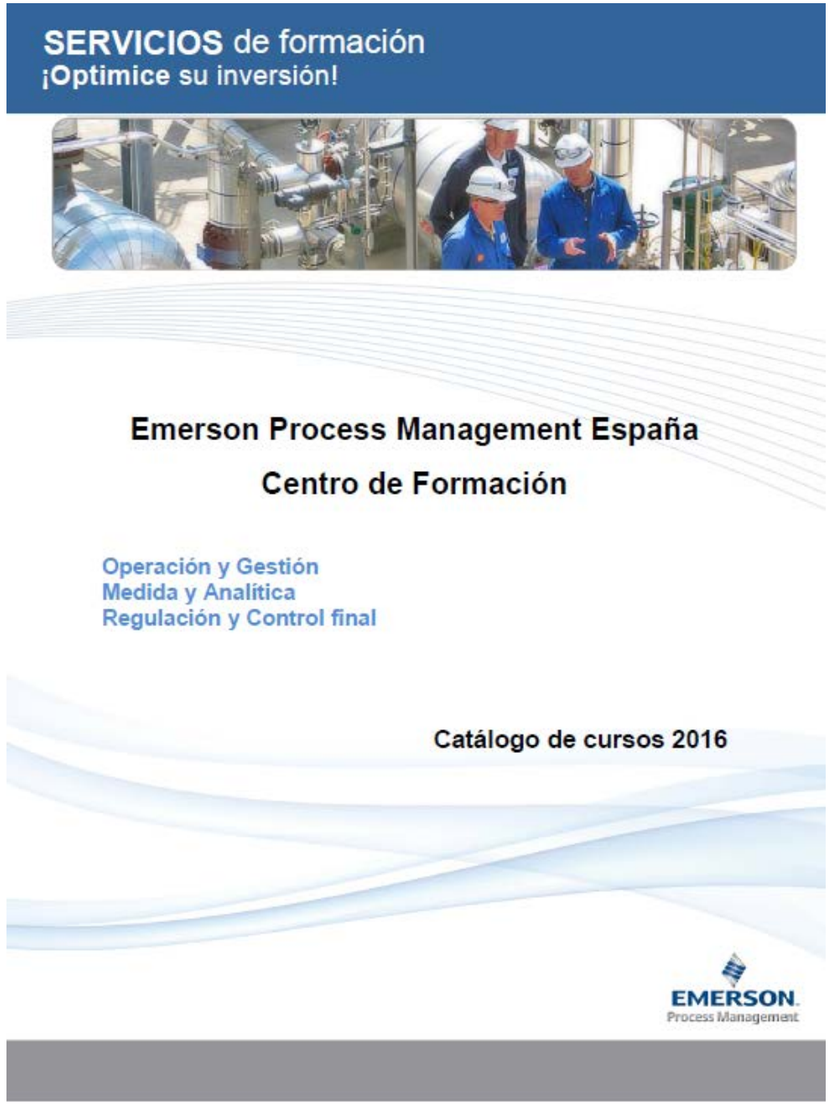
# Life Cycle Care Services: More…

Reliability Performance Maintenance

- Big portfolio
- Global Consistency
- Local Presence and Flexible Programs



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# Simulate for Operational Excellence

REDUCE COSTS:
ENGINEERING DESIGN
SYSTEM CONF.
MAINTENANCE
EQUIPMENT

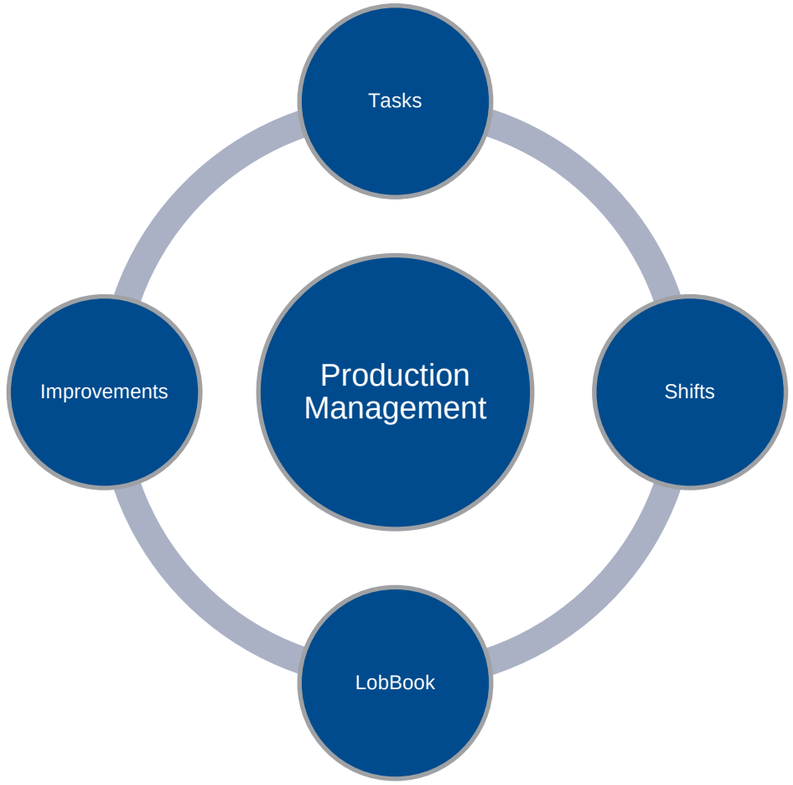
IMPROVE QUALITY:
CHECKOUT CONTROL CONF.
VERIFY DISPLAY IMPLEMENTATION
TEST CONTROL APP
TEST SIS

DYNAMIC SIMULATION

INCREASE SAFETY:
REDUCING INCIDENTS
INCREASE AVAILABILITY
OPERATORS TRAINIGN SYSTEM

DYNAMIC MODEL SIMULATION:
BASED ON MARKET STANDARDS
DESIGNING CONSIDERATION

# LogBooks, Operations and Production Management




- ✓ Tasks Management
- ✓ Shift Changes
- ✓ Electronic LogBook
- ✓Reporting and improvements



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# Muchas Gracias!!

David.ascarza@emerson.com



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