



Fieldbus
Foundation

Breaking the Limits of Analog Technology

Key attributes of the technology that makes FOUNDATION fieldbus suitable for process control

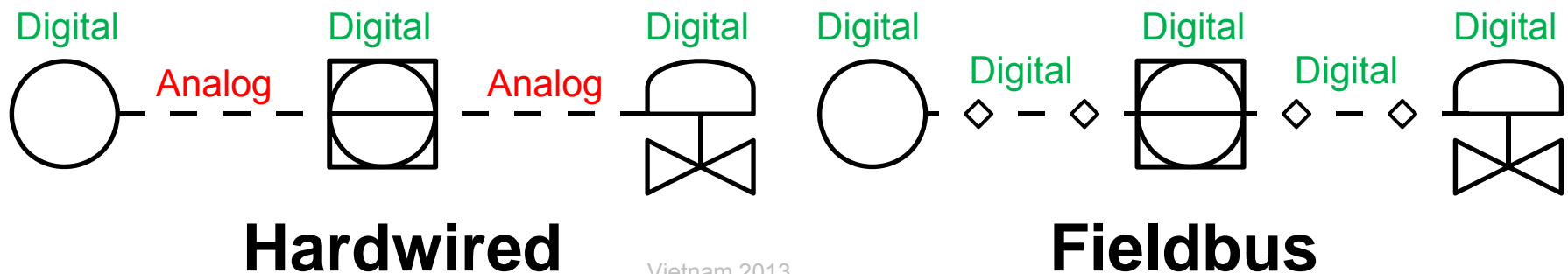
FOUNDATION Fieldbus Started with a Few Simple Ideas:

- Reduce cabling
- Simplify marshalling
- Enable real-time digital closed-loop control
- Ensure multi-vendor interoperability
- Expand device intelligence
- Allow diagnostics-based maintenance
- Liberate plants from proprietary protocols



Real-Time Digital Communication for Process Control

- Real-time digital communication network
- Designed specifically for process control applications
- Takes the place of analog 4-20 mA and on/off signals



Applies to All Controls & Instrumentation

Systems:

- Distributed control systems (DCS)
- Programmable logic controllers (PLC)
- Remote terminal units (RTU)

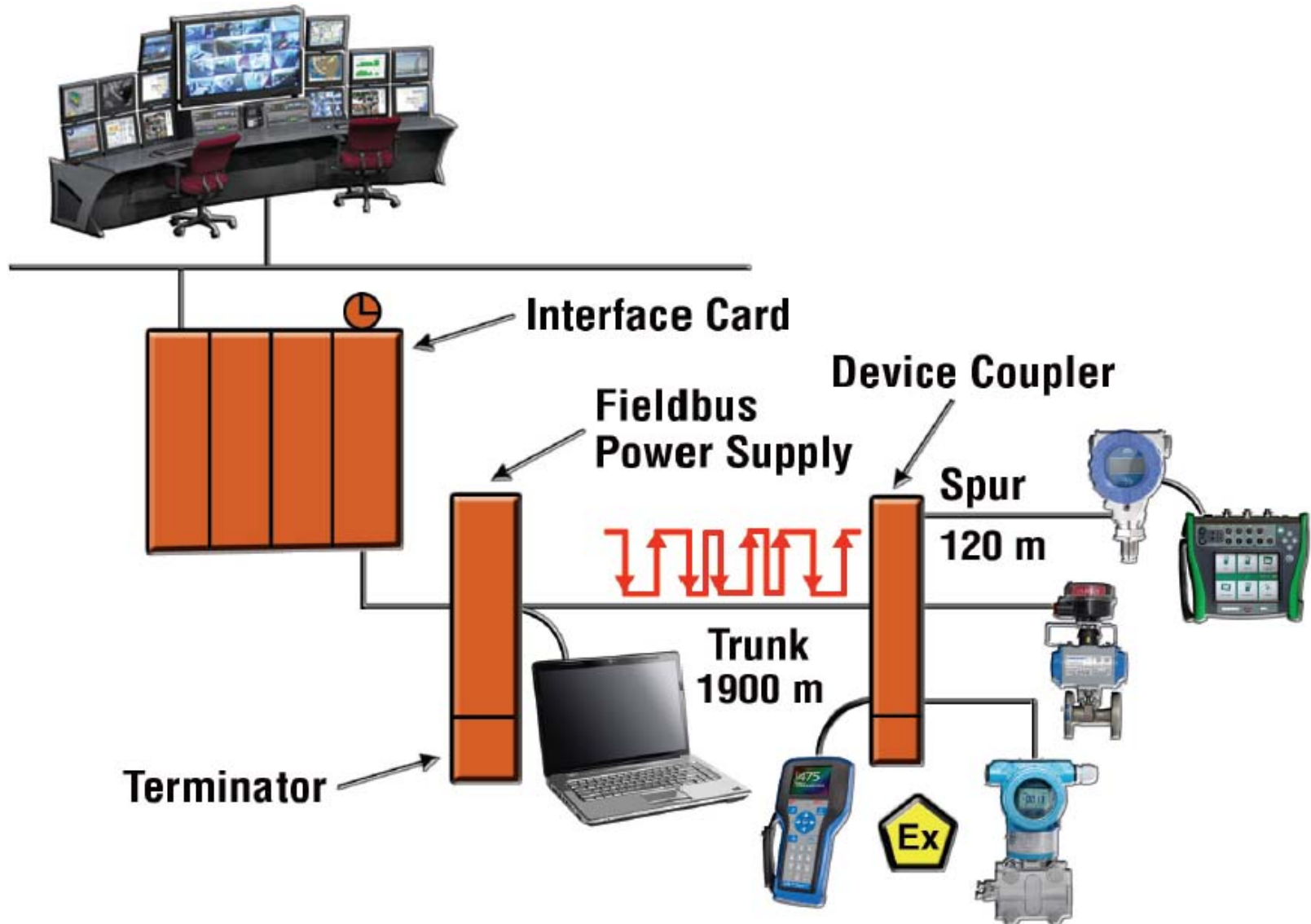


Instruments:

- Transmitters
- Analyzers
- Control valve positioners
- On/off valves

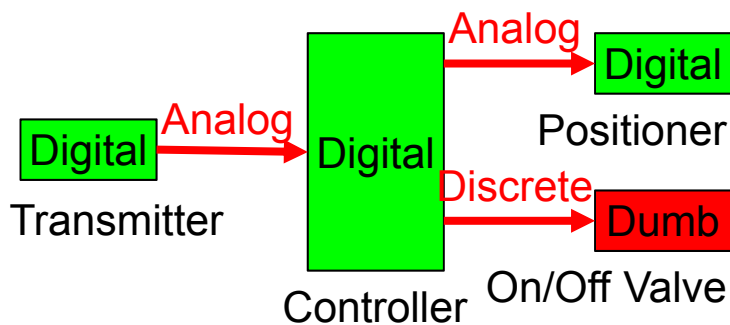
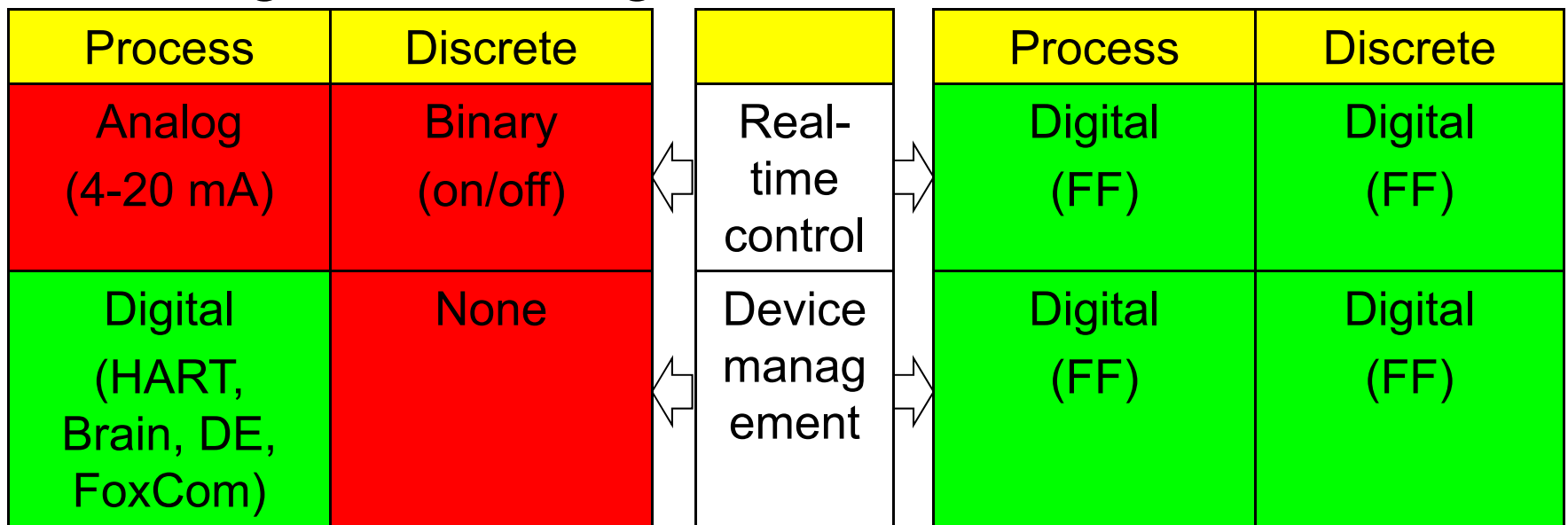


Basic Components

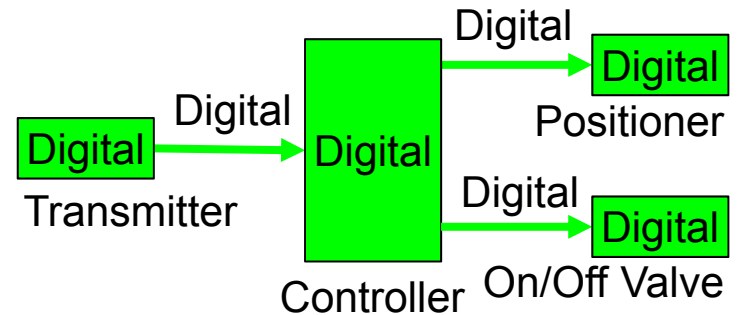


All-Digital From Sensor to Actuator

- Completely eliminating the need for intermediate analog 4-20 mA signals



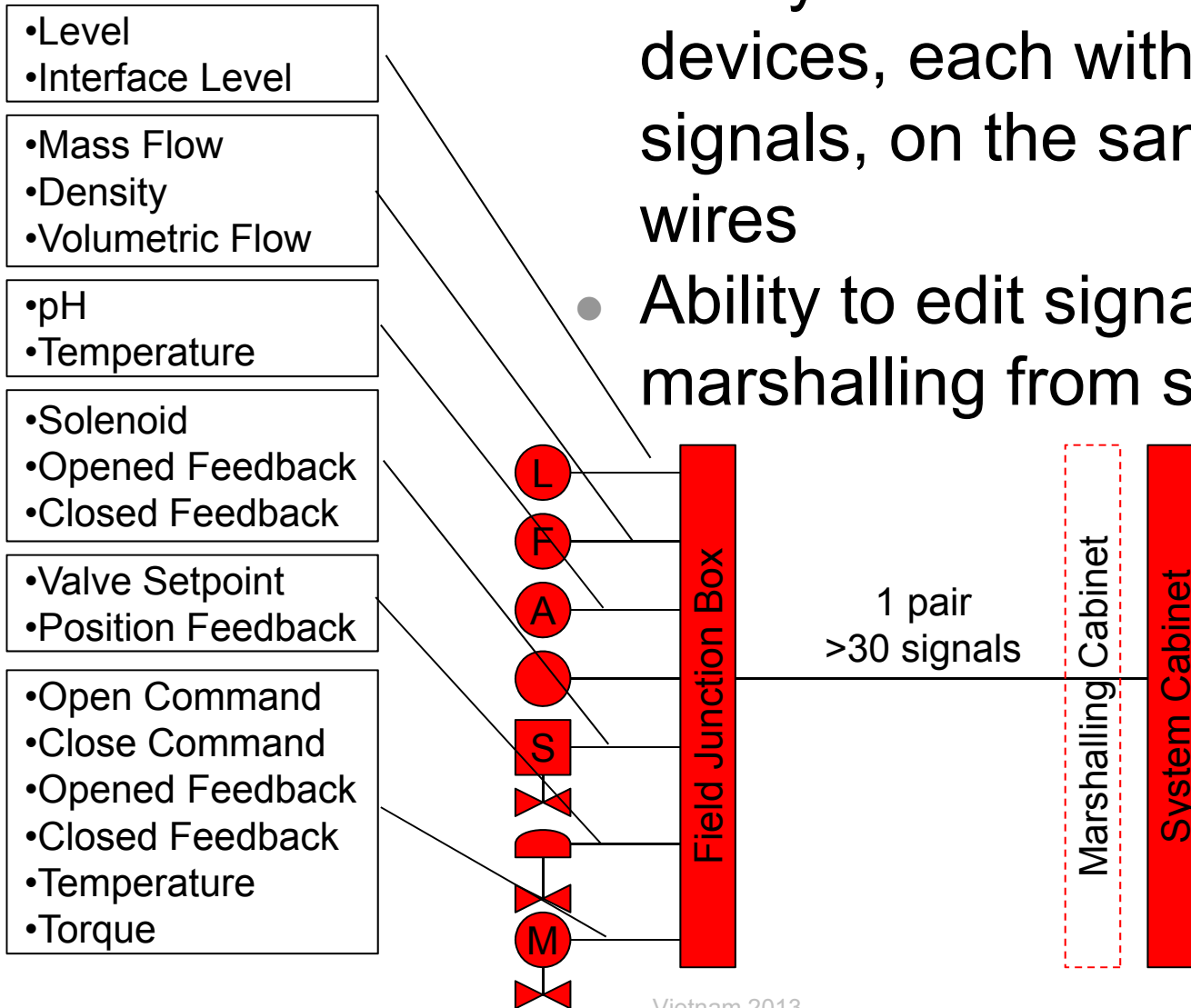
Hardwired



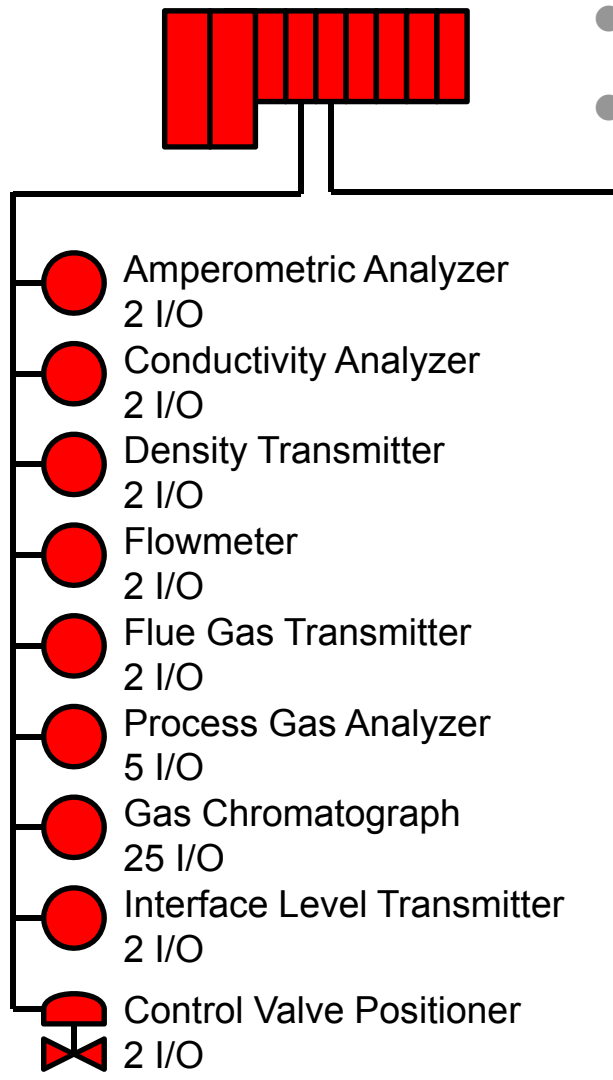
Fieldbus

Fieldbus is a Kind of Soft I/O

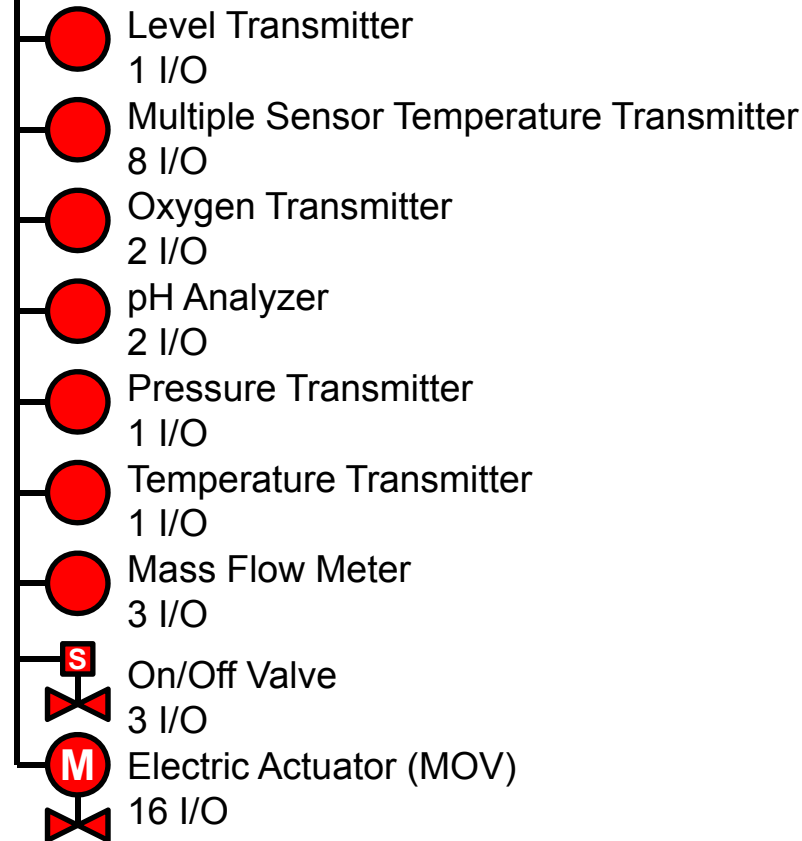
- Ability to connect multiple devices, each with multiple I/O signals, on the same pair of wires
- Ability to edit signal marshalling from software



Multiple I/O Signals per Device



- 1 device is not 1 I/O point
- 1 device corresponds to perhaps 3 I/O points on average



Common Open Standard Protocol Takes the Place of Proprietary Protocols

- Ability to freely replace devices while maintaining digital integration:
 - Electric actuators/motor-operated valves (MOV)
 - Gas chromatographs
 - Tank gauging systems



Digital Closed Loop Control

- Time-synchronized and scheduled communication
 - Ensure deterministic closed loop digital control



All devices are time-synchronized, executing their function at precisely the right time for best performance.

Designed for Process Plant Requirements










- Supports long cable lengths
 - Junction boxes far into the field
 - Long spurs for devices
- Two-wire twisted pair cable
 - Communication
 - Power supply
- The device power suitable for all hazardous areas zones 0/1/2:
 - Intrinsically safe
 - Non-incendive
- Rugged screw terminals
 - No special connectors



Suitable for Hazardous Areas

- Can be intrinsically safe or non-incendive
- Flameproof (explosion proof) also possible
- Supports field mounted safety barriers installed in Zone 2 or 1

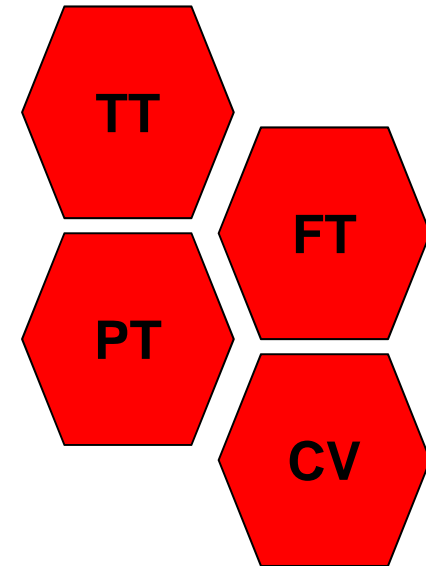


Power	Field		
			
			
			
			
Zone	2	1	0
Division	2	1	

Interoperability: Ability to Mix Devices and System from Different Manufacturers

- Standard Profiles:

- Standard communication settings
- Standard transducer blocks:
 - Temperature transmitter
 - Pressure transmitter
 - Flow transmitter
 - Valve positioner
 - Etc.

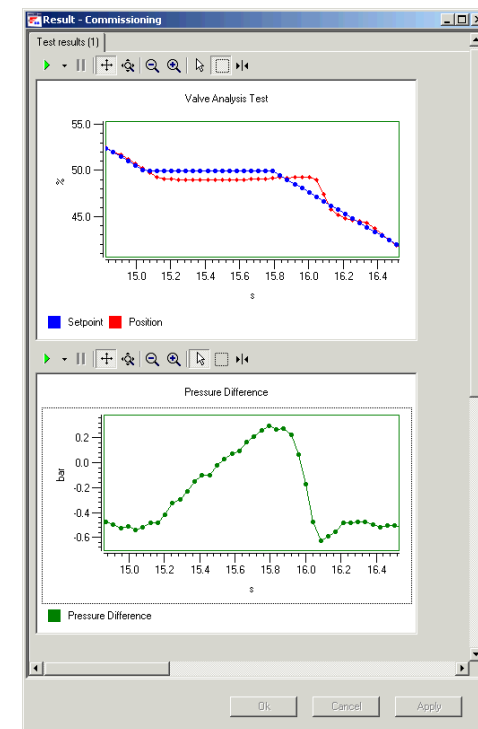
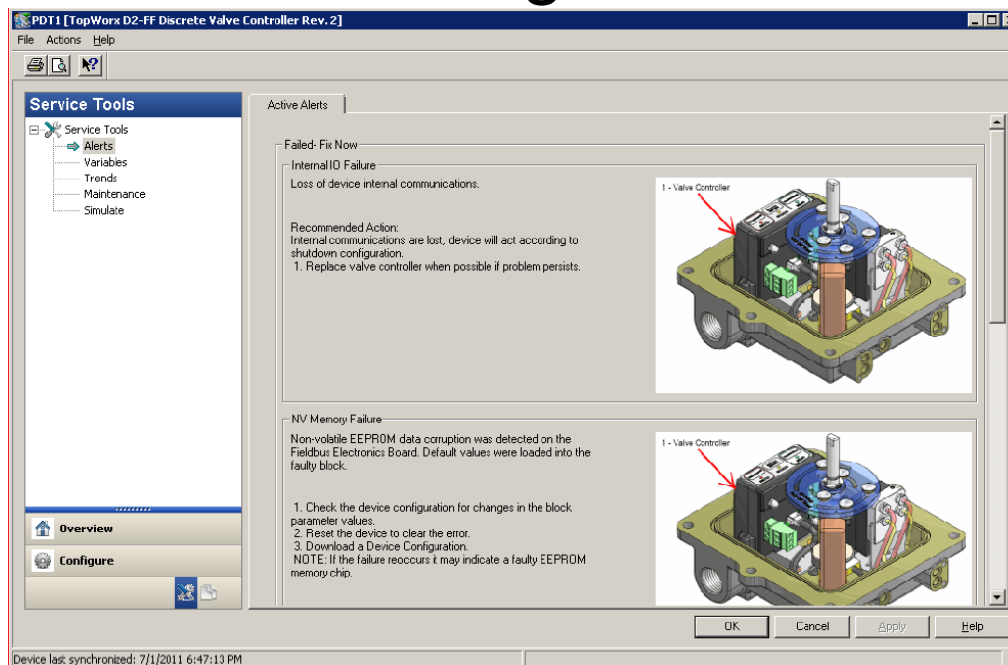


- EDDL Files

- Automatic integration of all device information into DCS
- Graphical display in intelligent device management (IDM) software part of the asset management system (AMS)
 - Configuration/Setup
 - Diagnostics











Digital Everywhere – Intelligence in Every Device

- Ability to centrally manage all field instruments including on/off valves and MOV
 - Configuration/setup
 - Diagnostics
- Ability to plan maintenance and turnaround based on diagnostics



Device Diagnostic Alarms: Ability to Detect Device Problems Early

- Fast reporting of device diagnostic alarms
 - No long polling cycles
- Alarms time-stamped at source
- NAMUR NE107 status signals for device diagnostic alarm management – no alarm flooding

Status Signal	Color	Symbol
Normal; valid output signal		
Maintenance required; still valid output signal		
Out of specification; signal out of the specified range		
Function check; temporary non-valid output signal		
Failure; non-valid output signal		

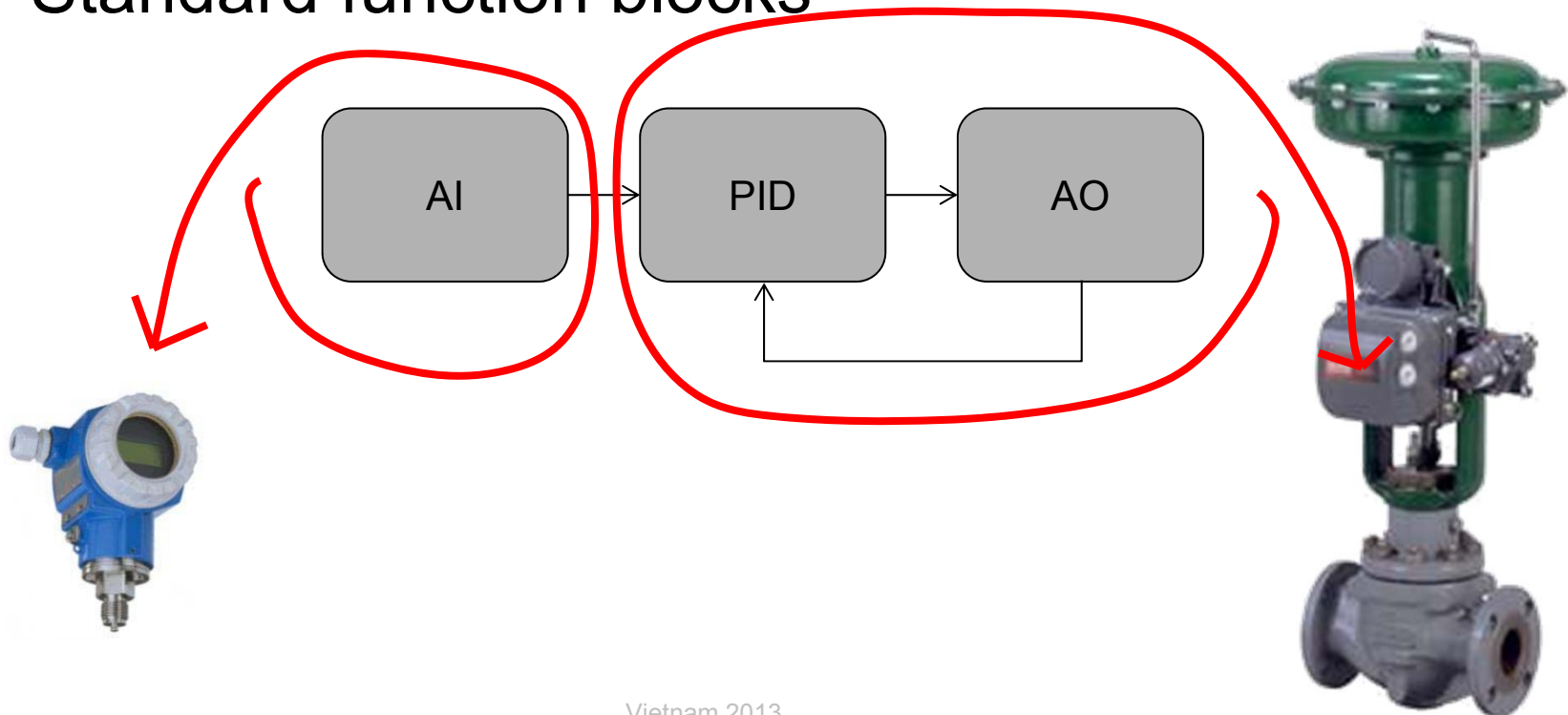
Familiarity: Ability to Use the Same Tools as for 4-20 mA/HART

- Uses device tag
 - No manual address setting
- Supports temporary masters:
 - Handheld field communicators
 - Laptop/tablet software
 - Documenting calibrators



Control-In-the-Field (CIF)

- Designed from the ground up to enable control-in-the-field (CIF)
 - Ability to control more loops fast
- Peer-to-peer communication
- Standard function blocks



Enables New Powerful Devices

- Intelligent two-wire on/off devices
 - with predictive diagnostics
- Multi-input temperature transmitters
- Multi-channel field indicators
- Etc.

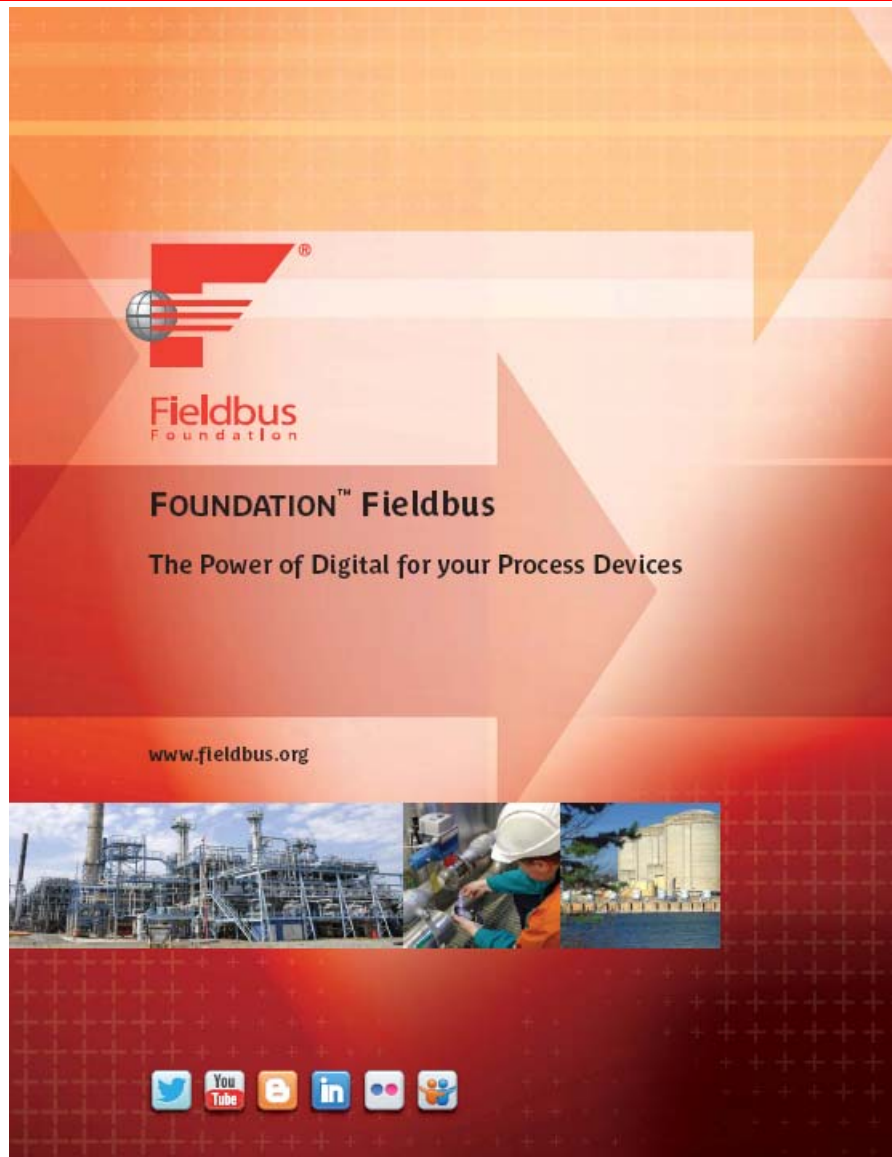


Enormous Benefits Demonstrated in Thousands of Sites Around the World

- Reliance Jamnagar Refinery
 - The Largest Refinery in the World: \geq 22,000 Devices
- Shanghai SECCO Refinery
 - 900 TPY Ethylene, Using Control in the Field
- CSPC Nanhai Refinery
 - Refining & Petrochemical Complex with 16,000 FF Devices
- Drax
 - Largest Coal Fired Power Plant in the UK
- NAM Groningen Gas Field
 - Largest Gas Producer in Netherlands
- Etc.



Where Can I Learn More?



- What is FOUNDATION fieldbus?
- Breaking the Limits of Analog Technology
- Proven Benefits in Projects Worldwide
- Enhanced Operations and Maintenance
- Ease of Use

http://www.fieldbus.org/images/stories/technology/aboutthetechology/overview/fieldbus_brochure.pdf

Enabler: FOUNDATION fieldbus

- Ability to connect many devices on the same pair of wires
- Ability to edit signal marshalling from software
- Ability to control more loops fast
- Ability to digitally integrate components from multi-vendors
- Ability to diagnose discrete devices
- Ability to plan maintenance and turnaround based on diagnostics
- Ability to freely replace devices while maintaining digital integration