ISA100 WCI Webinar

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ISA100 Wireless for unified process control and SIL2 detection in a wireless network.

Presenter:

Dräger

Ådne Baer-Olsen
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About the Speaker

Ådne Baer-Olsen

Business Develop Manager MEA
Draeger AG

Ådne has almost 20 years' in the Detection and automation industry and is regarded as a specialist in his field. He has been instrumental to the rise of wireless gas detection systems. His team designed and delivering the first Wireless SIL2 gas detection system in the world offshore Norway. Also as part of Drager suppling the first wireless systems to the Middle East and Africa

Among his significant positions, Ådne has is the Leader of WCI in Europe and Middle East promoting ISA100. Providing invaluable support, training, and expertise to major oil and gas operators
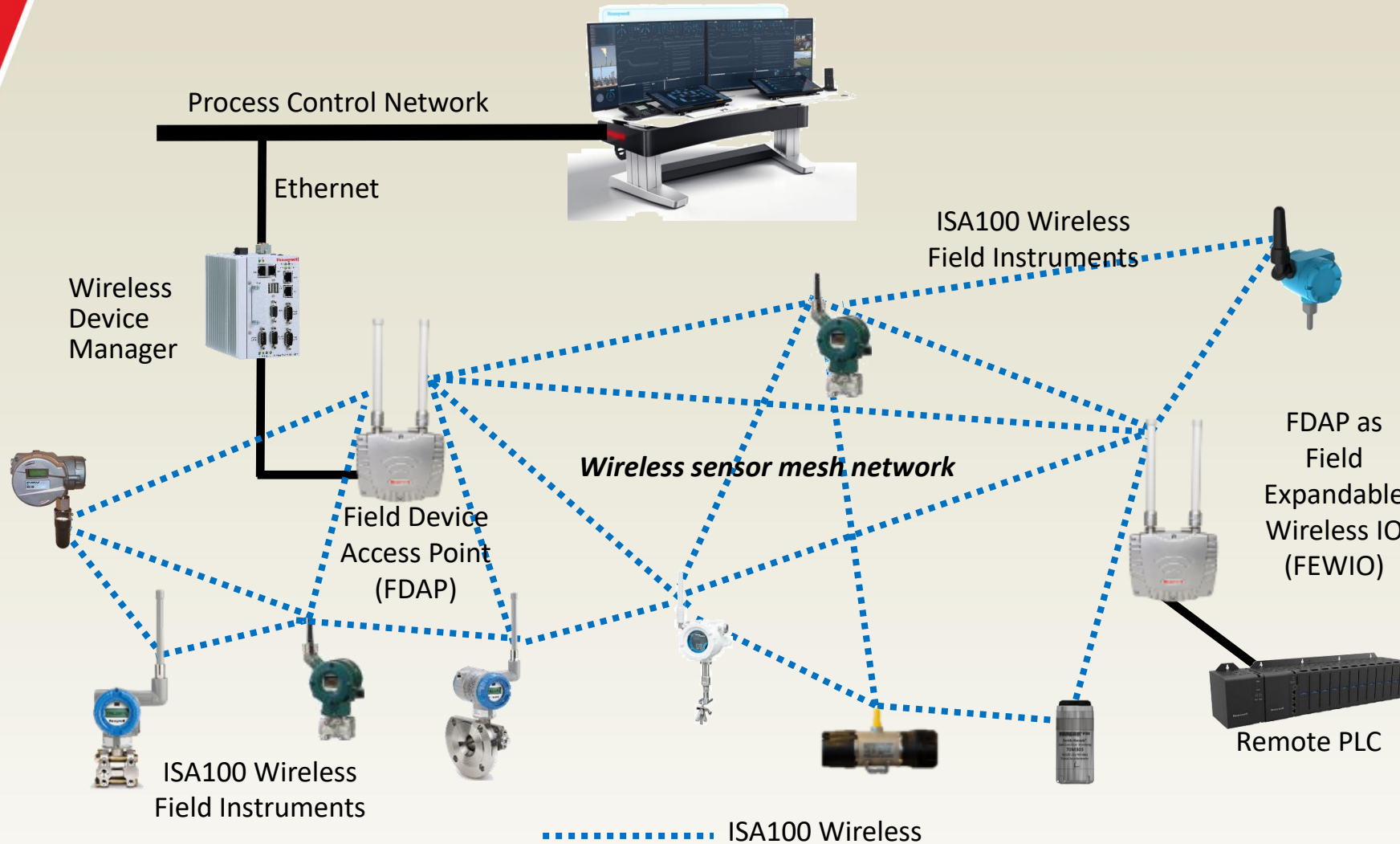
Agenda

Dräger

Introduction to Industrial Wireless

Process Control Network

Ethernet

Wireless Device Manager

Field Device Access Point (FDAP)

Wireless sensor mesh network

ISA100 Wireless Field Instruments

ISA100 Wireless Field Instruments

FDAP as Field Expandable Wireless IO (FEWIO)

Remote PLC

········· ISA100 Wireless

Applications examples
- Machine health monitoring
- Basic process control
- Monitoring of well heads
- Remote process monitoring
- Leak detection monitoring
- Diagnosis of field devices
- Condition monitoring of equipment
- Environmental monitoring
- Tank level monitoring
- Gas detection
- Fuel tank gauging
- Steam trap monitoring
- Open loop control
- Stranded data capture
- And more

ISA100 Wireless Fast Facts

- International standard IEC 62734 since 2014

- Complies with ETSI EN 300 320 v1.8.1 (LBT)

- End-User Driven Standard - meeting all current and future industrial needs

- Sensor routing or field routers for best performance – Freedom of choice

- Broad Multi-Vendor Portfolio of ISA100 Wireless Devices

- ISA100 Wireless enables SIL-2 Certification

- Ensured Interoperability - best-in-class solutions from best-in-class suppliers

- Readily available ISA100 Wireless Modules and Stacks

- Enable fast-track development and go to market

Benefits of ISA100 Wireless Instrumentation

Cost Savings	• Up to 90% of installed cos of conventional measurement technology can be for cable conduit and related construction • Typically: 1/2 the costs, 1/5 of the time • New and scaled applications are now economically feasible
Improved Reliability	• Wired sensors may be prone to failure in difficult environment • Wireless can add redundancy to a wired solution
Improved Visibility	• Condition monitoring of secondary and remote equipment • Process monitoring, fast additional data for trouble shooting
Improved Control	• Add wireless to existing processes for more optimal control
Improved Safety	• Safety related alarms - end to end SIL2 certifiable

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ISA100 Wireless Product Portfolio

Infrastructure

Independent Gateway
- Honeywell, Yokogawa

Access Point (AP)
- Honeywell, Yokogawa

Integrated Gateway/AP
- Honeywell, Yokogawa, CDS, Nexcom

GW/AP + Recorder
- Yokogawa

Adapter (HART, etc.)
- Honeywell, Yokogawa

Measurement & Control

Temperature
- Honeywell, Yokogawa

Pressure / Flow
- Honeywell, Yokogawa

Level
- Honeywell, Yokogawa

DI/DO, AI
- Honeywell, Yokogawa

Valve Position
- Eltav, Flowserve, Honeywell

HSE + Life cycle

Corrosion
- RCS , Honeywell

Steam Trap
- Spirax Sarco, TLV, Armstrong, Bitherm

Vibration
- GE's Bently Nevada, Divigraph

Gas
- GasSecure, Scott Safety, New Cosmos, Riken Keiki

pH
- Honeywell, Yokogawa

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Agenda

1. Introduction Industrial Wireless

2. ISA100 Wireless Industry Standard

3. Cyber security

4. Reliability

5. Scalability

6. Multiprotocol communication

7. Safety/ control application

8. Case Study

9. Summary

Cyber Security?

This is generally an high concern for end users

ISA100 Wireless has 128bit AES encryption

- 64-bit keys have about a million trillion possible keys. Max speed brute attack today would take about a second
- 128-bit keys might seem vulnerable in that respect only being twice the number of 64-bit

- Not so fast. There are around 32 million seconds in a year. 32 million is 25 doublings.

- So if you can crack a 64-bit key in a second it will take a year for an 89-bit key (64 + 25). A million is 20 doublings, so an 109-bit key will take a million years

Key Size	Possible combinations
1-bit	2
2-bit	4
4-bit	16
8-bit	256
16-bit	65536
32-bit	4.2×10^9
56-bit (DES)	7.2×10^{16}
64-bit	1.8×10^{19}
128-bit (AES)	3.4×10^{38}
192-bit (AES)	6.2×10^{57}
256-bit (AES)	1.1×10^{77}

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Moore's law

Moore's law says that computers get twice as fast every 2 years
In cryptography terms that means that advances in computer power will give you one extra bit every two years. That is, if you can crack a 64-bit key in a second this year, you should be able to crack a 65-bit key in a second 2 years later.

On that basis increases in computer power would bring the time to crack a
128-key down to one year 78 years from now and 128 years to bring it down to a second.

Given that our conservative estimates are orders of magnitude better than what can actually be done, we can conclude that 128 bit encryption is absolutely safe for the rest of the century from known technology.

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Bottom line

With 128-bit AES encryption you can relax — there are other things much more serious to worry about.

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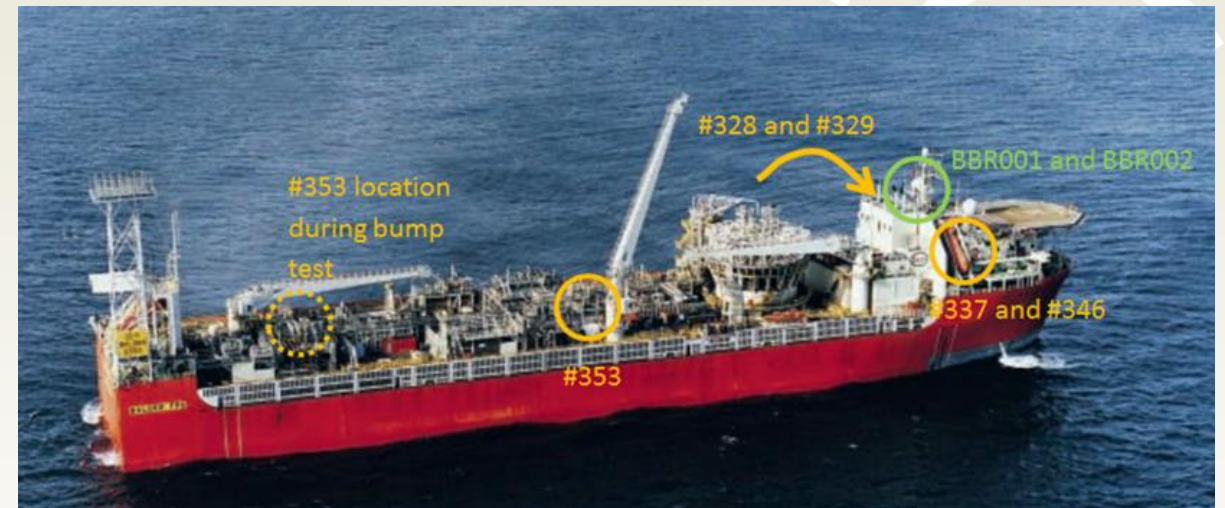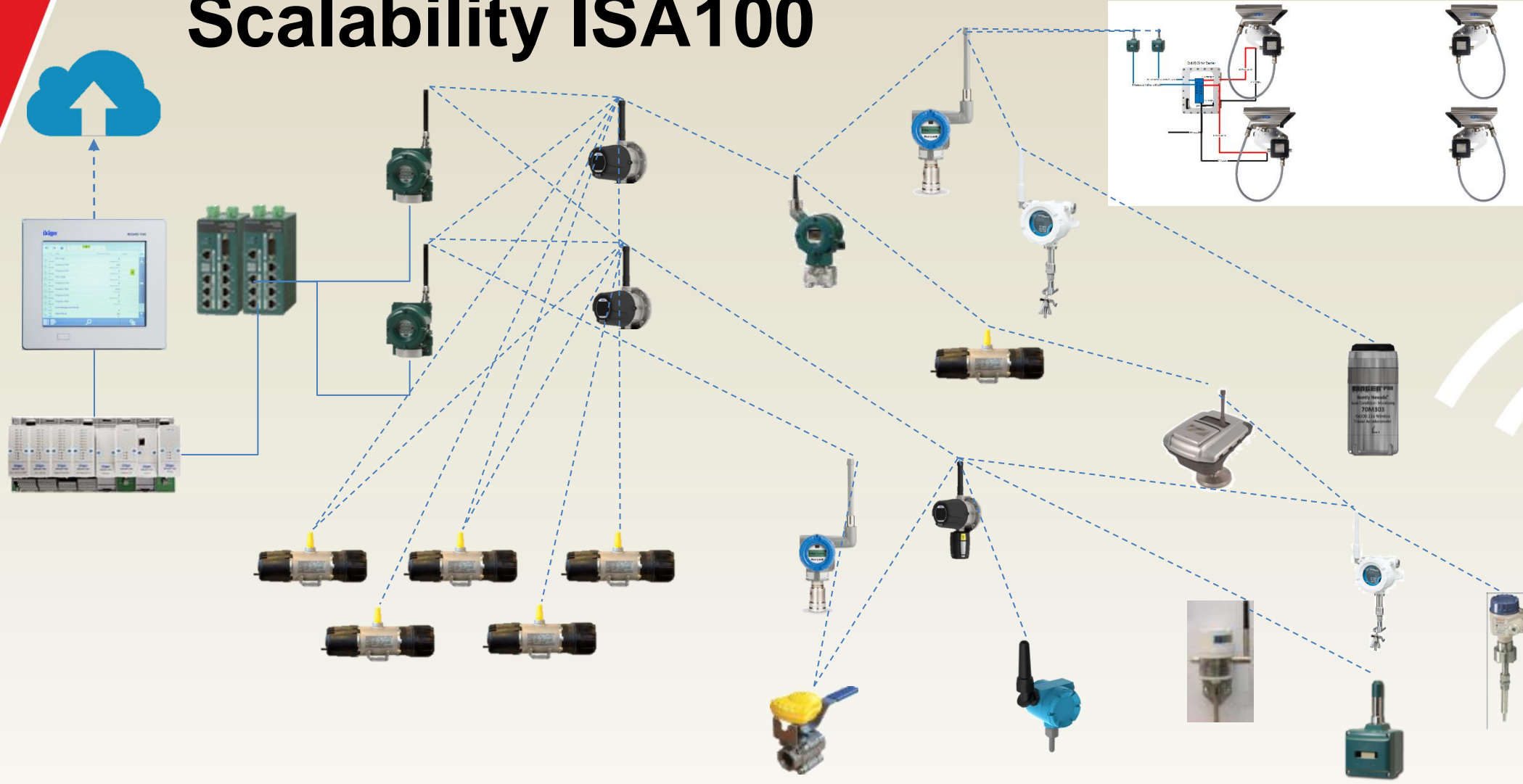
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Reliability

- Small amount of date maybe 2mb pr month
- Flexible communication Mesh, STAR and a combination of the two
- Holistically ground up design
- ISA compliance certification

- Clear channel assement
- Redundant communication paths

Jamming

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ISA100 Wireless IoT Network Architecture
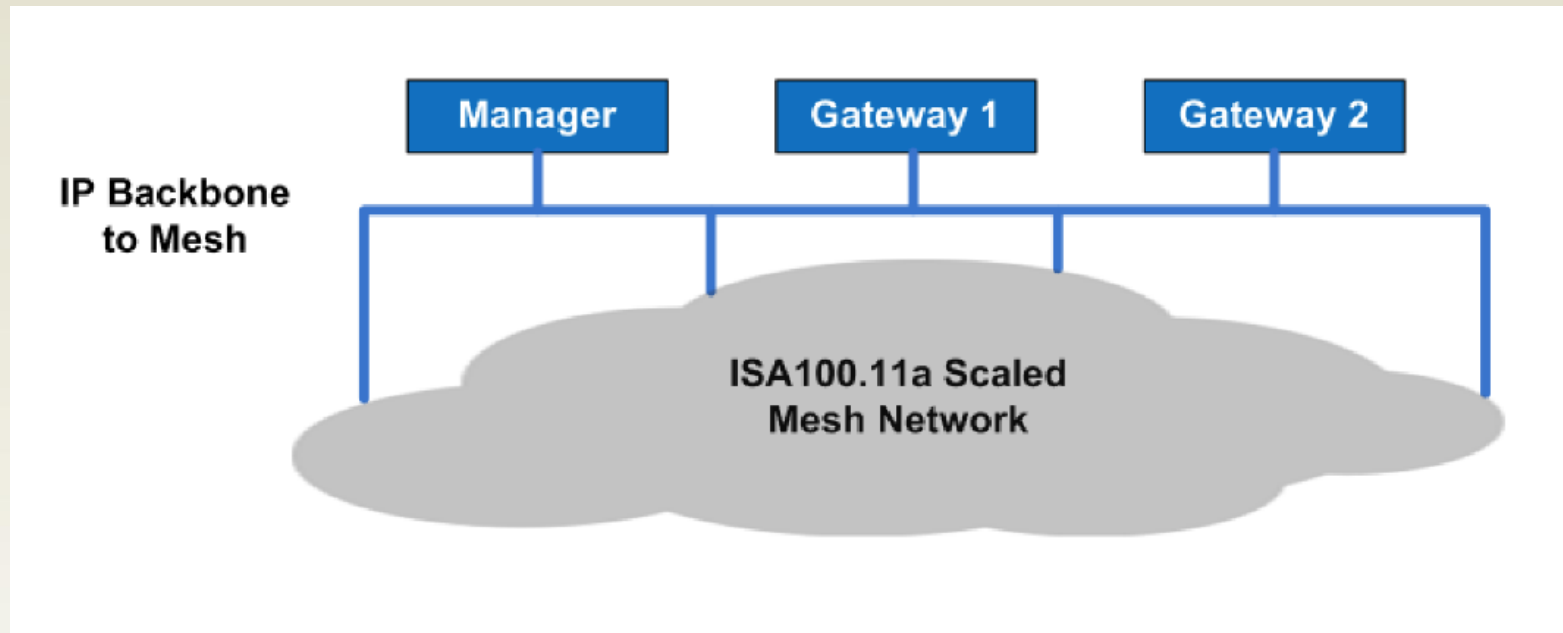
Plant-Wide Network
Scale through IP

Scalability ISA100
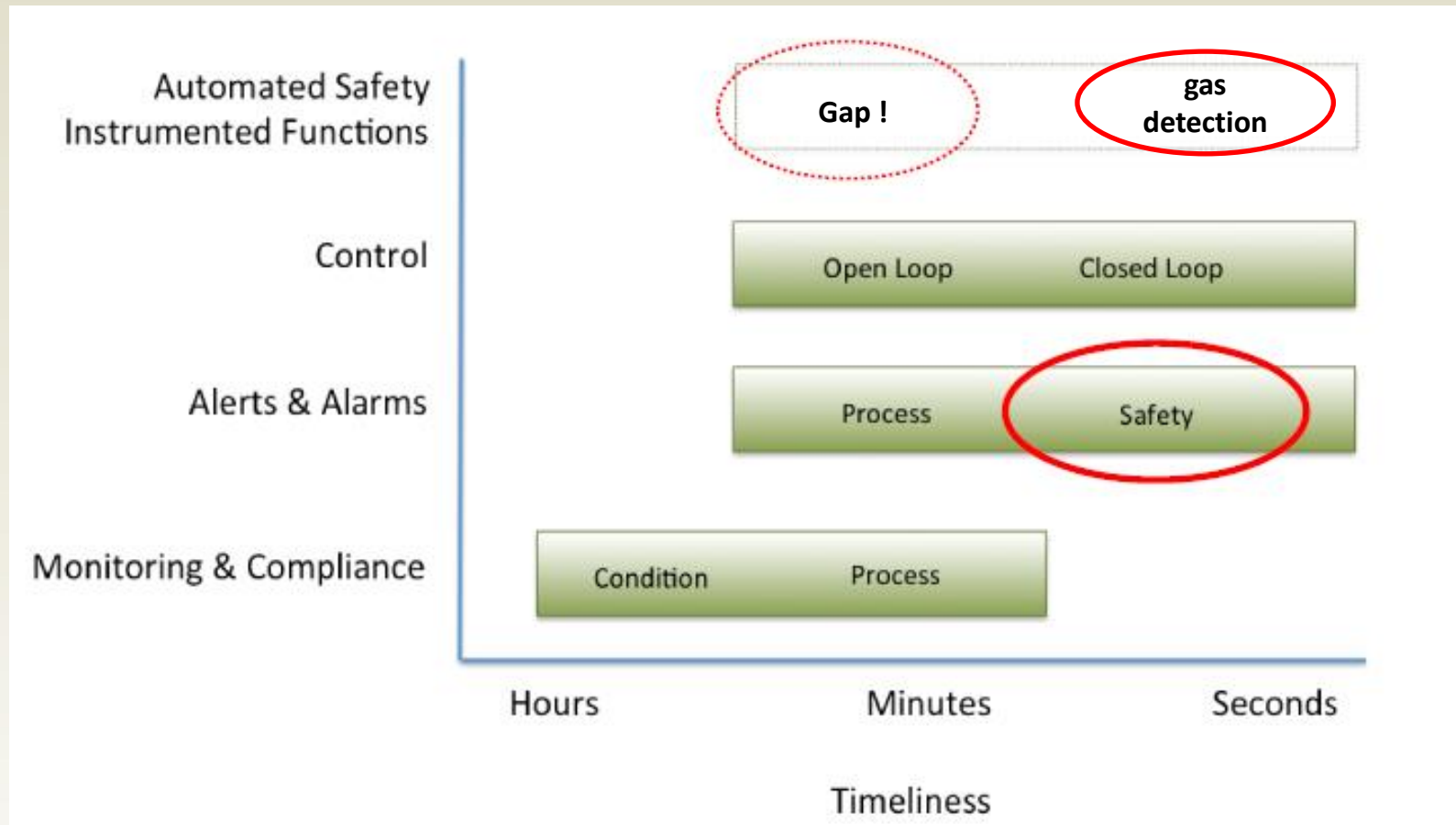
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Multi protocol communication

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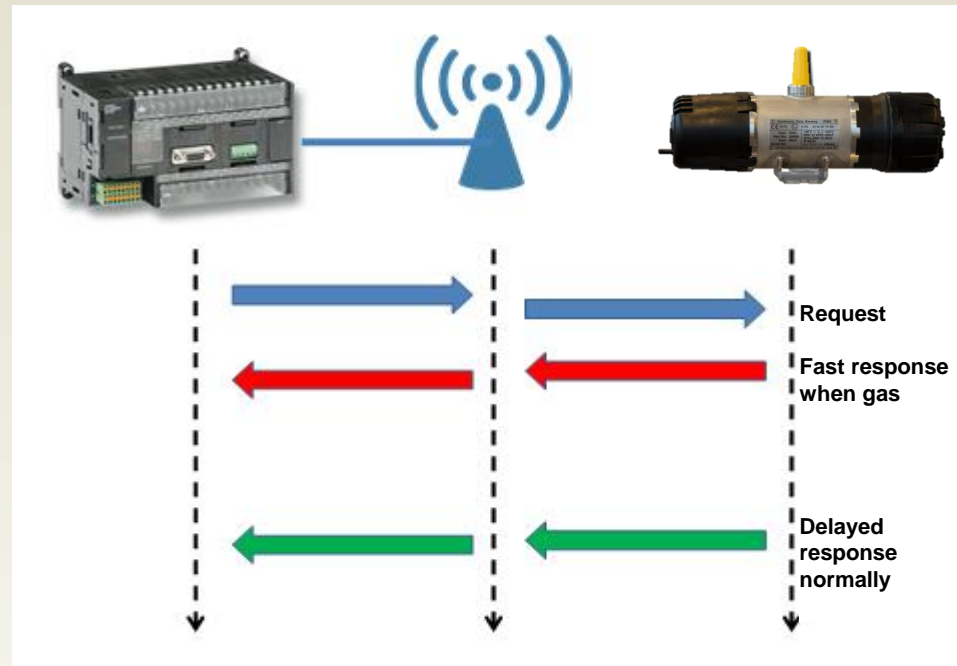7. Safety/ control application

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Safety/ control application

SIL Installations

- Cyclic communication, request initiated from controller

- Request must be answered within "process safety time"

- Detector "armed" with safe downlink packet

- Response delayed when no gas is present, but instantly when gas detected

- This will be part of the SIF for the system

SAFE WIRELESS™

Request

Fast response when gas

Delayed response normally

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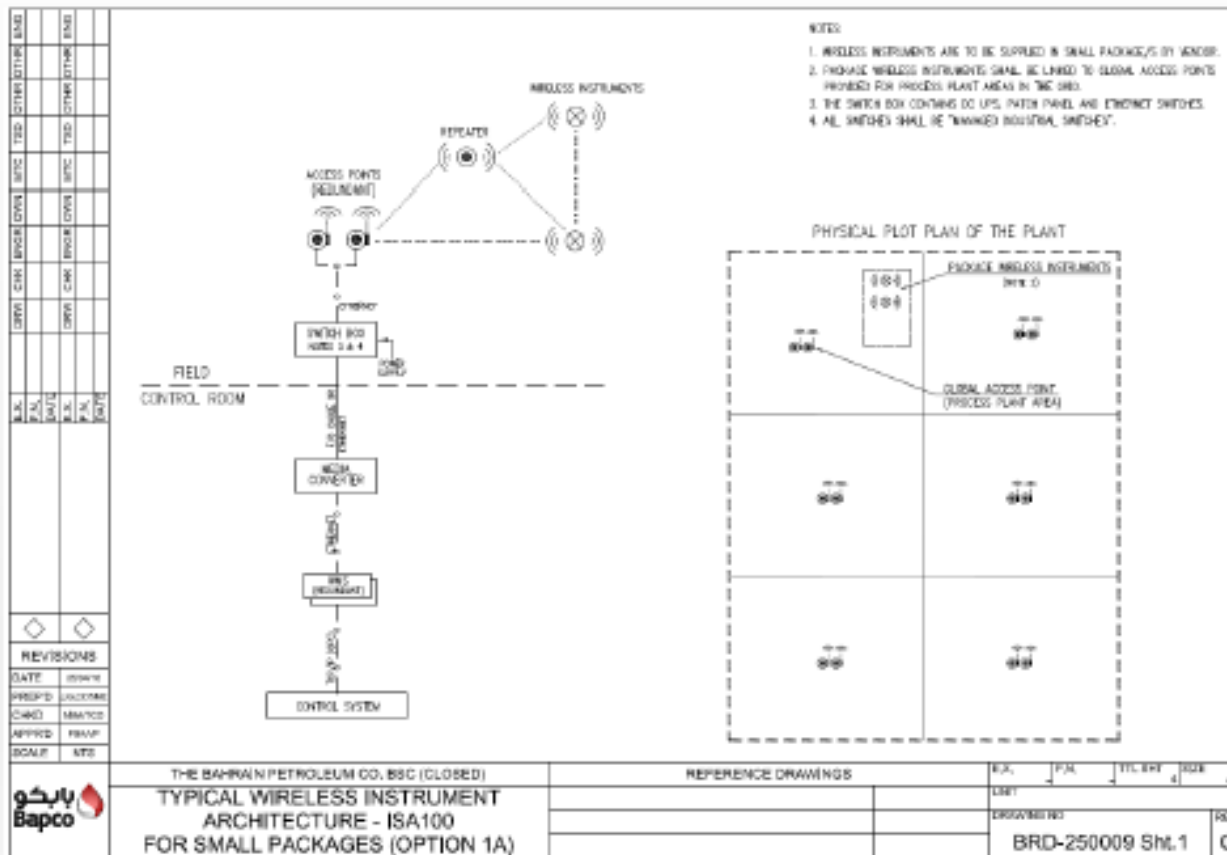
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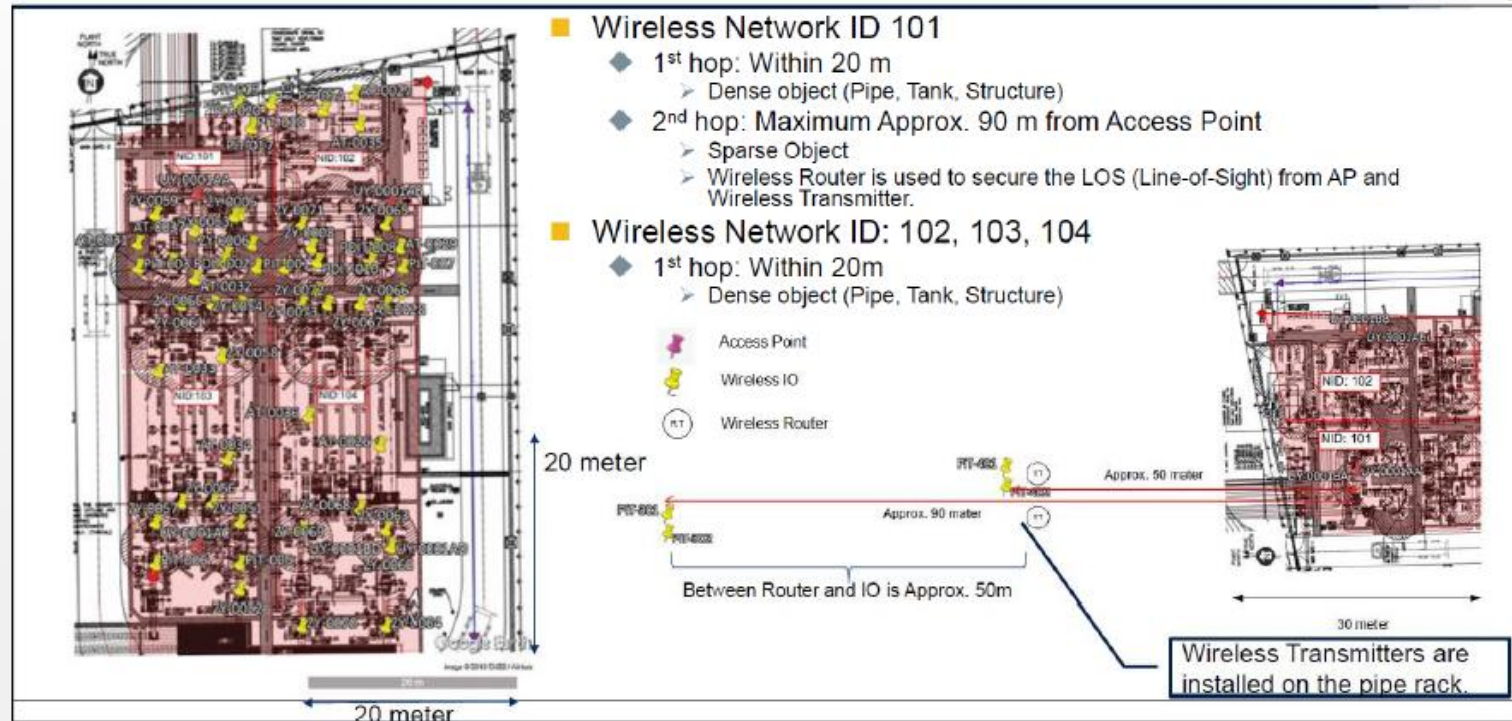# ALBA Station
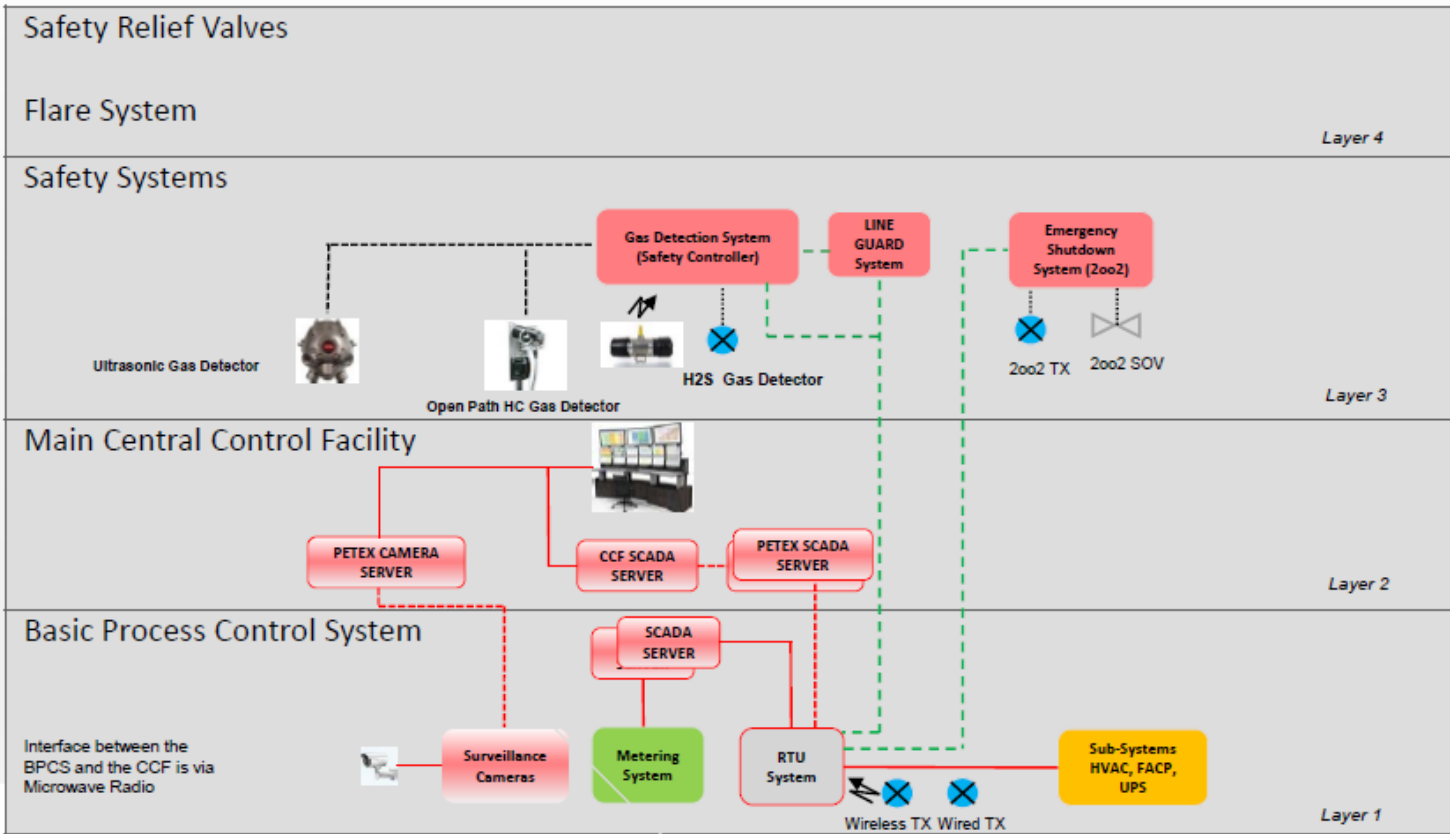

Cellular Concept for Small Packages – Device Wireless

ALBA Station

ALBA Station

SAFETY & RELIABILITY IN ENGINEERING DESIGN

Wrap-up

1. Introduction Industrial Wireless

2. ISA100 Wireless Industry Standard

3. Technology for wireless gas detection

4. System Architecture

5. SIL Certification and Safety Function

6. SafeWireless and PROFIsafe

7. Fault Tolerant Wireless Network

8. Case Study

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ISA100 Wireless Adoption Development Eco-system

WCI ISA100 Wireless Rapid Development Kit

- Everything you need to develop an ISA100 Wireless (IEC 62734) connected field instrument
- Develop ISA100 Wireless (IEC 62734) compliant and certifiable field instruments with minimal effort using application layer code provided
- Includes reference hardware design for ISA100 Wireless (IEC 62734) field instrument implementation
- Certified WISA modules run ISA100 Wireless communication stack
- User friendly SPiN development board includes OLED display and a large variety of sensors

https://centerotech.com/product/wci-isa100-rapid-development-kit/

Online Resources

ISA 100 WIRELESS **www.isa100wci.org**

- Learning Center with White Papers
- Articles, End-user stories, Forum
- Receiving over 20,000 web views per month
- Full list of certified/registered ISA100 Wireless devices
- And more useful content for you and your business

Linked in **ISA100 Wireless Interest Group**

- Latest news, end-user and expert discussions, insights
- 1100 members and growing; please join and invite your peers to join as well !
- Receiving over 5,000 web views per month
- Limited Time Offer: Join the group and you will be entered in a prize draw to win a new iPad

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ISA100 Wireless Linked in Interest Group

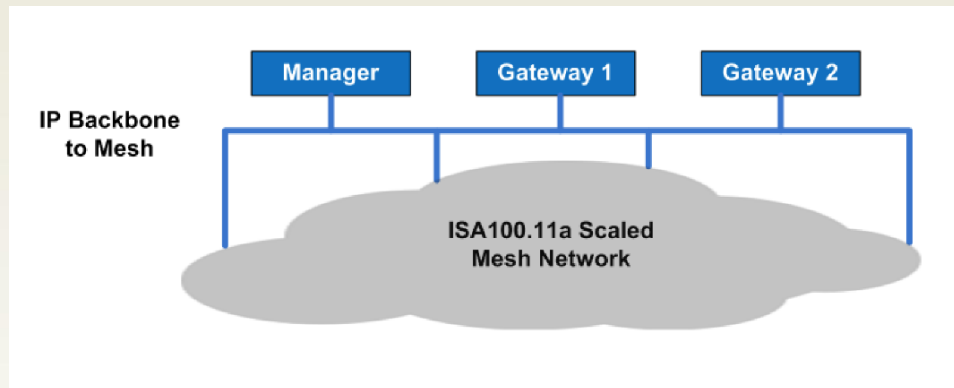## Limited Time Promotion

SCAN ME

Scan the QR code and join the ISA100 Wireless Linkedin group. **If you join during our limited time offer**, you will be entered in a prize draw to win a new iPad!

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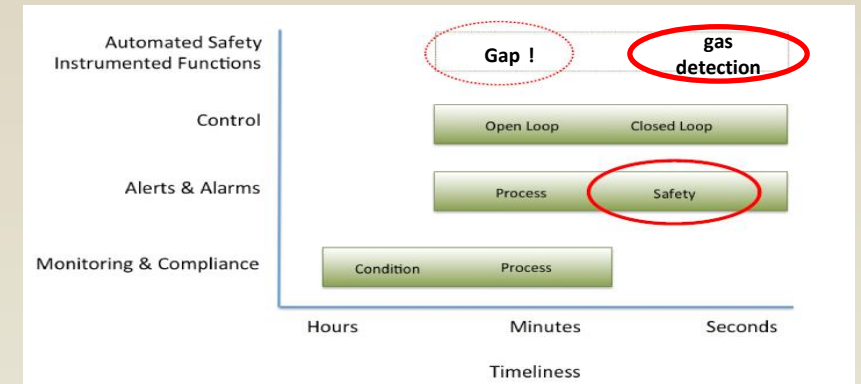
THANK YOU

For Your Attention!

Questions?

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