The Capital Project Challenge

Presentation to

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InstMC

EMERSON
Process Management
Wireless Myths! Wired vs. Wireless
Myth: It is the same as WiFi
Myth: Wireless is unsecure
Myth: Wireless is unreliable
Myth: Wireless is expensive
Our Challenge

- More Technology
- Retiring Workforce
- Inexperienced Workers
- Larger, More Complex Processes
- Fewer Specialists
- Fewer Incoming Workers
Capital Project Schedule – Office View

- Process
  - Automation
  - Control System
  - Hardware/Software
  - Factory Test
  - Ship & Install
  - Site Test
  - Commission
  - Start-up

Emerson Confidential, slide 9
Capital Project Schedule – Site View

- Construction
- Installation
- Wiring
- Commission
- Start-up
Office View vs Site View

Construction -> Installation -> Wiring -> Commission -> Start-up
Process -> Automation -> Control System -> Hardware/Software -> Factory Test -> Ship & Install -> Site Test -> Commission -> Start-up
Capital Project Schedule
Capital Project Schedule

Process Changes
Capital Project Schedule

- Process Changes
- Instrument Changes
Capital Project Schedule

- Process Changes
- I/O Database Changes
- Instrument Changes
Capital Project Schedule

- Process Changes
- I/O Database Changes
- Instrument Changes
- Piping Changes
Capital Project Schedule

- Process Changes
- Instrument Changes
- I/O Database Changes
- Piping Changes
- Late Package Vendor Data
Capital Project Schedule

- Process Changes
- I/O Database Changes
- Late Package Vendor Data
- Instrument Changes
- Piping Changes
- Human Error
Traditional Wiring

Controllers & I/O Work
- Power, grounding & fusing design
- Conduit & cable layout
- Installation package
- I/O lists & controller sizing
- Process narrative
- P&ID’s
- Spares sizing
- I/O design
- Cabinet design

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

Junction Boxes Work
- JB design
- Jumpers & terminations
- Wiring diagrams
- Cable layout
Electronic Marshalling

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Fluor Study: Electronic Marshalling vs. Traditional – Summary

- Cost
- Time

- 34% Saving
- 4 Months

$2m Saving
Electronic Marshalling

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Marshalling Work
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Wireless

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Marshalling Work

Junction Boxes Work
- JB design
- Jumpers & terminations
- Cable layout
Billions of hours of operating experience

Hundreds of Thousands of Smart Wireless field devices

Tens of Thousands of Wireless Field Networks
Proven with Customers

Emerson has installed hundreds of thousands of Smart Wireless Field Devices
Enabling the Contractor
Why Wireless?

Flexibility

Control Costs

Easy

Deliver on Time

Competitive Advantage
Why Wireless?

- Deliver on Time
- Flexibility
- Control Costs
- Easy
- Competitive Advantage
Reduced Complexity

Installation effort
Detailed Engineering Phase

Savings (%)

- 100
- 75
- 50
- 25

100  91  100  86  100  90

Wired

Wireless

>25m
Construction / Commissioning Phase

- Savings (%)
  - 100: Wired 26, Wireless 24
  - 75: Wired 74, Wireless 76
  - 50: Wired 100, Wireless 65
  - 25: Wired 100, Wireless 30

- Wired vs. Wireless comparison for different types of installations.
Why Wireless?

- Flexibility
- Control Costs
- Easy
- Competitive Advantage
- Deliver on Time
Engineering Flexibility

Project

100 points

100 points
IEC 62591 (WirelessHART) is HART Without the Wires
IEC 62591 (WirelessHART) is HART Without the Wires
Why Wireless?

Control Costs

Flexibility

Easy

Competitive Advantage

Deliver on Time

EMERSON
Process Management
Equipment Savings

- Power
- HVAC
- UPS
- Marshalling

- Size
- Weight
- Cabling
Improved Safety

- Fewer Wires to Run
- Lower Personnel Risk
- Costs

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Why Wireless?

- Easy
- Control Costs
- Flexibility
- Deliver on Time
- Competitive Advantage
“HART without the wires”
Easy Planning Mode
Interoperability
Interoperability

The HART Communications Foundation has in excess of 240 Members
Security

SSL

AES 128
No TCP/IP
24-hex join codes
Security

Risk

Reduced Risk

Wired

Wireless
Why Wireless?

- Flexibility
- Control Costs
- Easy
- Deliver on Time

Competitive Advantage
Wireless Value in Projects

- Discipline Lead
- Reduced Project Cost
- Easier Scope Management
- Reduces Schedule Risk
- Simplified Information Exchange

Cost  Risk  Time
**Typical Platform**

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<th>Used (%)</th>
<th>Conventional (Baseline)</th>
<th>Conventional Wireless</th>
<th>CHARMs in MR/Wireless</th>
<th>CHARMs in Junction Box/Wireless</th>
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<td>Cost</td>
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<tr>
<td>Power</td>
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</tbody>
</table>
Clearly Demonstrable Benefits of WirelessHART

Installation Time Savings Summary
Wired vs. Wireless

Wireless

Wired

Commissioning & Configuration
Terminations, Engineering, Design, Procurement
Installation
Faster Deployment

Time to commission

Hours

Weeks

Wired
Why Wireless?

- Flexibility
- Control Costs
- Easy
- Competitive Advantage
- Deliver on Time