Foxboro DCS... beyond 2013

Future Directions

I/A Series DCS Roadmap
Grant Le Sueur, Portfolio Director
April 2013
Legal Disclaimer

Copy information contained herein is the property of INVENSYS and any other use or disclosure of right © INVENSYS Systems, Inc 2013

The such information is prohibited.

This report shall not be reproduced, copied or used in whole or in part without the expressed written consent of INVENSYS

The names, logos, and taglines identifying the products and services of Invensys are proprietary marks of Invensys or its subsidiaries.

All third party trademarks and service marks are the proprietary marks of their respective owners.

Not for distribution.

All dates are currently scheduled dates and are subject to change.

All rights reserved.
# I/A Series ... proven track record

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Proof</th>
<th>Value</th>
</tr>
</thead>
</table>
| Sustainable | • + $18B Installed systems  
• + 2,500 System Engineers  
• 15 % of the world’s crude oil production  
• 64 % of the world’s LNG production  
• 24 % of the world’s electricity production  
• 24 % of the world’s chemical production  
• 37 % of the world's nuclear energy production | • Minimize risks to continued operations  
• Minimize Lifecycle costs |
| Available   | • Best MTBF in Process Control  
• Self Healing Process Control Network  
• Fault Tolerance  
• World’s Largest Refineries (Reliance, SATORP,….) | • Increase asset uptime  
• Increase production output  
• Increase efficiency |
| Secure      | • Achilles Certification  
• Domain Controller / Multiple systems  
• Cyber Security teams  
• Defence in Depth | • Increase Overall Equipment Effectiveness  
• Minimize investment and lifecycle costs  
• Minimize business interruption |

**Continuously Reliable Production**
Foxboro I/A Series Overview

**Operate**
- Visualize
- Alarm Mgmt
- Historian

**Engineer**
- Configuration
- Control
- Strategies
- Batch
- Device Mgmt
- Advanced Control

**Maintain**
- Asset Mgmt
- Alarm Analysis
- /Optimization
- Predictive Maintenance

**Fault-tolerant 1 gb MESH Network**

**Control & Measure**
- Powerful controllers
- Flexible I/O
- Open fieldbus integration

**Evolve**
- Low cost,
- low risk
- upgrade &
- migration strategies

---

Avantis  Eurotherm  Foxboro  IMServ  InFusion  SimSci-Esscor  Skelta  Triconex  Wonderware
Lifetime Partner for Your Plant

- Continuous evolution of the Foxboro Control System
- +25 Years of Continuous investment & innovation

1987
- 1st open industrial system
- 1st unified control
- 1st object software
- 1st distributed software
- Redundant fieldbus
- 1st Ethernet control bus
- UNIX workstations

1991
- Powerful SUN workstations
- All digital instrument bus
- All digital instruments

1992
- 1st standard UNIX operating system
- 1st Windows NT-based control
- 1st embedded digital fieldbus
- 2 msec logic in I/O
- 6000 foot remote fiber fieldbus

1994
- Windows NT based OCS
- Open modular controller
- Web-based applications

1996
- Windows Terminal Server

1999
- Connoisseur MPC blocks
- Windows Terminal Server

2000
- 1st Redundant, secure, high speed, Ethernet remote I/O

2001
- 200 series I/O
- Multiple fieldbus communication
- 1 gigabit Ethernet

2002
- Plug-in I/O
- Migration solutions – Bailey, TDC, WDPF, Provox, APAC5, etc

2003
- FOXboro Field Device Manager
- Anybus integration

2004
- FDT + EDDL

2006
- InFusion Enterprise Control

2009
- FDT co-founder
- Ethernet IP
- Intrinsically safe I/O
- Cyber Security Enhancements
- FF Control in the Field
- FDSI Superior integration to third parties
- Enterprise wide Control
- Intrinsically safe I/O
- Cyber Security Programs
- 100 Series Upgrade
- ArchestrA on I/A
- Virtualization
- Intelligent Marshalling
- Dynamic SAMA symbols

2013
- Ethernet IP
- Intrinsically safe I/O
- Cyber Security Programs
- 100 Series Upgrade
- ArchestrA on I/A
- Virtualization
- Intelligent Marshalling
- Dynamic SAMA symbols

Avantis, Eurotherm, Foxboro, IMServ, InFusion, SimSci-Esscor, Skelta, Triconex, Wonderware
I/A Series DCS Functional Roadmap

- **2012**
  - Reduced Footprint
    - More I/O Flexibility

- **2013**
  - Common Device Integration

- **2014**
  - Common Controller Platforms

- **2015**
  - Unified Control Network

- **2016**
  - WIB and ISA Secure

- **2017**
  - Common Configuration & Engineering Tools

- **2018**

- **2019**

- **2020**

- **2021**
  - Harmonized I/O Family
# I/A Series DCS Values Roadmap

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Applications &amp; Software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Network &amp; Security</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Controller</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Device &amp; Sys Int.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>I/O subsystem.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Reduce Engineering Complexity
- Consistent regulatory compliance
- Simplified Configuration & Maintenance throughout plant lifecycle

- Improved Scalability
- Shorten Commissioning
- Reduce Network Costs

- Lower Infrastructure Costs (network, enclosures,..)
- Increase Plant Efficiency, Optimize Production Assets

- Simplify 3rd Party Device Integration
- Lower Device Integration cost, less physical space required

- Lower Total Cost of Ownership
- Minimize Physical Size and Power Consumption
- Increased Lifecycle

- Continuously Secure
- Improved Scalability
- Shorten Commissioning
- Reduce Network Costs

Avantis  Eurotherm  Foxboro  IMServ  InFusion  SimSci-Esscor  Skelta  Triconex  Wonderware
Operations Management
# I/A Series DCS Product Roadmap

## Applications & Software
- **Virtualization Thin Client**
- **FSIM – FCP280**
- **Industry Expert Lib’s**
- **FSIM – FCP300**

## Network/Security
- **Wireless MESH**
- **Rugged Network**
- **WIB / ISA Secure**
- **Control Network Interface (CNI)**
- **Security Hardening / Updates (Continuous)**

## Controls
- **FCP280**
- **MPC in CP**
- **RCP290**
- **Foxboro Supervisory Control**
- **RCP300**

## Device & System Int.
- **TCX – I/A Series Integration**
- **NetARM FBM222/28/49**
- **Profinet**
- **Ethernet/IP**
- **Common Device Integration**

## I/O subsystem.
- **Wireless HART**
- **200 Series HD I/O**
- **FBM247 Knife Switch**
- **FBM247 Redundant**

---

**LEGEND:**
- **BLUE** under development
- **YELLOW** planned
- **BLACK** complete

Invensys Proprietary & Confidential
I/A Series DCS  Foundational element for the ECS

InFusion Enterprise Control System

Control Room Applications

Foxboro Control Software

Process connected equipment

Industrial Software Platform
- HMI
- Historian
- Configuration
- Communication
- System Management
- Device Connectivity

Microsoft.Net
- Technology for communications – Web Service, COM+, MSMQ
- User Interface Technology
- Language Neutral run-time platform
- Tools – VS.NET
- Common framework for different hardware

Industrial Applications
- Energy Management
- ERP / SCM integration
- Crude Assay
- ROMeo
- Planning/Scheduling
- Yield Accounting
- Off-sites Suite

Industrial Common Core-Apps
- Workflow
- Intelligence

ArchestrA
- Common services for industrial automation
  - Common name space
  - Deployment
  - Communication
  - Alarms
  - History
  - Real-time data
  - Visualization
  - Security
- Common scripting language
- Integrated Tools
- Designed for different hardware platforms

Avantis  Eurotherm  Foxboro  IMServ  InFusion  SimSci-Esscor  Skelta  Triconex  Wonderware
What’s coming in Control and Safety

Control and I/O
- Marine Certification
- Soft CP270
- Wireless MESH networking
- Wireless HART

Workstation Platforms
- Virtualization Host Server (V90)
- Thin Client Platforms
- Win7 – Srv 2008

Configuration
- Win7 – Srv 2008 Support
- Classic Stations Support
- Field device Manager – (HART, FF, Profibus)

Visualization & History
- Classic Station Support
- Alarm Configuration Discovery
- Style Library Import/Export

Other highlights
- Safety View (Triconex)
- Remote Watch

Control and I/O
- CP280 – 2X performance
- Control Network Interface
- Ext. Device Integrator

Workstation Platform
- Virtualization: Disaster Recovery / High Availability
- Alarm Annunciator Keyboards

Configuration
- Unified DCS – ESD Configuration
- SAMA Editors
- ‘On sheet’ Calc block rendering

Visualization & History
- Alarm Redundancy
- Alarm Failover
- Unified Enterprise Historian

Future
- InTouch Windows to ArchestrA Graphics Conversion
- HMI Migration

Major Release – Systems
Workstation solutions

Release Plan (highlights)

- Virtualization Host (V90) – Improved life cycle, Workstation / Server consolidation

- Thin client workstation – Improved life cycle, solid state workstations

- Operator Keyboards – Modular alarm annunciator keyboards
Control solutions

Release Plan (highlights)

• Control Processor CP280 – Lower installed cost, high performance, high capacity – Virtual controllers SoftCP

• Wireless MESH Networking – Flexible deployment, lower installed cost, secure

• Wireless HART Gateway – Flexible deployment, Lower installed cost, centralised management

• Intelligent Marshalling – Software configurable IO
Other highlights

Release Plan (highlights)

• Triconex Safety View– TÜV certified Safety Bypass Management
  * Maintenance Bypass, Calibration, testing

Putting it together

**Intelligent execution**

- **DECOUPLE**
  - s/w applications from hardware

- **DECOUPLE**
  - Engineering from geography and location

- **DECOUPLE**
  - IO specific deliverables

Intelligent Project Execution
Typical Execution Schedule

3mth
- Order Placement
- System Design Functional design

3mth
- Workstation procurement
- Cabinet design build
- System configuration

3mth
- Workstation procurement
- Test
- Integrated FAT

3mth
- Install on Site
- Install on Site
- Site Acceptance

Life time
- Install on Site
- Site Acceptance

- Continuous Revision Cycles
- Lifetime Update cycles and expansions

- Acquire Hardware later Improved lifecycle
- Ship generic IO to site Schedule gain
- Decouple Engineering Schedule gain
- Continuous revisions Change agile
Release themes and focus

• Improved Operational effectiveness
• Reduce cost of installation and delivery
• Reduce cost of ownership
• Simplified design and deployment
• Industry focused content
HP Workstations & Servers

Needs
• Maximize the lifecycle of the PC/Server Platforms
• Maintain regulatory/legal compliance

Facts
• Quick turnover of the PC platforms

Solution
• Switch from DELL to HP , with a 6 months overlap
• One to One replacement

Benefits
• Longer lifecycle platforms for clients
• Workstations & servers – 3 years
• Fewer platform qualifications
I/A Series Intelligent Marshalling

**Needs**
- Minimize Foot Print
- Minimize Engineering and Schedule Risks

**Facts**
- Each channel is software configurable
- Analog: 4-20ma I/O, 0-10VDC input, Pulse, Frequency, HART
- Discrete: 0-24 VDC input & output, NAMUR

**Solution**
- Intelligent Marshalling / FBM247

**Benefits:**
- Eliminate Marshalling
- Reduce field labor costs
- Decrease inventory and spares
- Faster implementation
- Faster start-up time
I/A Series Intelligent Marshalling

Modernize the Plant without expanding the Equipment Room

Massive Space Savings

Before

After

(courtesy of a North American customer)
I/A Series Intelligent Marshalling Brownfield Recommendations

- Use Intelligent Marshalling when I/O information is unclear or expected to be provided late in a project
- Use Intelligent Marshalling for future upgrades with uncertain I/O requirements
- Use Intelligent Marshalling for 100 series Migration for space savings
- Use Intelligent Marshalling for FoxCom Migration/Advantage Program
Cyber Security, Phase 2

Needs

• Minimize the impact of Cyber attacks

Facts

• Cyber attacks are more frequent and more hostile

Solution

• Support off-MESH Primary and Secondary Active Directory Domain
• Allow Domain Controllers to span multiple I/A Series Installations and other systems.
• Workstation Server Update Services (WSUS) – better manage software updates, patches, QuickFixes

Benefits

• Avoid process shutdown due to cyber attack
• Migration path to protect existing installations
Wireless Extension to the MESH

• Transparently connects remote segments to the wired MESH

• Closed loop control connections are supported via wireless link

• Wireless configuration maintains security, redundancy and robustness

• Enterasys wireless AP’s (preferred Hardware platform) used for validation testing
# I/A Series DCS Product Roadmap

## Applications & Software
- **Virtualization Thin Client**
- **FCS 4.0 FDM HART**
- **FCS 5.0 SAMA+**
- **FCS 6.0**
- **Industry Expert Lib's**
- **Industry Expert Lib's**
- **Windows/Server Update**

## Network / Security
- **Wireless MESH**
- **Rugged Network**
- **WIB / ISA Secure**
- **Control Network Interface (CNI)**
- **Security Hardening / Updates (Continuous)**

## Controls
- **FCP280**
- **MPC in CP**
- **RCP290**
- **Foxboro Supervisory Control**
- **RCP300**

## Device & System Int.
- **TCX – I/A Series Integration**
- **NetARM FBM222/28/49**
- **Profinet**
- **Ethernet/IP**
- **Common Device Integration**

## I/O subsystem
- **Wireless HART**
- **200 Series HD I/O**
- **FBM247 Knife Switch**
- **FBM247 Redundant**
- **RCP280**
- **FSIM – FCP280**
- **FSIM – FCP300**
- **FCS 5.0 SAMA+**

---

**LEGEND:**
- **BLUE** under development
- **YELLOW** planned
- **BLACK** complete

Invensys Proprietary & Confidential
I/A Integration with Pepperl+Fuchs WirelessHART Gateway

I/A operator Stations
- FCP270
- FBM 232

I/A Engineering Station
- E’Net Hub / Switch
- Foxboro Control Software
- Field Device Manager for HART

One Adapter can support up to 4 HART devices

December 2012
FCS 4.0: Unified System & Configuration

- Compatible with Version 8.7 (XP/Svr03) AND Version 8.8 (W7/Svr08)
- Supports Classic I/A control Stations
  - CP40B, CP60, MDG30B, AB30B, DI30B, FoxGuard Manager (ACM)
- Integrates FDM for FF, HART, Profibus and DeviceNet
- Improved Engineering capabilities (FF, HART)
## I/A Series DCS Product Roadmap

### Applications & Software
- **Virtualization Thin Client**
- **FSIM – FCP280**
- **Industry Expert Lib’s**
- **FSIM – FCP300**

### Network / Security
- **Wireless MESH**
- **Rugged Network**
- **WIB / ISA Secure**
- **Security Hardening / Updates (Continuous)**

### Controls
- **FCP280**
- **MPC in CP**
- **Foxboro Supervisory Control**
- **RCP300**

### Device & System Int.
- **TCX – I/A Series Integration**
- **NetARM FBM222/28/49**
- **Profinet**
- **Ethernet/IP**

### I/O subsystem
- **Wireless HART**
- **200 Series HD I/O**
- **FBM247 Knife Switch**
- **FBM247 Redundant**
- **Harmonized I/O Family**

### LEGEND:
- **BLUE** under development
- **YELLOW** planned
- **BLACK** complete

---

Invensys Proprietary & Confidential
Field Device Manager for HART

Needs
• Instrument Asset Management

Facts
• Configure, commission & maintain HART devices

Solution
• Integrated field device management for HART devices which is FDT compliant

Benefits
• Unified Predictive Asset Management for FF, HART, Profibus, Devicenet,…
• Seamless integration of any HART device from any vendor
• Eliminates need for third party software
Virtualization & Thin Client

**Needs**
- Minimize the PC/Server Footprint
- Maximize Lifecycle Expectations for hardware and software

**Facts**
- Multiple Solutions for VM

**Solution**
- Hyper V solution
- Thin Clients

**Benefits**
- Many to 1 equipment reduction
- Less cost, space & energy consumption
- Faster/easier HW/SW upgrades
# I/A Series DCS Product Roadmap

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications &amp; Software</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtualization Thin Client</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCS 4.0 FDM HART</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marine Cert.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless MESH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rugged Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Network Interface (CNI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCP280</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPC in CP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foxboro Supervisory Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCM222/28/49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TCX – I/A Series Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Device Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless HART</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 Series HD I/O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBM247 Knife Switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBM247 Redundant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless HART</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBM247</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBM222/28/49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NetARM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profinet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet/IP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCS 6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-Core Appl.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Expert Lib's</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSIM – FCP300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security Hardening / Updates (Continuous)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unified Control &amp; Safety Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCS / ISA106 / Lifecycle Engineering Tools for DCS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows/Server Update</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmonized I/O Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEGEND: BLUE under development YELLOW planned: BLACK complete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Invensys Proprietary & Confidential
I/A Series Marine Certification

**Needs**
- Off-Shore applications require harsher environmental protection

**Facts**
- Type Approval is mandated for off-shore applications

**Solution**
- BV (member of IACS) is the certifying authority
- Standard I/A Series to be qualified.
- Shielded enclosure to be used.

**Benefits**
- Eliminate risk of marine certification on a per project basis
- Written assurance that equipment is in accordance with international standards.
I/A Series DCS Product Roadmap

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Applications & Software**
- Virtualization Thin Client
- FCS 4.0 FDM HART
- Marine Cert.
- FSIM – FCP280
- Industry Expert Lib's
- FCS 5.0 SAMA+
- FCS 6.0

**Network / Security**
- Wireless MESH
- Rugged Network
- WIB / ISA Secure
- Control Network Interface (CNI)

**Controls**
- FCP280
- MPC in CP
- RCP290
- Foxboro Supervisory Control
- RCP300

**Device & System Int.**
- TCX – I/A Series Integration
- NetARM FBM222/28/49
- Profinet
- Ethernet/IP

**I/O subsystem.**
- External Device Integration
- Common Device Integration
- Harmonized I/O Family
- 200 Series HD I/O
- FBM247 Knife Switch
- FBM247 Redundant

**FCS / ISA106 / Lifecycle Engineering Tools for DCS**
- Windows/Server Update

**Security Hardening / Updates (Continuous)**

**Unified Control & Safety Network**

**Invensys Proprietary & Confidential**

**LEGEND:**
- BLUE under development
- YELLOW planned
- BLACK complete
Foxboro Control Software 5.0

Needs

• Adoption of maintenance improvements for integrated controls
• Adoption of operational improvements for Power applications

Facts

• Expanded capabilities in the unified software platform for engineering and operations of process plants

Solution

• Support for new FCP280
• Boolean Logic - loop troubleshooting, maintenance, documentation
• Dynamic SAMA+ diagrams to support Power Industry
• Dual Historian & Backup Alarm Provider

Benefits

• Simplified maintenance of applications
• Increase operational efficiency & self documentation in Power Industry
• Higher availability of historian
# I/A Series DCS Product Roadmap

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications &amp; Software</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtualization Thin Client</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCS 4.0 FDM HART</td>
<td>FSIM – FCP280</td>
<td></td>
<td></td>
<td>Industry Expert Lib’s</td>
<td></td>
<td></td>
<td>FSIM – FCP300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marine Cert.</td>
<td>Wireless MESH</td>
<td>Rugged Network</td>
<td></td>
<td>WIB / ISA Secure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network / Security</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless MESH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Network Interface (CNI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contrls</td>
<td>FCP280</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device &amp; System Int.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Device Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network / Security</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security Hardening / Updates (Continuous)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unified Control &amp; Safety Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device &amp; System Int.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 Series HD I/O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBM247 Knife Switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/O subsystem.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network / Security</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmonized I/O Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND:**
- **BLUE** under development
- **YELLOW** planned
- **BLACK** complete

Invensys Proprietary & Confidential
FCP270/ZCP270 to FCP280 Evolution

**Needs**
- Maximize CP capabilities with greater flexibility in process applications

**Facts**
- FCP270 in use for 8+ years; a successor CP is needed to sustain and enhance existing & new installations

**Solution**
- Higher performance and capacity FCP280 with Copper or Fiber network connections

**Benefits**
- Lower the cost of infrastructure
- Flexible platform for future advanced functionality:
  - Alarm Management
  - Field Device Management
  - Advanced Control
FCP270 to FCP280 Comparisons

Simplified wiring and connectivity
FCP270 to FCP280 Comparisons

1. Network Infrastructure
   • Fiber Optic vs Copper

2. FBM Network
   • 128 FBM = FEM

3. Capacity
   • 4,000 blocks

Same footprint

FCP280

4 independent fieldbuses

FCP270

Copper

Fiber Optic

8,000 Blocks

December 2013
New FCP280 Baseplates

Choice – ideal when modernizing

Horizontal

Vertical
# I/A Series DCS Product Roadmap

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications &amp; Software</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtualization Thin Client</td>
<td>FSIM – FCP280</td>
<td></td>
<td>Industry Expert Lib's</td>
<td></td>
<td></td>
<td>FSIM – FCP300</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCS 4.0 FDM HART</td>
<td>FCS 5.0 SAMA+</td>
<td>FCS 6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marine Cert.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless MESH</td>
<td>Rugged Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network / Security</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Network Interface (CNI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCP280</td>
<td>MPC in CP</td>
<td>Foxboro Supervisory Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCP300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device &amp; System Int.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBM247</td>
<td>NetARM FBM222/28/49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 Series HD I/O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TCX – I/A Series Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Device Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 Series HD I/O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/O subsystem.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBM247 Knife Switch</td>
<td>FBM247 Redundant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND:**
- **BLUE** under development
- **YELLOW** planned
- **BLACK** complete

Invensys Proprietary & Confidential
Control Network Interface (CNI)

**Needs**
- Bridge two I/A Series systems separated by arbitrary distances
- Filter real-time data, alarms and events messages between systems
- Reduce effort needed to install and maintain

**Facts**
- Large DCS systems are difficult to maintain w/o impacting operation
- Cyber security protection can be improved with a segmented system

**Solution**
- A redundant connection between two I/A Series systems with automated tools to simplify configuration

**Benefits**
- Optimize communication between segmented DCS systems
- Limit propagation of errors and isolate intruders
- Minimize operational impact of DCS maintenance
# I/A Series DCS Product Roadmap

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications &amp; Software</td>
<td>Virtualization Thin Client</td>
<td>FSIM – FCP280</td>
<td>Industry Expert Lib’s</td>
<td>FSIM – FCP300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network / Security</td>
<td>Wireless MESH</td>
<td>Rugged Network</td>
<td>WIB / ISA Secure</td>
<td>Security Hardening / Updates (Continuous)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td>FCP280</td>
<td>MPC in CP</td>
<td>Foxboro Supervisory Control</td>
<td>Unified Control &amp; Safety Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device &amp; System Int.</td>
<td>TCX – I/A Series Integration</td>
<td>NetARM FBM222/28/49</td>
<td>Profinet</td>
<td>Ethernet/IP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/O subsystem.</td>
<td>External Device Integration</td>
<td>200 Series HD I/O</td>
<td>Harmonized I/O Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND:**
- **BLUE** under development
- **YELLOW** planned
- **BLACK** complete

Invensys Proprietary & Confidential
External Device Integration

Needs

• Easy integration of diverse 3rd party devices into I/A Series DCS
• Migration for I/A Series Legacy Gateways

Facts

• Large quantities of non-DCS information important to plant operations

Solution

• Centralized or remote integration of 3rd party devices for data monitoring, supervisory control or closed loop control

Benefits

• Minimal footprint, higher capacity & performance
• Seamless integration of 3rd party device data for visualization and historization
• Overall lower engineering & operation costs
I/A Series DCS Product Roadmap

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications &amp; Software</td>
<td>Virtualization Thin Client</td>
<td>FSIM – FCP280</td>
<td>Industry Expert Lib’s</td>
<td>FSIM – FCP300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FCS 4.0 FDM HART</td>
<td>FCS 5.0 SAMA+</td>
<td>FCS 6.0</td>
<td>FCS / ISA106 / Lifecycle Engineering Tools for DCS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marine Cert.</td>
<td>Multi-Core Appl.</td>
<td>Windows/Server Update</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wireless MESH</td>
<td>Rugged Network</td>
<td>Security Hardening/Updates (Continuous)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control Network Interface (CNI)</td>
<td></td>
<td>Unified Control &amp; Safety Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FCP280</td>
<td>MPC in CP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RCP290</td>
<td>Foxboro Supervisory Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TCX – I/A Series Integration</td>
<td>NetARM FBM222/28/49</td>
<td>Profinet</td>
<td>Ethernet/IP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>External Device Integration</td>
<td>Common Device Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wireless HART</td>
<td>200 Series HD I/O</td>
<td>Harmonized I/O Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FBM247 Knife Switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FBM247 Redundant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LEGEND: **BLUE** under development **YELLOW** planned: **BLACK** complete

Invensys Proprietary & Confidential
MultiVariable Controller in FCP280

Needs

- Process industries with high variability require optimization at the lowest levels of the process to achieve better yields and production efficiencies

Facts

- MultiVariable Control using a 10x10x10 matrix with 160 prediction coefficients is adequate for majority of applications

Solution

- A controller with a dimension of 10x10x10 embedded in the FCP280

Benefits

- Maximize Production Yield
- Field Proven Implementation
- Simple Deployment, integrated within FCP280
I/A Series DCS Product Roadmap

LEGEND: **BLUE** under development  **YELLOW** planned: **BLACK** complete

Invensys Proprietary & Confidential
WIB and ISASecure

Needs
• Plantwide DCS systems must be auditable and certified to Cyber Security industry standards

Facts
• Product certification while required is not sufficient alone
• Design and support organizations must also be trained and certified

Solution
• Achilles Level II tested I/A Series DCS with accredited policies, practices, and procedures to implement secure systems
• PLUS continuous support via the Global Customer Support centers

Benefits
• Plant Cyber Security maintained continuously with appropriate event response when required
• Assured continuity of operations against cyber attack
Triconex – I/A Series Integration

**Needs**
- Simplified, yet comprehensive integration of SIS with DCS

**Facts**
- Unified integration of DCS & SIS engineering and operational environments with complete functional separation

**Solution**
- Triconex configuration integrated with FCS
- Single data entry, common configuration environment
- Fully integrated real time, SOE and alarm data
- Triconex as a control station on the MESH

**Benefits**
- Lower Total Cost of Ownership
- Reduced physical space
- Faster installation & commissioning
- Maintain Separation
Integrated Control & Safety

Control Network

Operator Workstations
- Real Time Data
- Historian
- Alarms / SOE

Engineering / Maintenance Workstation
- Engineering
- Galaxy Repository

Process Controllers

Safety Controllers

Dedicated Safety Peer to Peer

Invensys Proprietary & Confidential

Slide 59
Maintain Separation

Safety Network (Peer to Peer)

Control Network

Safety
Triconex
Communications
Module (TCM)

Control
Triconex
Advanced
Communications
Module (ACM II)

Separation
Integrated System Management

System Monitor Pane

Station Information Pane

Safety System Information Pane

Control Network

Engineering / Maintenance Workstation

System Management
Questions ?
2013 Global User Conference

Call for Papers!

Save the Date
Foxboro Triconex
Two unique conferences. One great location.

The Future Starts Here!
Watch for details coming soon

Call for Papers!
Grant Le Sueur
Sr Portfolio Director

T +1 469 356 6718  M +1 713 314 7440
E grant.lesueur@invensys.com

Invensys Systems

iom.invensys.com