Novel Adaptations of ISA100 Wireless™

eChemExpo
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Webinar Topics
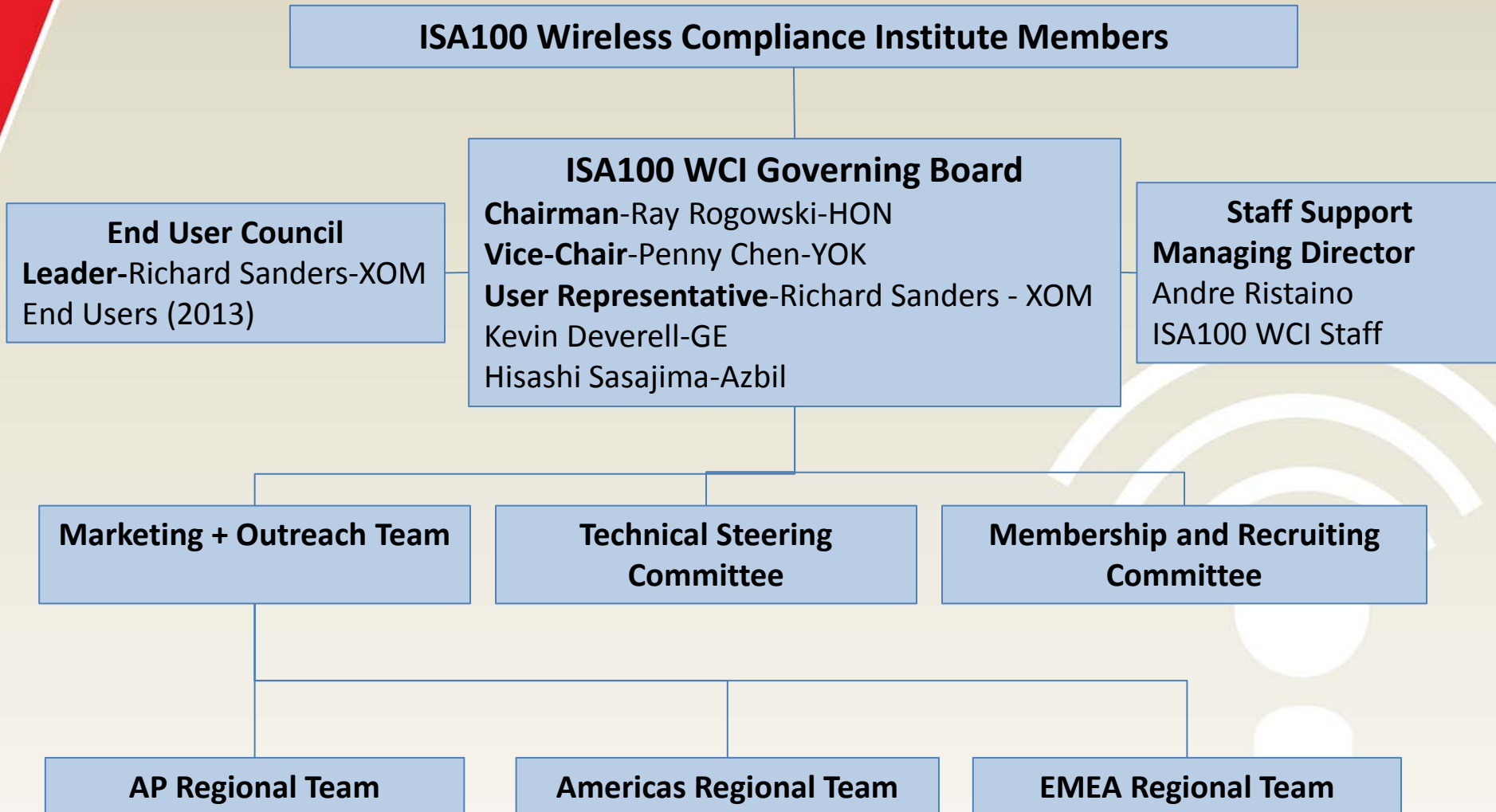## Introduction and Status of ISA100 WCI

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

Website – www.isa100wci.org
Articles, Presentations and, Webinars - http://www.isa100wci.org/en-US/Learning-Center
YouTube - http://www.youtube.com/isa100wireless

ISA100 WIRELESS COMPLIANCE INSTITUTE

Organization Structure

ISA100 Wireless Compliance Institute Members

ISA100 WCI Governing Board
Chairman-Ray Rogowski-HON
Vice-Chair-Penny Chen-YOK
User Representative-Richard Sanders - XOM
Kevin Deverell-GE
Hisashi Sasajima-Azbil

End User Council
Leader-Richard Sanders-XOM
End Users (2013)

Staff Support
Managing Director
Andre Ristaino
ISA100 WCI Staff

Marketing + Outreach Team

Technical Steering Committee

Membership and Recruiting Committee

AP Regional Team

Americas Regional Team

EMEA Regional Team

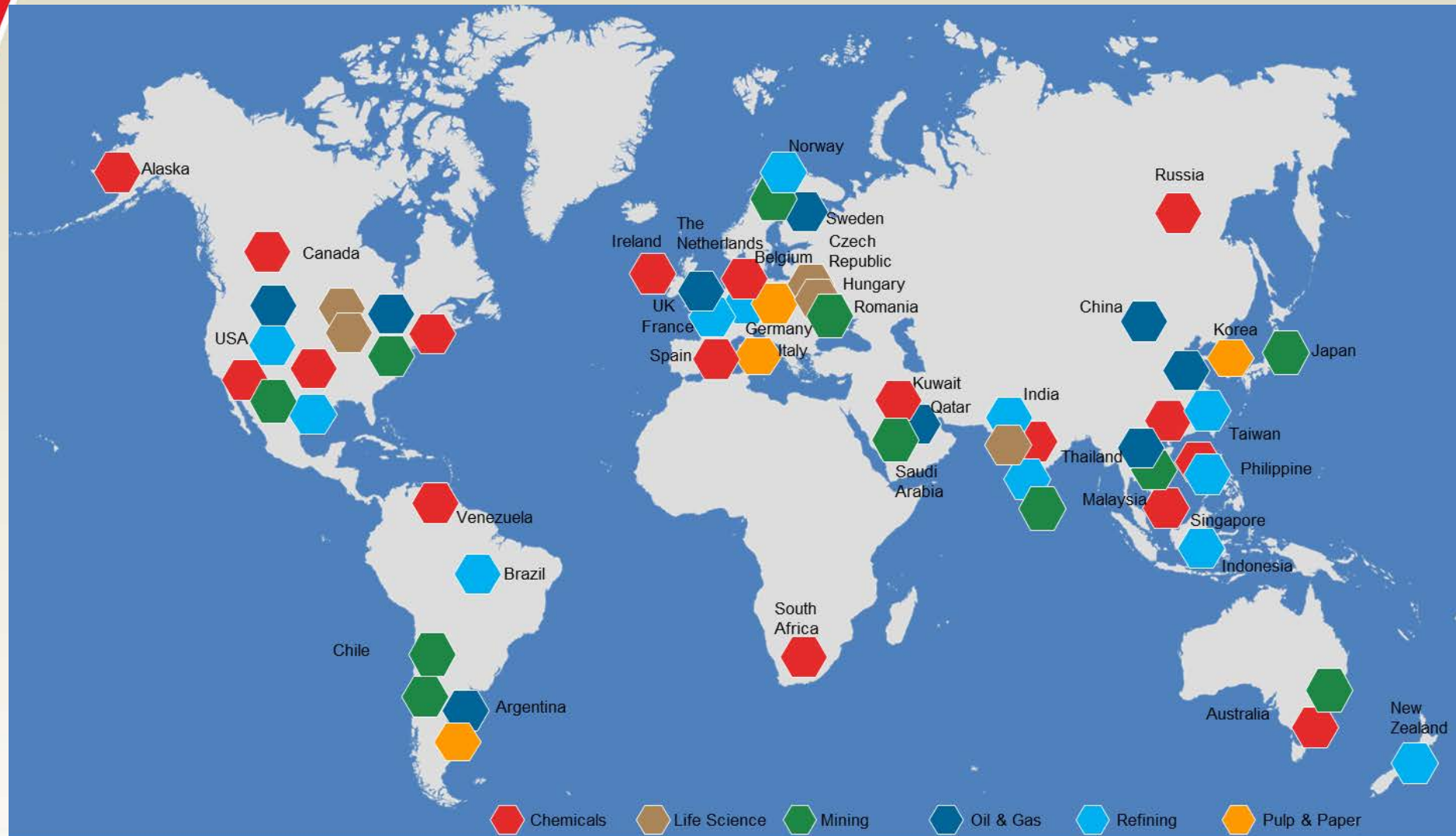ISA100 WIRELESS COMPLIANCE INSTITUTE

ISA100 WCI Member Companies

ISA100 Wireless Globalization

- ISA/ANSI ISA100.11a-2011 international standard
- ISO/IEC 62734 unanimous CD approval 2013, FDIS mid-2014
- Strong global adoption.
- Installations around the globe with over 134,000 devices connected in 2012 and consistent growth projected for next 5 years.
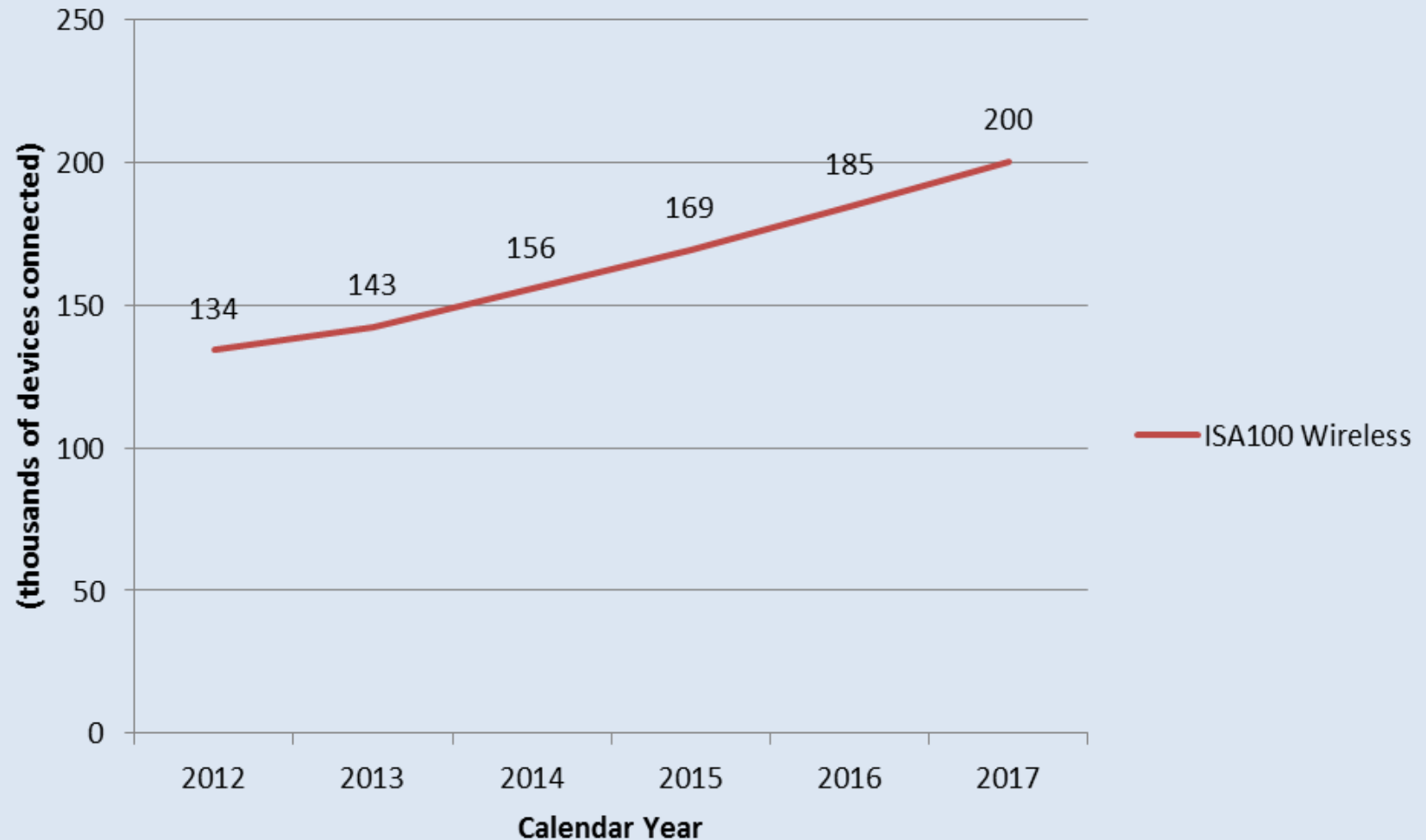- Over 1 Billion hours of operation for ISA100 Wireless devices around the world.

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ISA100 Wireless Global Installation Map
Over One Billion Operation Hours

World Market-All Regions Uptake of ISA100 Wirelesss
(source IMS March 2013 report)

Chart: (thousands of devices connected) vs Calendar Year

- 2012: 134
- 2013: 143
- 2014: 156
- 2015: 169
- 2016: 185
- 2017: 200

Legend: ISA100 Wireless

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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 using ISA100 Wireless device emulator.

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ISA100 Wireless Technical Ecosystem

New technology providers added during 2013

1. CDS – Romania - ISA100 Wireless product integrator. Nivis channel sales partner EMEA.

2. Centero – USA based ISA100 Wireless product integrator. Nivis channel sales partner NA, AP

3. Yokogawa – Now offering components to any supplier including universal antenna module.

4. Agiliad – Product Integration services

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ISA100 Wireless Products in Pipeline

Company	Key Products
COSASCO	Corrosion Sensors
Centero	ISA100 Wireless SDK-available today
TLV	Steam Trap and valves
CDS	ISA100 Wireless SDK-available today
Nexcom	Routers, Gateways, infrastructure
Eltav	Manual Valve Position Sensor
Flowserve	Control Valve, position sensor
Azbil	Control Valve
Agiliad	Product integration services
New Cosmos	Gas Detection Systems
Forbes Marshall	Steam Engineering & Controls
Spirax Sarco	Boiler controls, steam traps, valves
Yokogawa	Universal Antenna-available today
Yokogawa	Modbus, Profibus, Hart adapters

1. GasSecure

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GS01 ISA100 Wireless™ Infrared Gas Detectors

GAS SECURE

See Webcast, July 16th, 2013
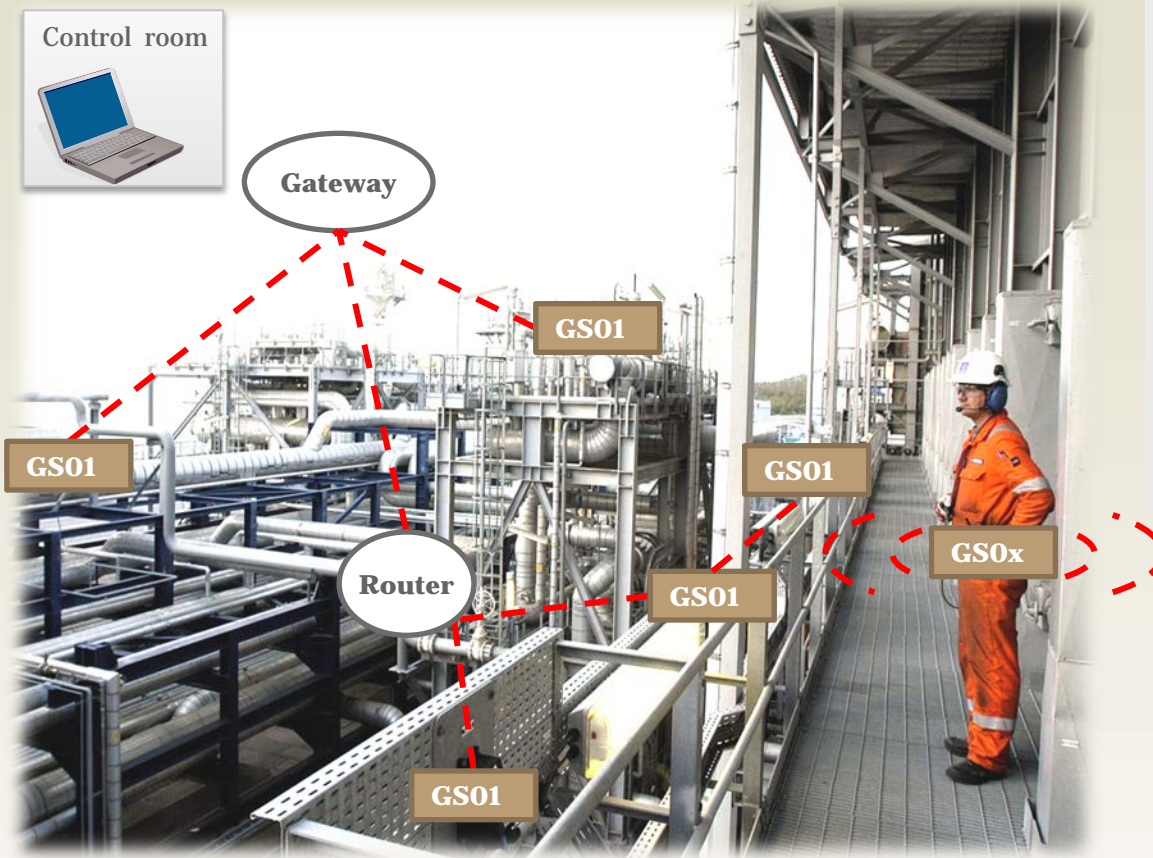
Features:

- High reliability – SIL2 incl. SafeWireless™ communication

- Continuous monitoring with two years battery life

- Fast response (5 s)

- No recalibration

http://www.gassecure.com/

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Gullfaks C.

- Rig operated by Statoil in the North Sea.

- 20 detectors

Architecture

Ethernet/Modbus

Wired
ProfiNET

GW

Wireless ProfiSAFE
on
ISA100 Wireless
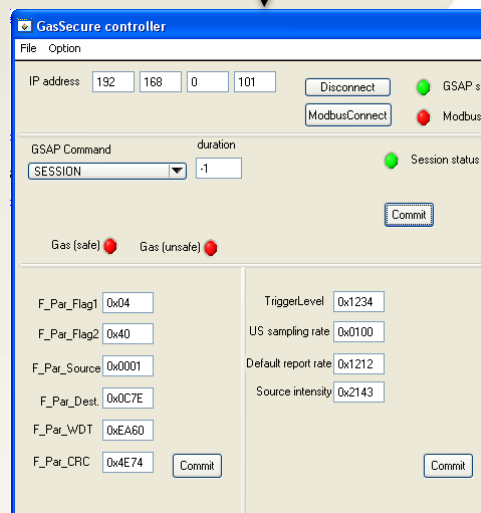
GasSecure tool
for safety and
operating
parameters

Enabling Features Unique to ISA100 Wireless

Native IPv6 addressing- Internet of Things

ISA100 Wireless CONTRACTS (QoS)
- – Gives guaranteed (if no packet loss) time of packet delivery
- – Publish
- – Client/Server
- – **Bi-directional**

ISA100 Wireless Modern Object oriented design
- – Supports tunneling of other protocols
- – Facilitates design of user defined operations

ISA100 Wireless supports fragmented packets,
ISA100 Wireless supports slow hopping

ISA100 Wireless supports variable length slots

ISA100 Wireless supports star networks (nodes do not have to be routers)

2. Ultra-3eTI

Ultra-3eTI - Air Guard iMesh 3e 540 Series

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

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

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

3. General Electric – Condition Monitoring

Essential Insight.mesh

Bently Nevada™

Asset Condition Monitoring

El.mesh certified ISA 100

ISA 100 Manager

ISA Static from ISA GW

DCS

System 1

Static and waveform flow

Yokogawa YFGW710 ISA 100 Gateway

El.mesh_ISA 100

imagination at work

Motor

Pump
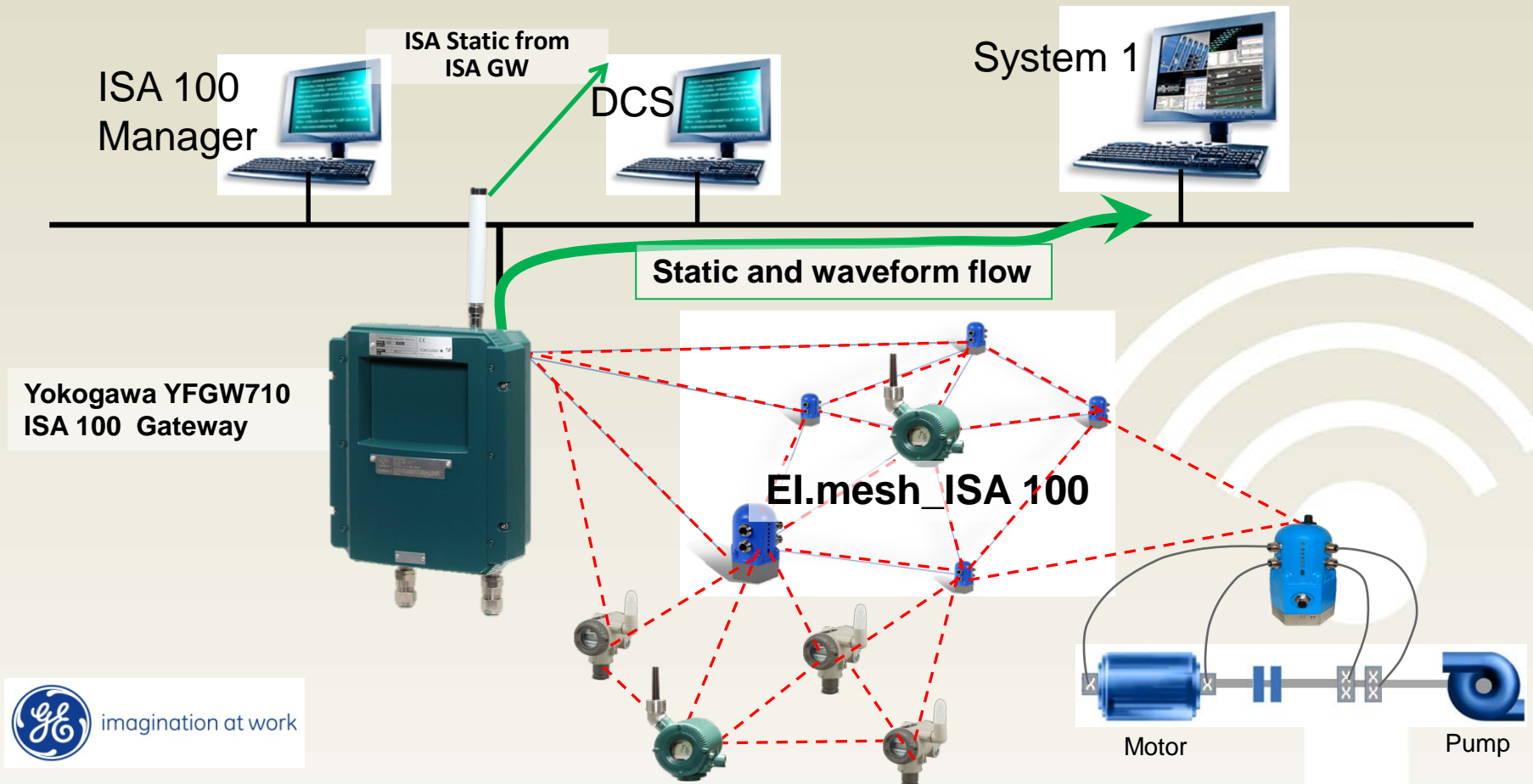
GE Bently Nevada data served to directly to DCS through other vendor gateways
http://www.ge-mcs.com/en/bently-nevada-monitoring/

Flexible mounting options

mounting example with Unistrut ®

Mounting options:
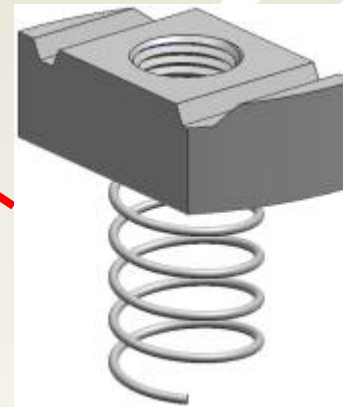– Mount for Unistrut ®
– Stud mount
– Magnetic mount
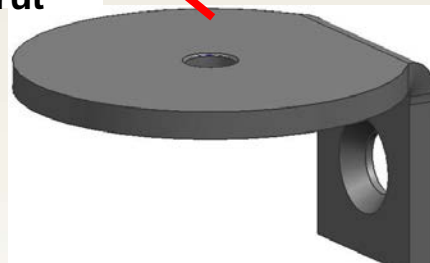
mounting Bracket for Unistrut®

mounting Nut for Unistrut®

4. GE – Portable Condition Diagnosis

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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.

5. Honeywell – Hart Adapter

Hart Adapter – Wired Hart to ISA100 Wireless

What it does:

- **Wirelessly connects any HART device to an ISA100.11a 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**

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6. Honeywell Enraf Wireless FlexLine Level Sensor

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Honeywell Enraf wireless FlexLine

- 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

  Proprietary protocol sent through ISA100 Wireless Network.

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Key Drivers of ISA100 Wireless Popularity

- **ISA100 Wireless is the Industrial Internet of Things – native IPv6 and smart objects**

- 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

- Superior Meshing Scheme - ISA100 Wireless supports star networks (nodes do not have to be routers)
- Native IPv6loWPAN
- Duo-cast
- 128 bit AES
- PKI
- Tunneling
- Many applications in one infrastructure – no regretted investments

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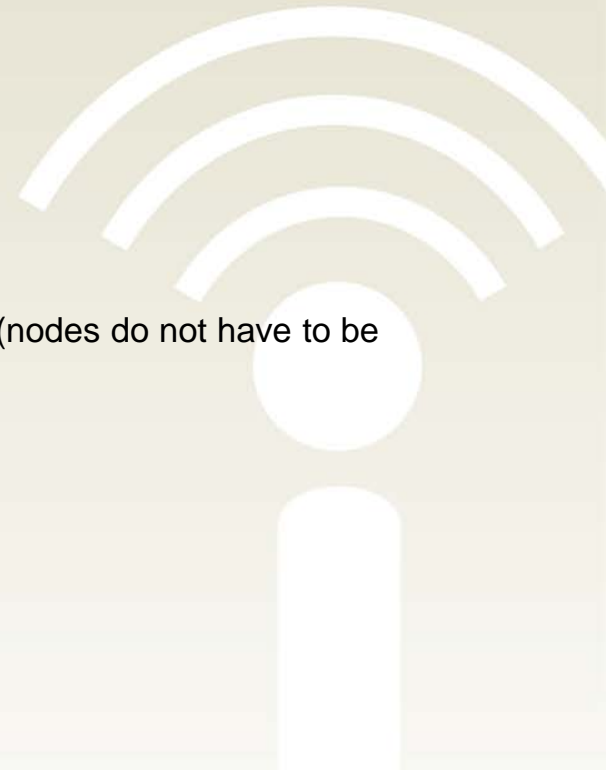
Multi-protocol Support – No regretted investments!!
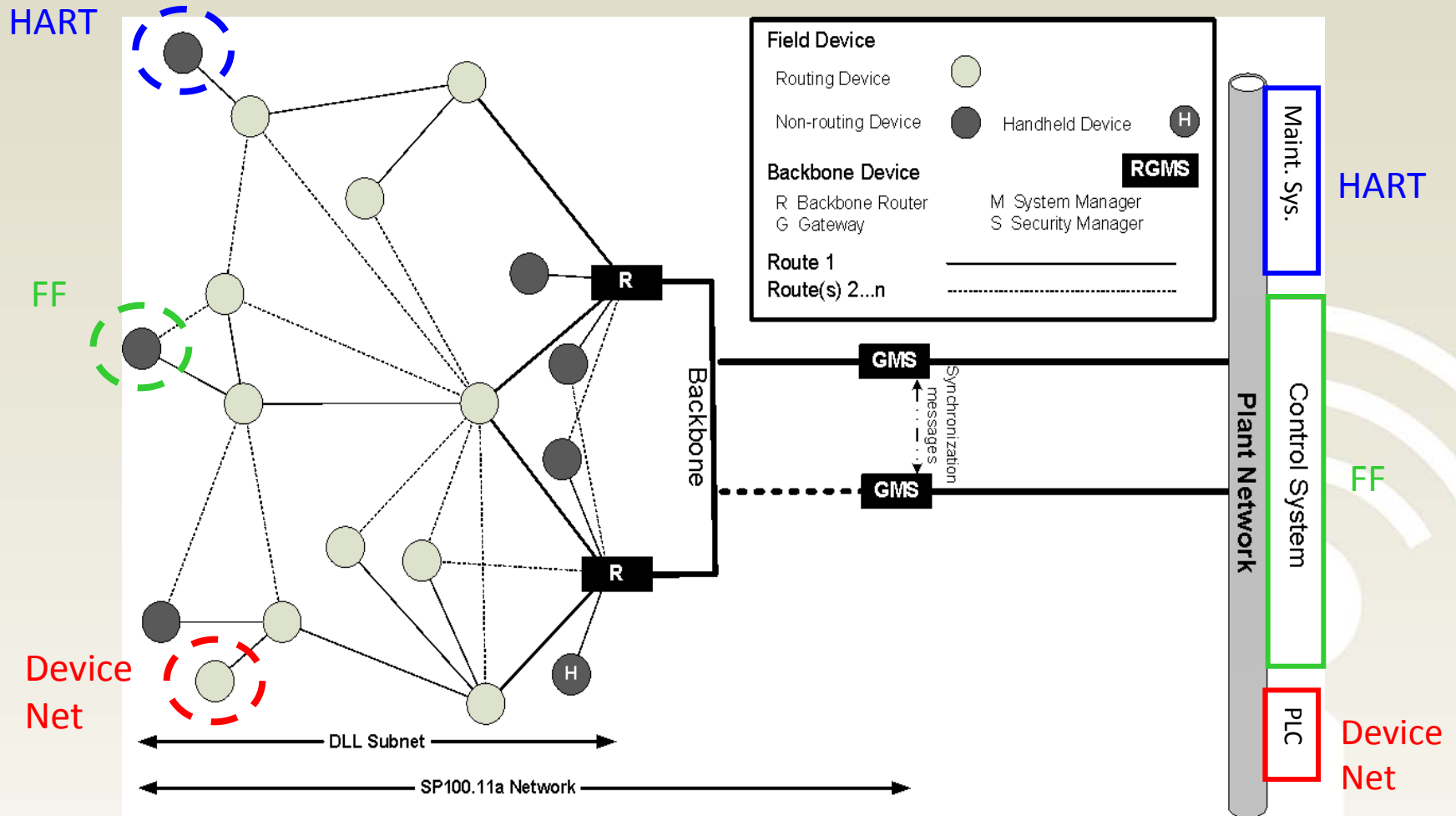
Why Does IPv6 in ISA100 Wireless™ Matter?

Internet of Things (IOT)   Internet of Everything (IOE)   Industrial Internet of Things (I2OT)

Whatever your name for it, IPv6 and ISA100 Wireless make the Industrial Internet of Things (I2OT) a reality TODAY.

ISA100 Wireless is the only industrial wireless protocol standard to incorporate IPv6 directly as part of its network layer and transport layer. This gives ISA100 Wireless the advantage of seamless end-to-end routing with "anything anywhere" effectively in a single environment.

IPv6 in ISA100 Wireless supports multiple subnets which enables sensors to be grouped together much like a VLAN for traffic and network management, while also breaking the network into zones for security reasons. Support for subnet-level mesh, as well as backbone-level routing, is also supported in ISA100 Wireless.

IPv6 networks use familiar standards-based addressing and can be managed using tools derived from traditional IT network management tools and systems. Today's generation of network managers and automation engineers understand IPv6 and so will future generations.

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Many think IPv6 only increases IP addresses, but there are a number of other advantages:

Security Boost – Internet Protocol Security (IPsec), a major design improvement of IPv6, authenticates and encrypts each IP packet of a communication **session. IPsec operates in the Internet Layer, thus it protects any and all application traffic across an IP network.**

Support For New Services - By eliminating Network Address Translation (NAT), true end-to-end connectivity at the IP layer is restored, enabling new and valuable services. Peer-to-peer networks are easier to create and maintain, more robust Quality of Service (QoS).

More Efficient Routing - reduced routing table sizes, more hierarchal routing**.**

More Efficient Packet Processing - simplified packet headers; eliminated IP-level checksum that exists in IPv4

Directed Data Flows - IPv6 supports a superior multicast method saving network bandwidth

Simplified Network Configuration - address auto-configure is built into IPv6 (address assignment)

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With the IOT, everyone wins and ISA100 Wireless with IPv6 is already helping companies today.

User Benefits:

- Improve Performance and Reduce Downtime
- Lower Asset Lifecycle Costs
- Platform for Innovation and Continuous Improvement

Suppliers Benefits:

- Improve Service Performance
- Improve Service Business Profitability
- Platform for Innovation
- Sell Products-as-Service

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