



*Setting the Standard for Automation™*

# ISA100 Wireless

End-User Vision Realized

Standards  
Certification  
Education & Training  
Publishing  
Conferences & Exhibits



**Presenter: Andre Ristaino, ASCI Managing Director**

Mr. Ristaino is Managing Director of the ISA Automation Standards Compliance Institute based in RTP, North Carolina providing staff leadership for the ISA Security Compliance Institute and ISA100 Wireless Compliance Institute. Mr. Ristaino held positions at NEMA, Renaissance Worldwide and, Deloitte & Touche Consulting's Advanced Manufacturing Technology Group where he was a recognized leader in system lifecycle methodologies. Mr. Ristaino earned a BS in Business Management from the University of Maryland, College Park and an MS in Technology Management from the American University in Washington DC. Mr. Ristaino holds an APICS CPIM certification.



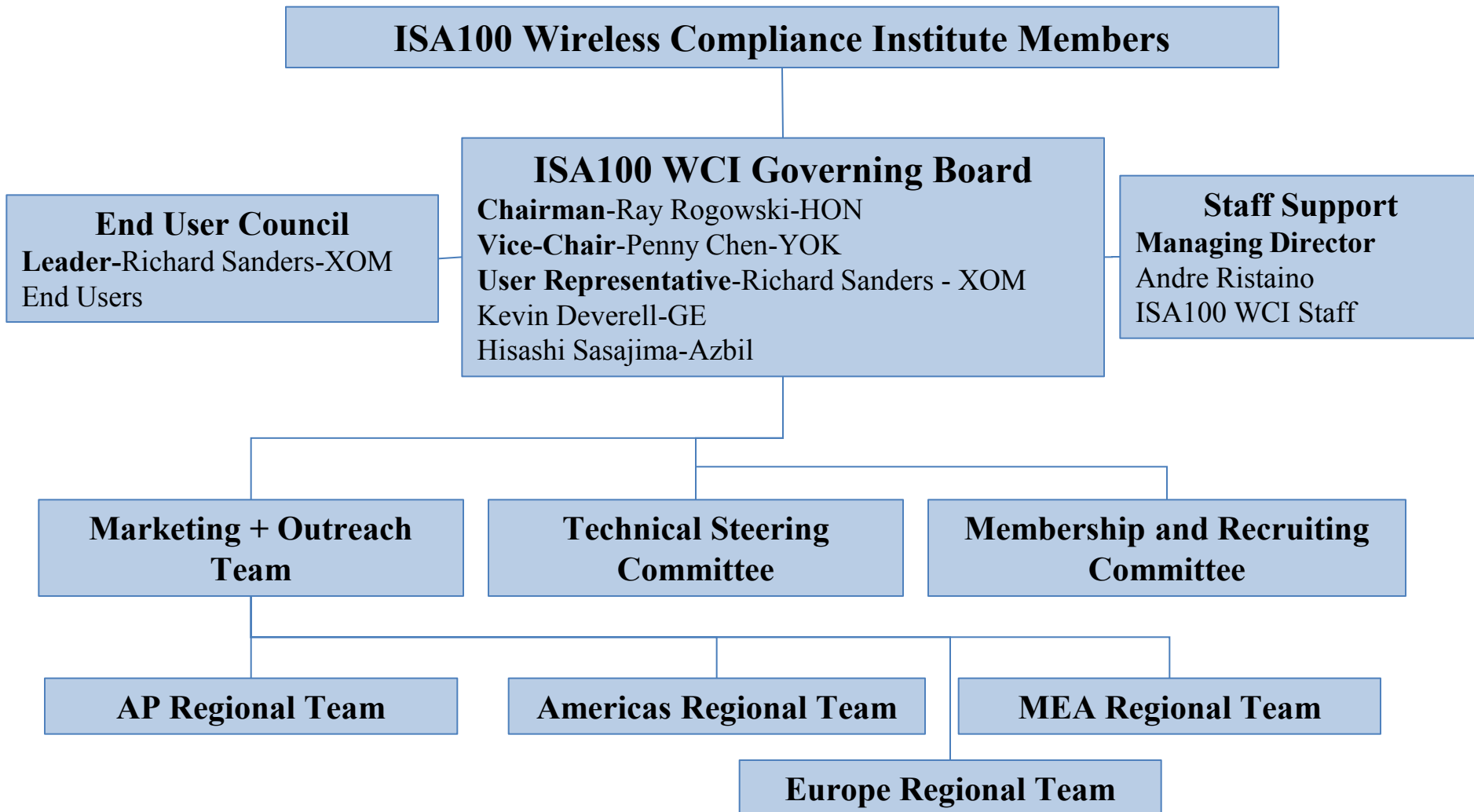
1. Introduction and Status of ISA100 WCI
2. GasSecure – GS01 Gas Detector – SIL2 Profisafe
3. Ultra-3eTI - Air Guard iMesh 3e 540 Series (FIPS 140-2)
4. GE Condition Monitoring– Protocol Tunneling
5. GE Portable Condition Diagnosis
6. Honeywell - Hart Adaptor – Protocol conversion or tunneling
7. Enraf Level Sensor – Protocol Tunneling
8. Key Drivers of ISA100 Wireless Popularity

Website – [www.isa100wci.org](http://www.isa100wci.org)

Articles, Presentations and, Webinars - <http://www.isa100wci.org/en-US/Learning-Center>

YouTube - <http://www.youtube.com/isa100wireless>

# ISA100 WCI Organization Structure



# ISA100 WCI End-user Council

Leader-Richard Sanders, ExxonMobil

- Elected by end-user members
- Ensures end-user voice is represented on Governing Board
- Voting seat on ISA100 WCI Governing Board
- Forum for vetting requirements for end-user experience initiatives (example IR provisioning)
- Provide input on priority of ISA100 WCI technical projects.

# ISA100 WCI Member Companies



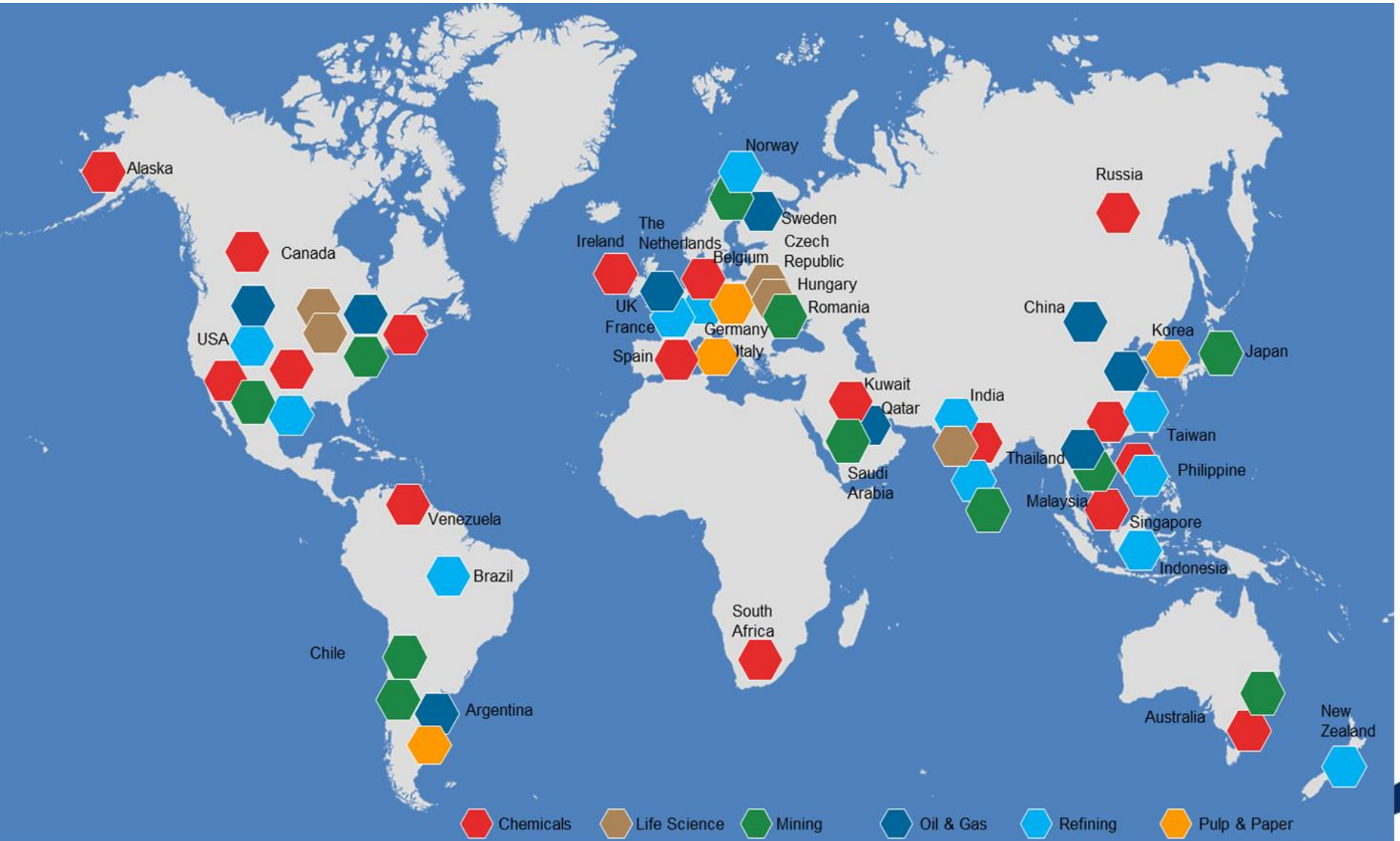
# ISA100 Wireless Globalization

- ISA/ANSI ISA100.11a-2011 international standard
- ISO/IEC 62734 CDV approved Oct 2013
- Strong interest from around the globe including China.
- Installations around the globe with over 134,000 devices connected in 2012 and consistent growth projected for next 5 years.
- Over 1 Billion hours of operation for ISA100 Wireless devices around the world.



# ISA100 Wireless Global Installation Map

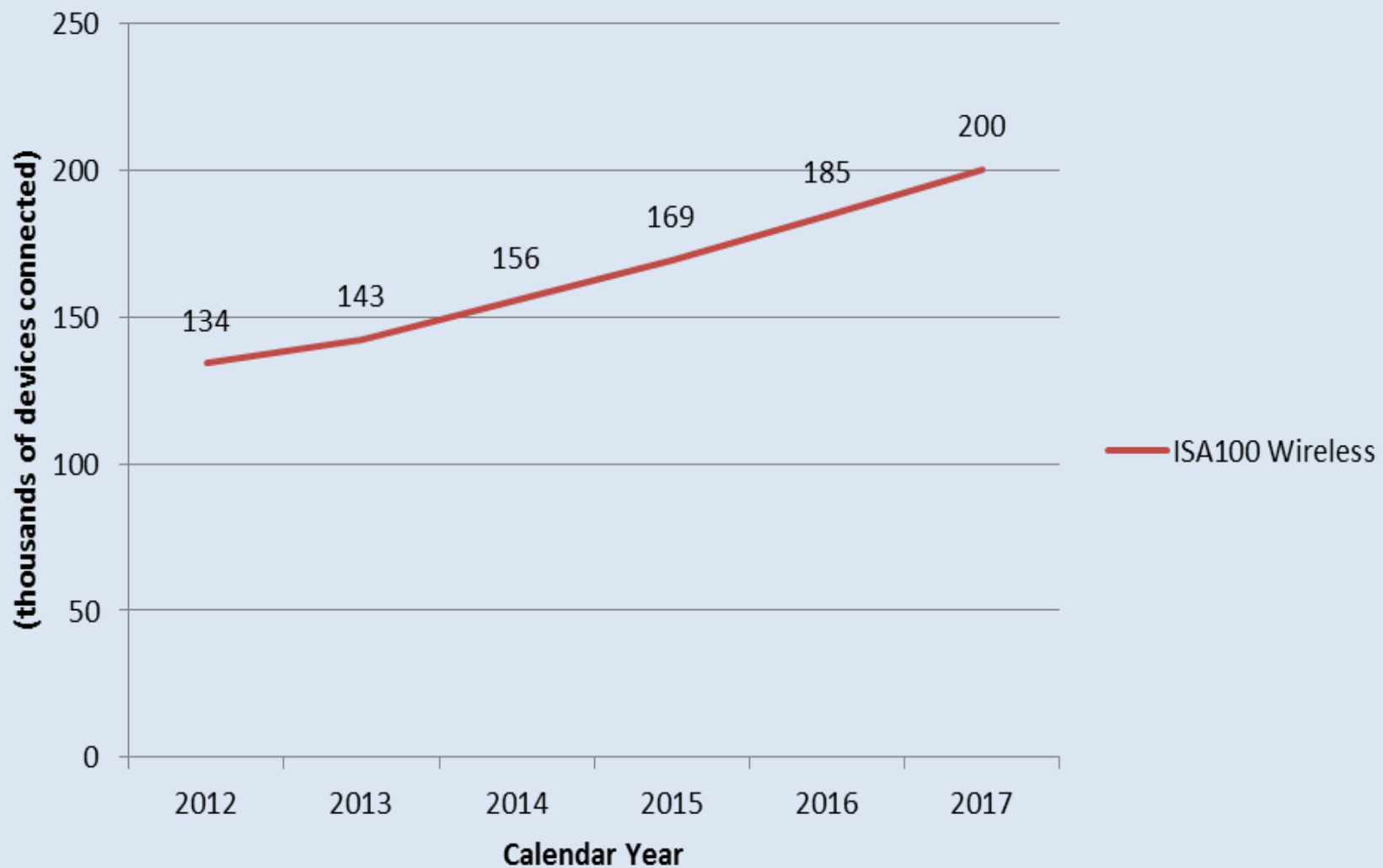
## Over One Billion Operation Hours





## World Market-All Regions Uptake of ISA100 Wireless

(source IMS March 2013 report)



# Collaboration With Other Standards Groups

1. **FDT** - Completed FDT DTM Annex for ISA100 Wireless in 2012
2. **Fieldbus Foundation** – The Fieldbus Foundation issued a Preliminary Specification (PS) in August 2013 addressing fieldbus transducer blocks for ISA100.11a wireless devices. The new transducer block specification will enable automation end users to interface ISA100.11a devices to FOUNDATION fieldbus for better integration with a control system, or with FOUNDATION devices.
3. **Fieldbus Foundation** – ISA100 Wireless included in successful Remote operations Management (ROM) trials at Petrobras

# ISA100 Wireless Technical Ecosystem

## New technology providers added during 2013

1. CDS – Romania - ISA100 Wireless product integrator. Nivis channel sales partner EMEA.
2. R3 Sensors – USA based ISA100 Wireless product integrator.
3. Centro – USA based ISA100 Wireless product integrator. Nivis channel sales partner NA, AP
4. BeamLogic-USA based ISA100 Wireless product integrator
5. Team PDI – USA based ISA100 Wireless product integrator

# ISA100 Wireless Products in Pipeline

Company	Key Products
COSASCO	Corrosion Sensors
Nivis	ISA100 Wireless SDK-available today
TLV	Steam Trap and valves
R3 Sensors	Temperature, Pressure
CQUPT	Temperature, Pressure
Eltav	Manual Valve Position Sensor
Flowserve	Control Valve, position sensor
Azbil	Control Valve
John Crane	Temperature, Pressure
New Cosmos	Gas Detection Systems
Forbes Marshall	Steam Engineering & Controls
Spirax Sarco	Boiler controls, steam traps, valves

# ISA100 Wireless Applications

## GasSecure – Wireless Gas Sensor

# Wireless Gas Sensors

## *Gulfaks C.*

- Rig operated by Statoil in the North Sea.
- 20 detectors

GAS  
SECURE



# Architecture

GAS  
SECURE

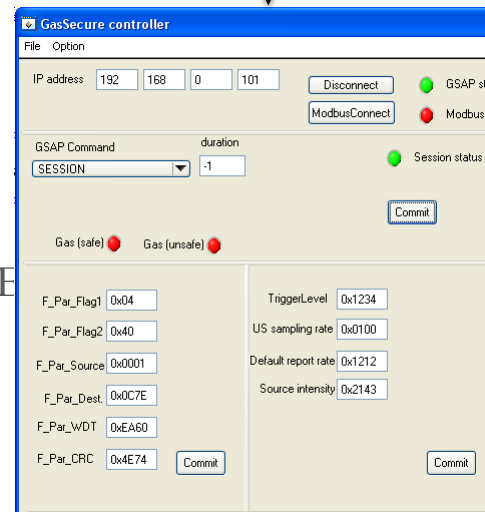


Wired  
ProfiNET

Ethernet/Modbus



Wireless ProfiSAFE  
on  
ISA100 Wireless



GasSecure tool  
for safety and  
operating  
parameters



# Enabling Features Unique to ISA100 Wireless

1. ISA100 Wireless CONTRACTS (QoS)  
Gives guaranteed (if no packet loss) time of packet delivery  
Publish  
Client/Server  
**Bi-directional**
2. ISA100 Wireless Modern Object oriented design  
Supports tunneling of other protocols  
Facilitates design of user defined operations
3. ISA100 Wireless supports fragmented packets, in HART this needs to be done by application
4. ISA100 Wireless supports slow hopping
5. ISA100 Wireless supports variable length slots
6. ISA100 Wireless supports star networks (nodes do not have to be routers)

# ISA100 Wireless Applications

## Ultra-3eTI - Wireless Gateways and Sensor Nodes

# Flexible ISA100 Wireless Application Layer

Seemingly generic ISA100 Wireless **gateways** and **sensor nodes** enhanced for USA DOD encryption requirements.

1. FIPS 140-2 cybersecurity certification by US National Institute of Standards and Technology (data encryption)
2. Uses certified ISA100 Wireless radio module
3. United States of America Department of Defense Market
4. Applications include process monitoring, equipment monitoring, maintenance, energy/conservation, HSE.



<http://www.ultra-3eti.com>

# ISA100 Wireless Applications

## General Electric – Condition Monitoring

# Essential Insight.mesh



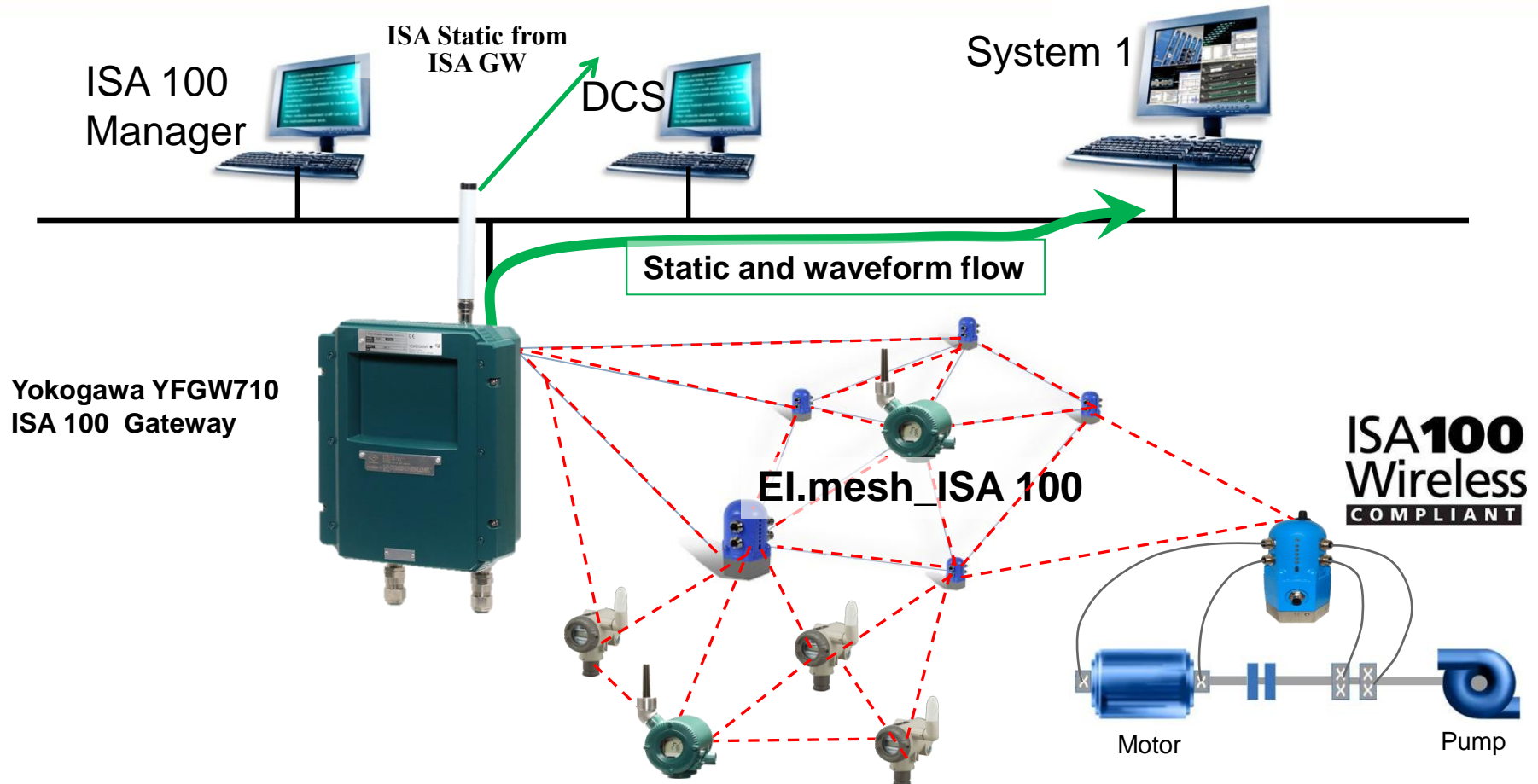
Bently Nevada™  
Asset Condition Monitoring



imagination at work

**ISA100**  
**Wireless**  
**COMPLIANT**

# El.mesh certified ISA 100 Wireless Compliant



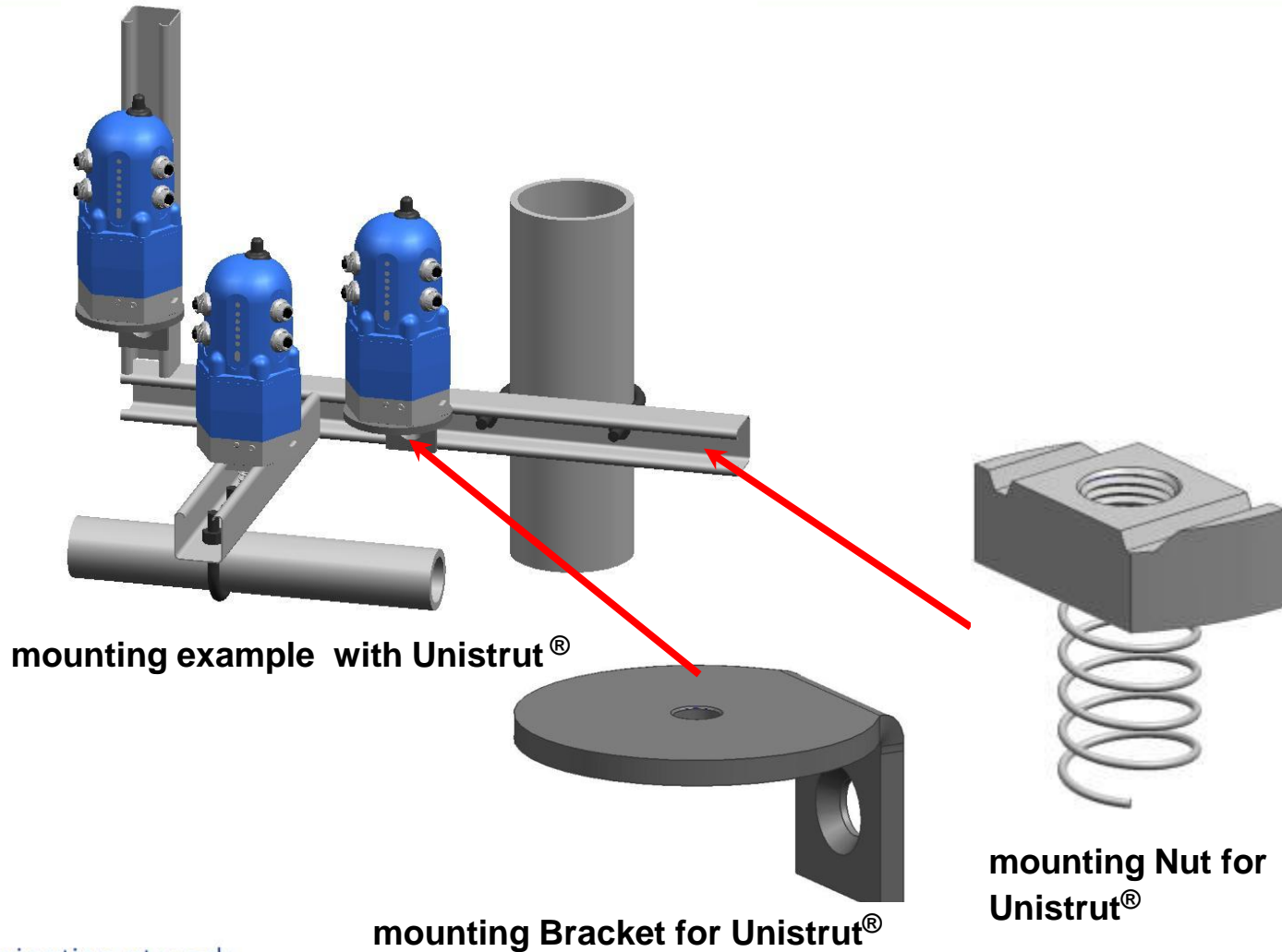
**GE Bently Nevada data served to directly to DCS through other vendor gateways**



imagination at work

<http://www.ge-mcs.com/en/bently-nevada-monitoring/>

# Flexible mounting options





# ISA100 Wireless Applications

## GE – Portable Condition Diagnosis

# Prowler™ Portable Data Collection Kit

GE's Bently Nevada Prowler Portable Data Collection Kit is a preassembled collection of the components needed to deploy up to four wireless monitoring points on equipment where monitoring is desired.

This self-contained kit enables quick deployment of one temperature and three vibration measurements to effectively monitor machinery on a long term or short term basis with virtually no installation costs. The kit includes GE's System 1\* condition monitoring software that delivers all the tools needed for an operator to analyze potential faults on any machine.



# ISA100 Wireless Applications

Honeywell – Hart Adapter

# Hart Adapter – Wired Hart to ISA100 Wireless



What it does:

- **Wirelessly connects any HART device to an ISA100 Wireless Network**



Key Features:

- **ISA100 Wireless Compliant**
- **Transmit diagnostics and process variable data**
- **Up to 350 meters (1,000 ft.) range**
- **Powered from 4-20mA loop and D-cell battery**
- **Diagnostics indicated by LEDs**
- **FM Class 1, Div 1, ATEX Class 1, Zone 1**
- **UNLOCK STRANDED DIAGNOSTICS**

# ISA100 Wireless Applications

## Enraf ISA100 Wireless FlexLine Level Sensor

# Honeywell Enraf wireless FlexLine Level Sensor

- Additional diagnostics to detect hardware failures, while a 1oo2D voting algorithm will detect, report and isolate failures on the boards without interruption.
- Validated for use in SIL-2 and SIL-3 applications allowing it to be used in overfill protection applications.
- Certified for use in custody transfer applications
- Customer application remains the same  
Data sent to the same Entis Pro software
- Handles large FFT data sets



*Proprietary protocol sent through ISA100 Wireless Network.*

# Key Drivers of ISA100 Wireless Popularity

- ISA100 Wireless CONTRACTS (QoS)
  - Gives guaranteed (if no packet loss) time of packet delivery
  - Publish
  - Client/Server
  - **Bi-directional**
- ISA100 Wireless supports slow hopping and variable length slots
- ISA100 Wireless Modern Object oriented design
  - Supports tunneling of other protocols
  - Facilitates design of user defined operations
  - Flexible, open application layer
- Superior Meshing Scheme - ISA100 Wireless supports star networks (nodes do not have to be routers)
- Native IPv6loWPAN in the mesh
- Duo-cast
- 128 bit AES
- PKI
- Tunneling
- Many applications in one infrastructure



# Multi-protocol Support

