ISA WIRELESS COMPLIANCE INSTITUTE

Andre Ristaino, ISA100 WCI Managing Director

www.isa100wci.org

Topics

A. Impact of Approval of IEC 62734
B. ETSI 300 328 v1.8.1 Compliant
C. Status of ISA100 WCI
D. Unique ISA100 Wireless Features Enables Broad Use-Cases
    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. CDS 'lick and stick' Satellite Sensor System
    5. Honeywell - Hart Adaptor – Protocol conversion or tunneling
    6. Enraf Level Sensor – Protocol Tunneling
E. 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

IEC 62734 Approved

- ISA/ANSI ISA100.11a-2011 international standard approved in 2011
- ISO/IEC 62734 FDIS received unanimous approval in September 2014
- EN 62734 FDIS also received unanimous approval by CENELEC (parallel voting process).

Why Does IEC 62734 Matter?

- Formal acceptance by 52 participating countries (21 voting committee members) on the IEC 62734 committee.
- Expanded adoption rate since some jurisdictions require IEC standards compliance as a procurement requirement.
- IEC committee process ensures that jurisdictional radio regulations such as ETSI in the EU or FCC in USA are considered.
- Although ISA standards are international, IEC standards have better recognition and adoption outside North America.

ISA100 Wireless Certification Update

- ISA100 Wireless Compliance Institute has been reviewing and updating the ISA100 Wireless certification test requirements to harmonize them with IEC 62734.

- Harmonized ISA100 Wireless certification test kits will be available in Q1 2015

- Harmonized ISA100 Wireless certification testing will be available in Q1 2015

ISA100 Wireless is Compliant with ETSI 300 328 v1.8.1

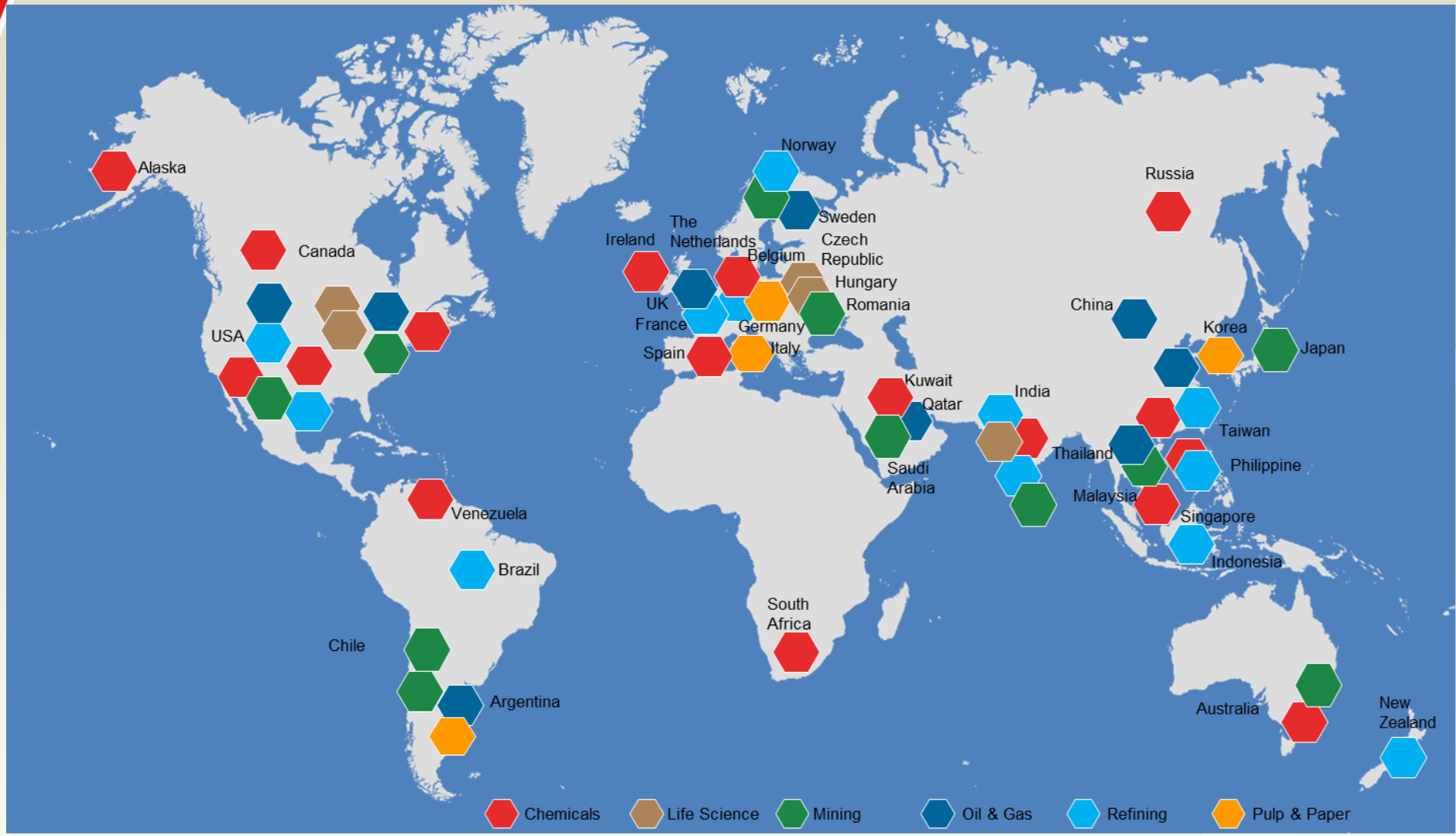
- The Updated version of the regulation which goes into effect 01 Jan 2015 requires 'clear channel assessment' (CCA) a behavior also known as LBT or 'listen before talk' and a few other requirements.
- LBT is defined in the base IEEE 802.15.4 radio standard (physical layer), but is not always implemented in wireless protocols. LBT is implemented in ISA100 Wireless as a mandatory requirement.
- ISA100 Wireless includes additional features and functions that provides suppliers flexible approaches to comply with ETSI EN 300328 v1.8.1 such as country codes to identify device location and the ability to attenuate output power levels.
- The IEC 62734 standard includes Annex V, an informative attachment that describes multiple scenarios and approaches to ensure ETSI compliance.
- If you are an EU end-user with ISA100 Wireless installed, or in your procurement plans, ISA100 Wireless complies.
- If you are a supplier evaluating wireless technologies for your product line, ISA100 Wireless meets this impending EU requirement.

Strong ISA100 Wireless™ Growth

- ISA100.11a wireless products have been shipping since 2010 under the ISA100 Wireless™ brand.
- Installations around the globe with over 150,000 devices connected in 2012 and consistent growth experienced over the ensuing years.
- Over 1 Billion hours of operation for ISA100 Wireless devices around the world.

ISA100 Wireless Global Installation Map

Over One Billion Operation Hours

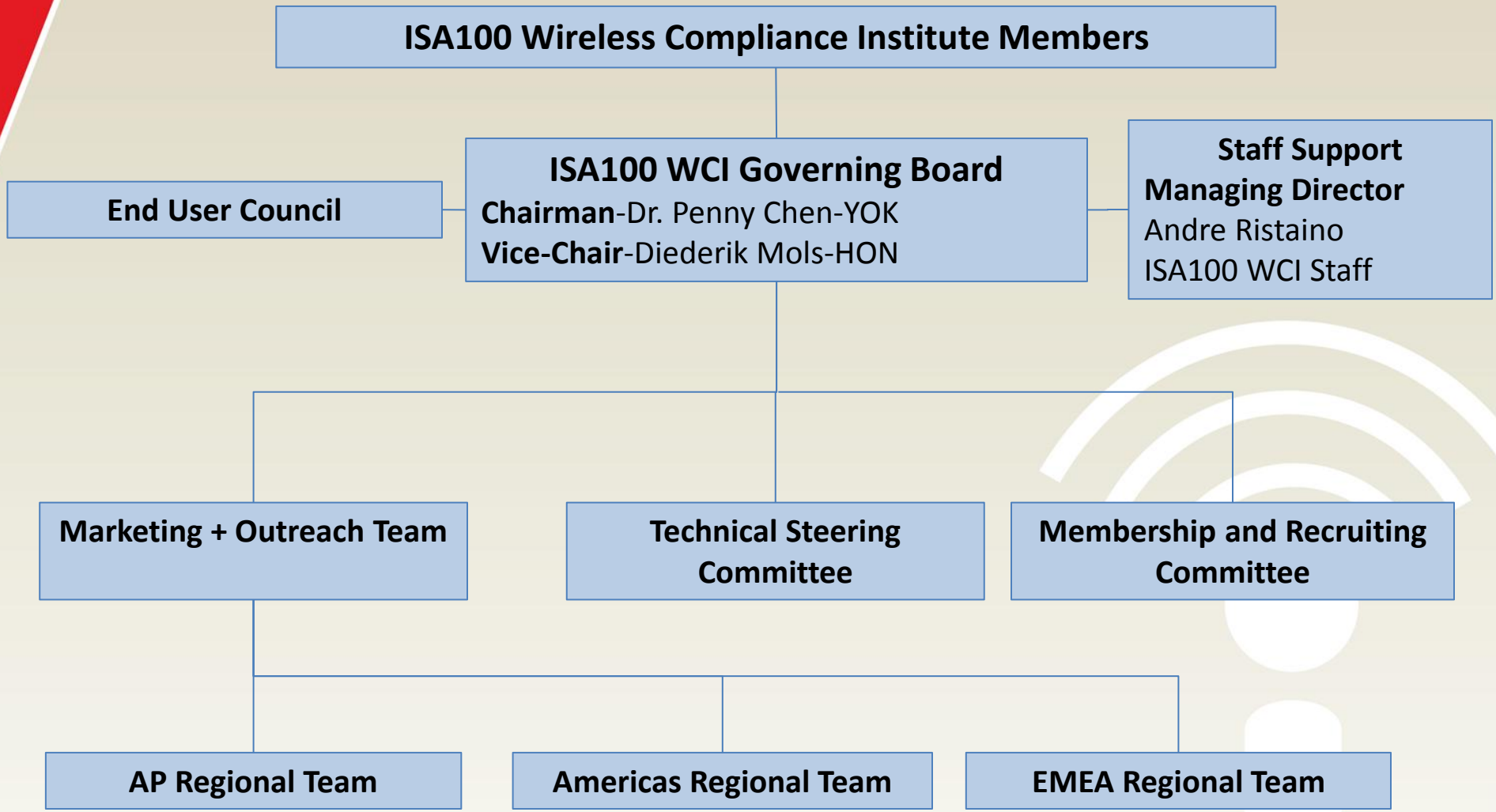


Sample of ISA100 Wireless Products

Company	Key Products
Agiliad	Product integration services
Armstrong International	Steam Trap Monitors
Azbil	Control Valves
CDS	ISA100 Wireless SDK, Disposable satellite sensors - 2015
Centero	ISA100 Wireless SDK, integration support, test kits
COSASCO	Corrosion Sensors - 2015
Eltav	Manual Valve Position Sensor
Flowserve	Control Valve, position sensor - 2015
Murata	ISA100 Wireless modules and infrastructure devices
HIKOB	Sensors and Data Acquisition for Roads & Civil Projects
New Cosmos	Gas Detection Systems
Nexcom	Infrastructure Devices, Gateways, Access Points, Routers - 2015
Riken Keiki	Gas Detection Systems
Scott Safety	Gas Detection Systems - 2015
SKF	Bearings and Asset Monitoring
Spirax Sarco	Boiler controls, steam traps, valves
TLV	Steam Trap and valves
Yokogawa	Universal Antenna, Modbus and Hart Adaptors

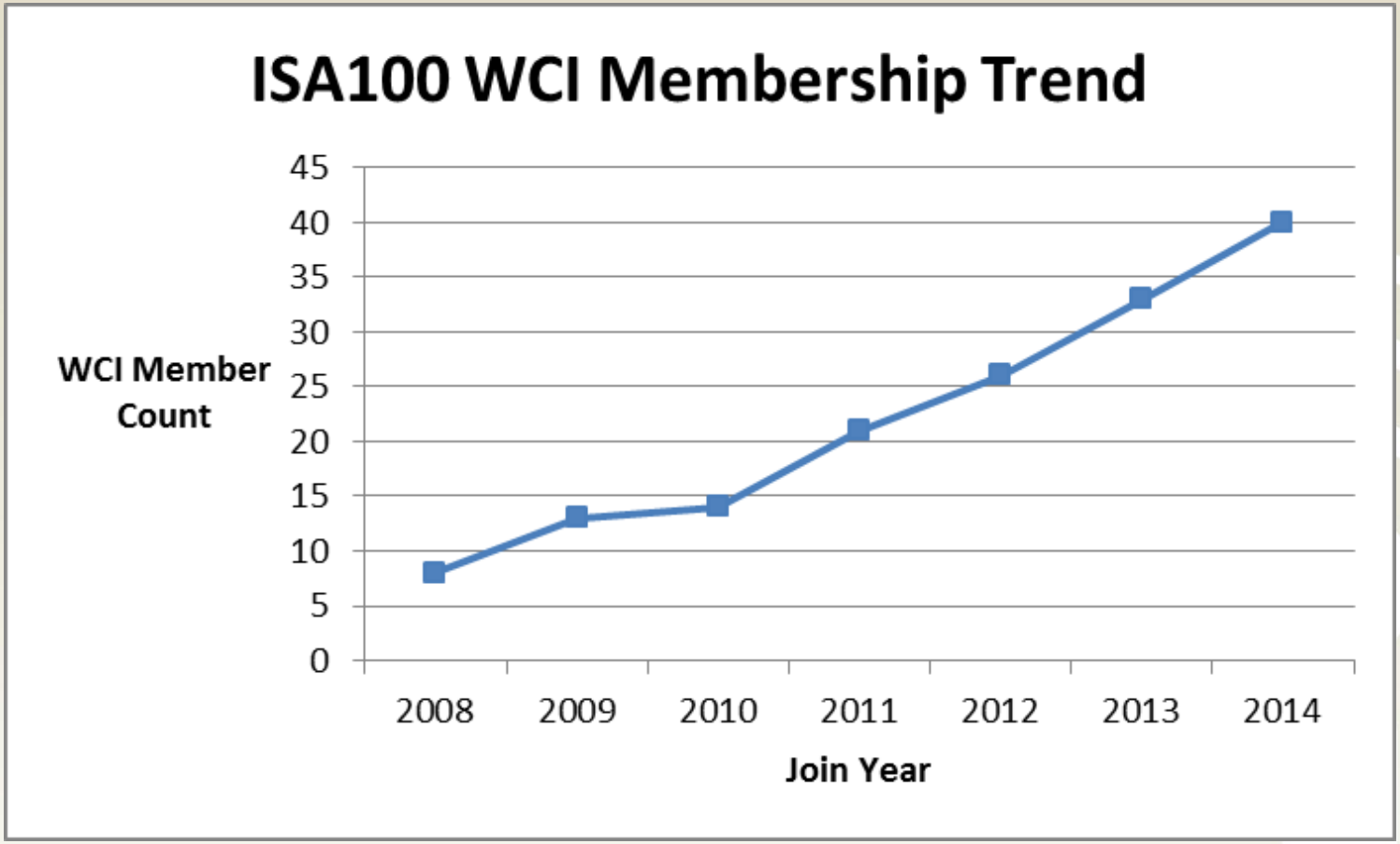
http://www.isa100wci.org/en-US/End-User-Resources/Product-Portfolio

Organization Structure



ISA100 WCI Member Companies

User and Supplier Support Is Growing



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.

4. **FDI – Add ISA100 Wireless to technical roadmap.**
5. **OPC, Profibus, FDT, Fieldcomm Group Collaboration at industry events- Hannover Messe/ACHEMA**

ISA100 Wireless Technical Ecosystem is Growing

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. Distributes ISA100 Wireless test kits.

3. Yokogawa – Now offering components to any supplier including universal antenna module. (Distributors TBA)

4. Agiliad – Product Integration services

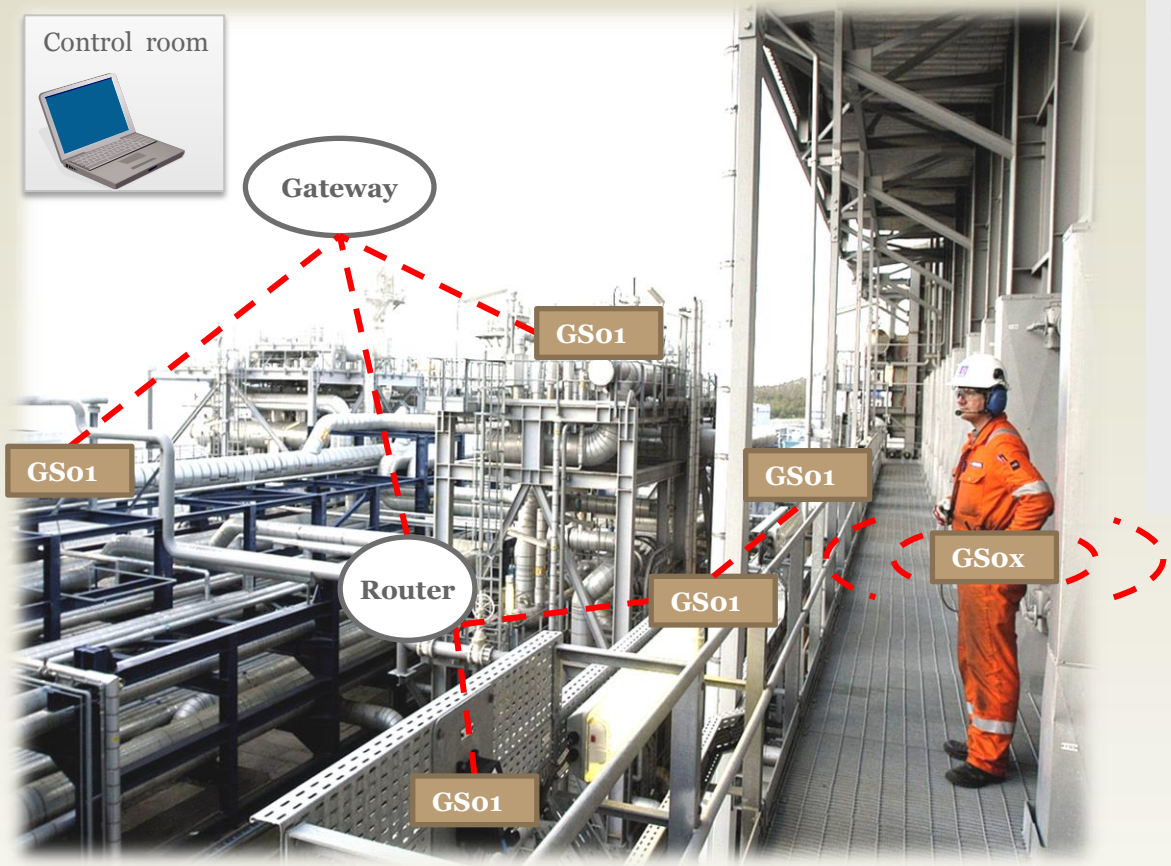
5. Nexcom – ISA100 Wireless infrastructure products / integration services
6. Murata – Design and manufacture ISA100 Wireless modules

1. GasSecure

GAS SECURE

GS01 ISA100 Wireless™ Infrared Gas Detectors

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/

Gullfaks C.

GAS SECURE

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

GAS SECURE

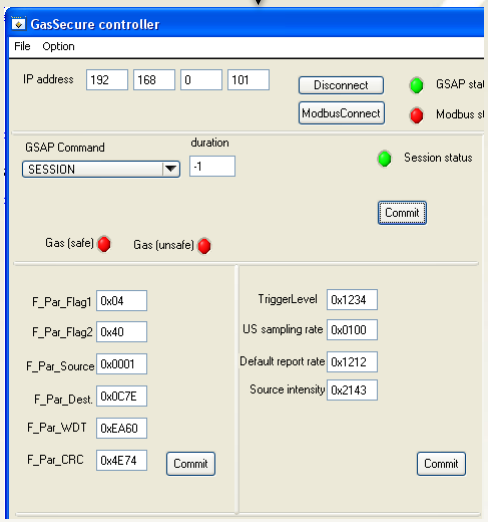
Architecture

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 and protocol tunneling

- 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™

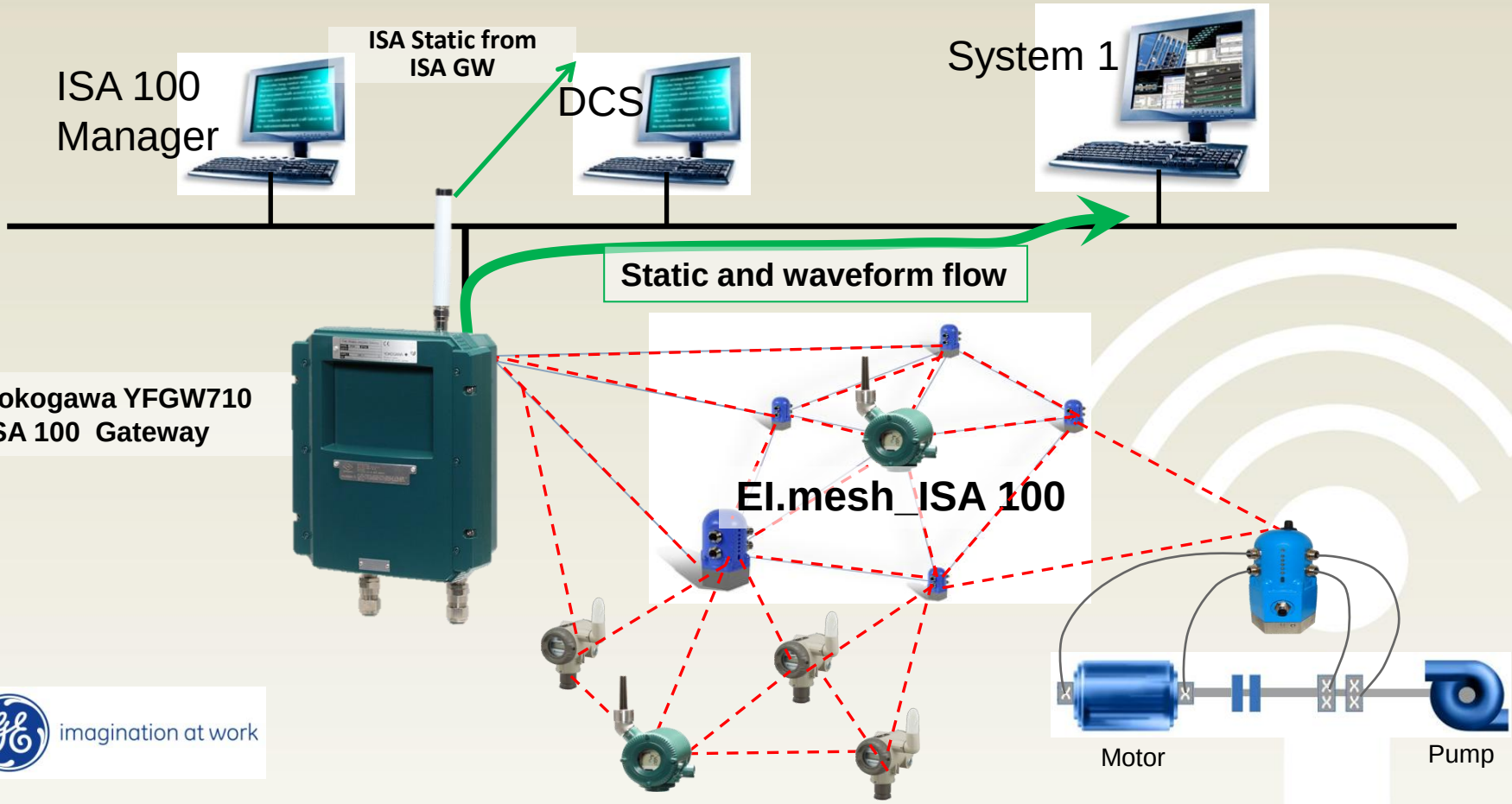
Asset Condition Monitoring

imagination at work

ISA100 Wireless COMPLIANT

El.mesh certified ISA 100

ISA100 Certification

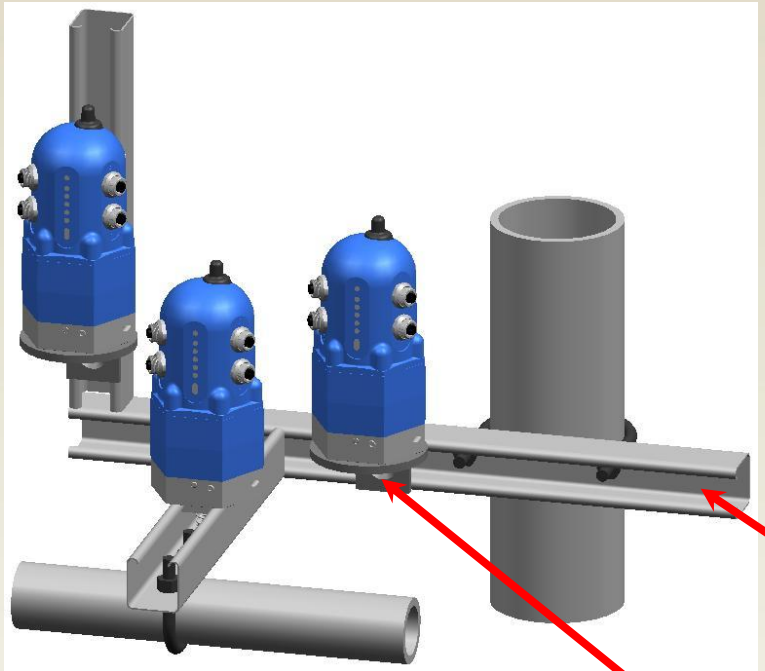


imagination at work

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

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

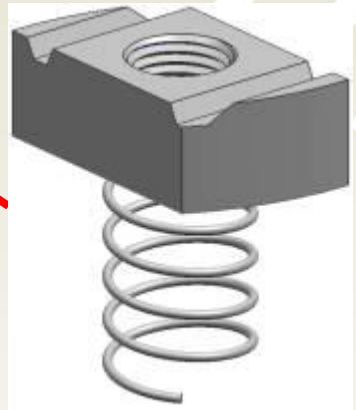
Flexible mounting options



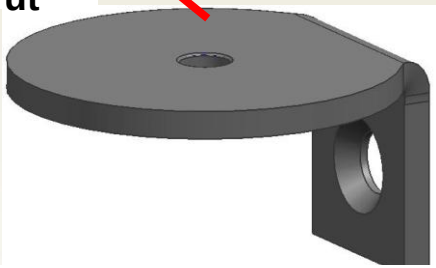
mounting example with Unistrut®

Mounting options:

- Mount for Unistrut ®
- Stud mount
- Magnetic mount



mounting Nut for Unistrut®



mounting Bracket for Unistrut®

imagination at work

4. CDS

Disposable Sensors for Satellite Application (also known as ‘lick and stick’)

Data acquisition with ISA100 Wireless for vibration and thermal tests conducted during satellite AIT (Assembly, Integration and Test) phase of satellite.

ISA100 WCI will be hosting a webinar later in 2015 on this topic.

Topic:
An ISA100 Wireless temperature and vibration sensor system developed for the European Space Agency. Hundreds of sensors initially, then 1,500 or more.

Description:
The system is used on a satellite to collect and transmit temperature and vibration data during its Assembly, Integration and Testing (AIT) phase.

Background: This application of ISA100 Wireless addresses the use-case of **hundreds** of wired sensors (thermocouples and accelerometers) that are required to monitor the behavior of a satellite during thermal, vibration and acoustic tests. The objective is to replace legacy wired sensors with wireless devices aimed at providing the required monitoring functions.

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**

6. Honeywell Enraf Wireless FlexLine Level Sensor

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.

Key Drivers of ISA100 Wireless Popularity

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

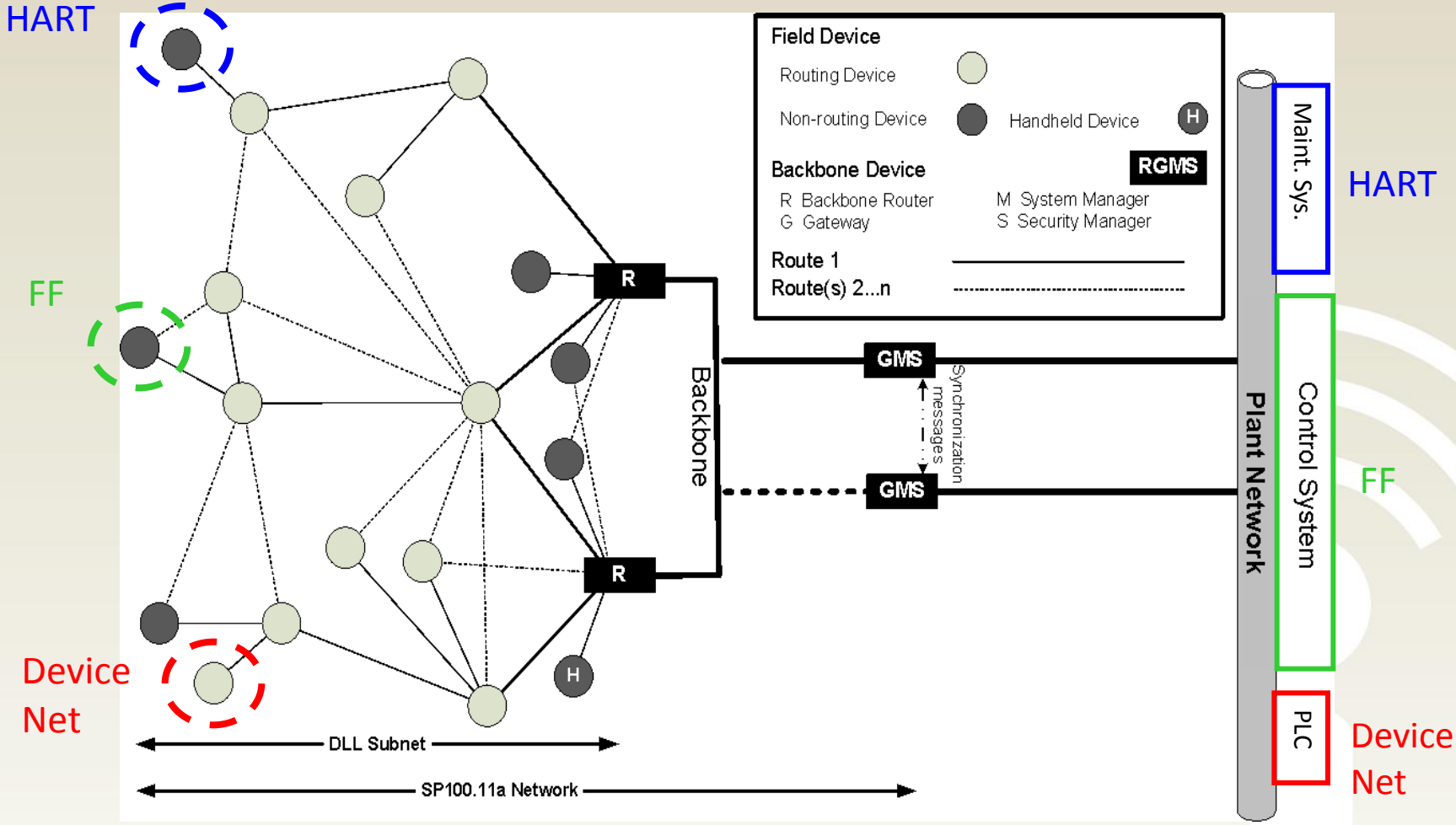
- ISA100 Wireless CONTRACTS (QoS)
  - Gives guaranteed (if no packet loss) time of packet delivery
  - Publish
  - Client/Server
  - **Bi-directional**

- 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 any network topologies (nodes do not have to be routers)
- Native IPv6 6loWPAN
- Duo-cast
- 128 bit AES
- PKI
- Tunneling
- Many applications in one infrastructure – no regretted investments

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 included 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.

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)

Summary

1. IPv6
2. Duo-cast
3. QOS / Contracts
4. Layered Architecture
5. Any protocol

No regretted investments

Questions?

To review a recording of this and other webinars go to our website.
www.isa100wci.org