ISA100 WCI Webinar

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Cybersecurity Defenses Built into ISA100 Wireless

Presenter:

Dräger

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About the Speaker

Ådne Baer-Olsen

Global BDM Lead Wireless safety
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. Currently he is globally responsible for all wireless safety systems within Dräger.
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

About the Speaker

David Kean

Project Engineer Wireless safety
Draeger SCB

David Kean joined Draeger in 2017. In his position as wireless field engineer, he has been involved in system design, testing, installation and commissioning of all UK fixed wireless systems.

Currently studying for a masters degree in cyber security.

In previous roles he was heavily involved in industrial IT infrastructure as a communications engineer, specialising in wireless communication.
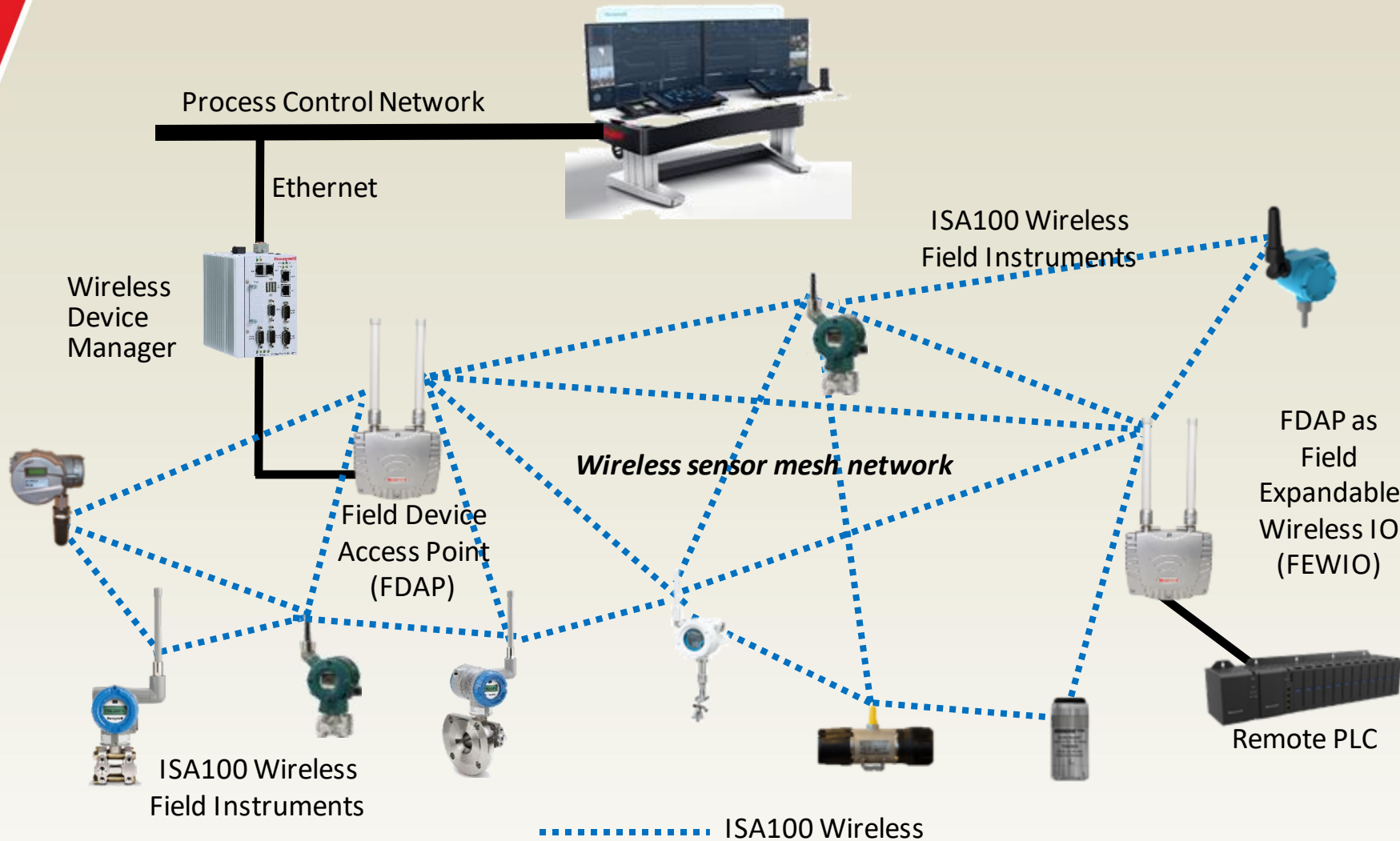
Dräger

Agenda

1. ISA100 Introduction

2. Technical features

3. Security Features

4. Defense

5. Case Study

ISA100 Introduction

Process Control Network

Ethernet

Wireless Device Manager

Field Device Access Point (FDAP)

ISA100 Wireless Field Instruments

Wireless sensor mesh network

FDAP as Field Expandable Wireless IO (FEWIO)

Remote PLC

ISA100 Wireless Field Instruments

• • • • • • • • 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

ISA100 WIRELESS COMPLIANCE INSTITUTE™

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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Technical Features of the ISA100.11a Standard

The ISA100.11a is an industrial wireless standard which was developed based on the requirements of users in automation areas. It can be summarised in the following three technical features:

A network standard applicable to a wide range of circumstances, covering monitoring applications to control applications, which features highly reliable and time deterministic communications, and high-level security technologies.

Superior network expandability, owing to open wireless mesh networks (2.4 GHz/IEEE802.15.4) ensuring the interoperability of devices from different vendors and IPv6-based backbone routing.

An object-oriented application layer equipped with flexibility and expandability which can implement various use cases to satisfy users' requirements. Existing protocols can be used through the tunneling protocol, and analog and binary input function blocks in the ISA100.11a native mode are also supported.

Security Features

ISA100 wireless protocol offers several security benefits that make it suitable for industrial automation and control systems.

Here are some key security features:

Encryption

Authentication
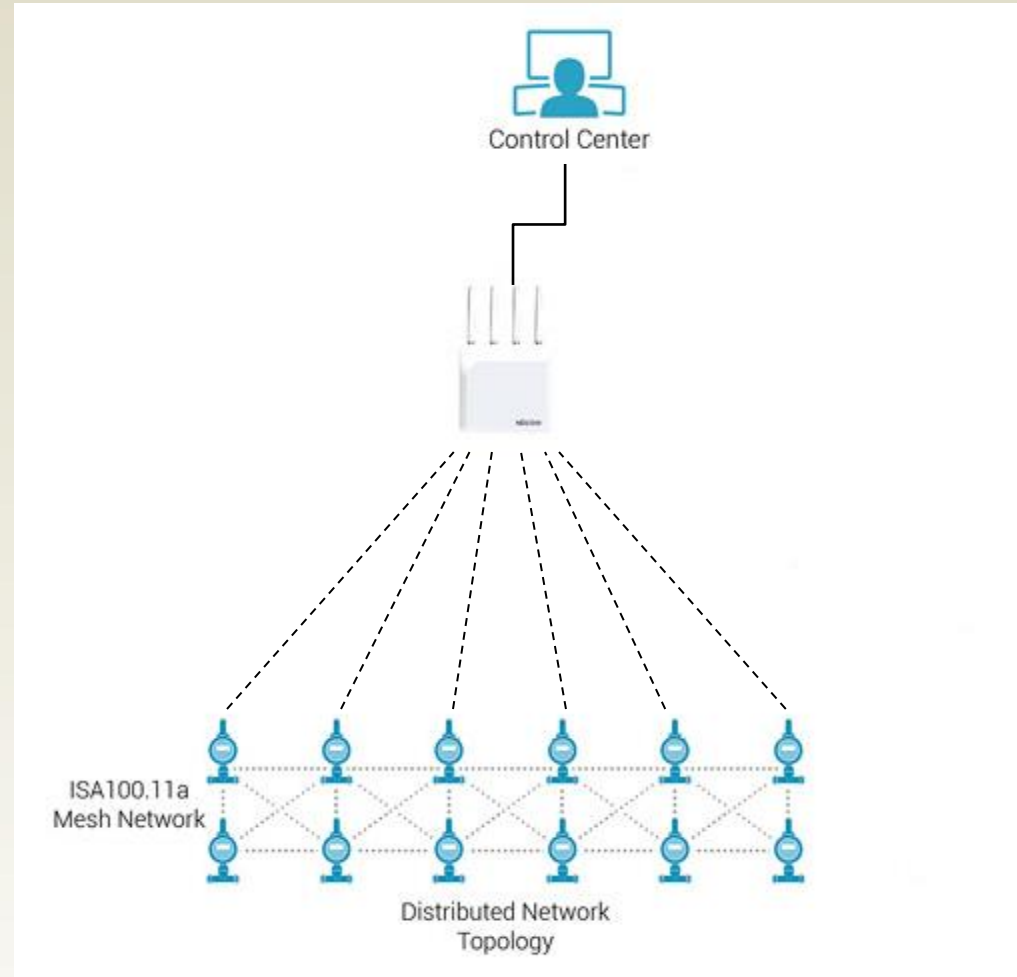
Integrity Protection

Key Management

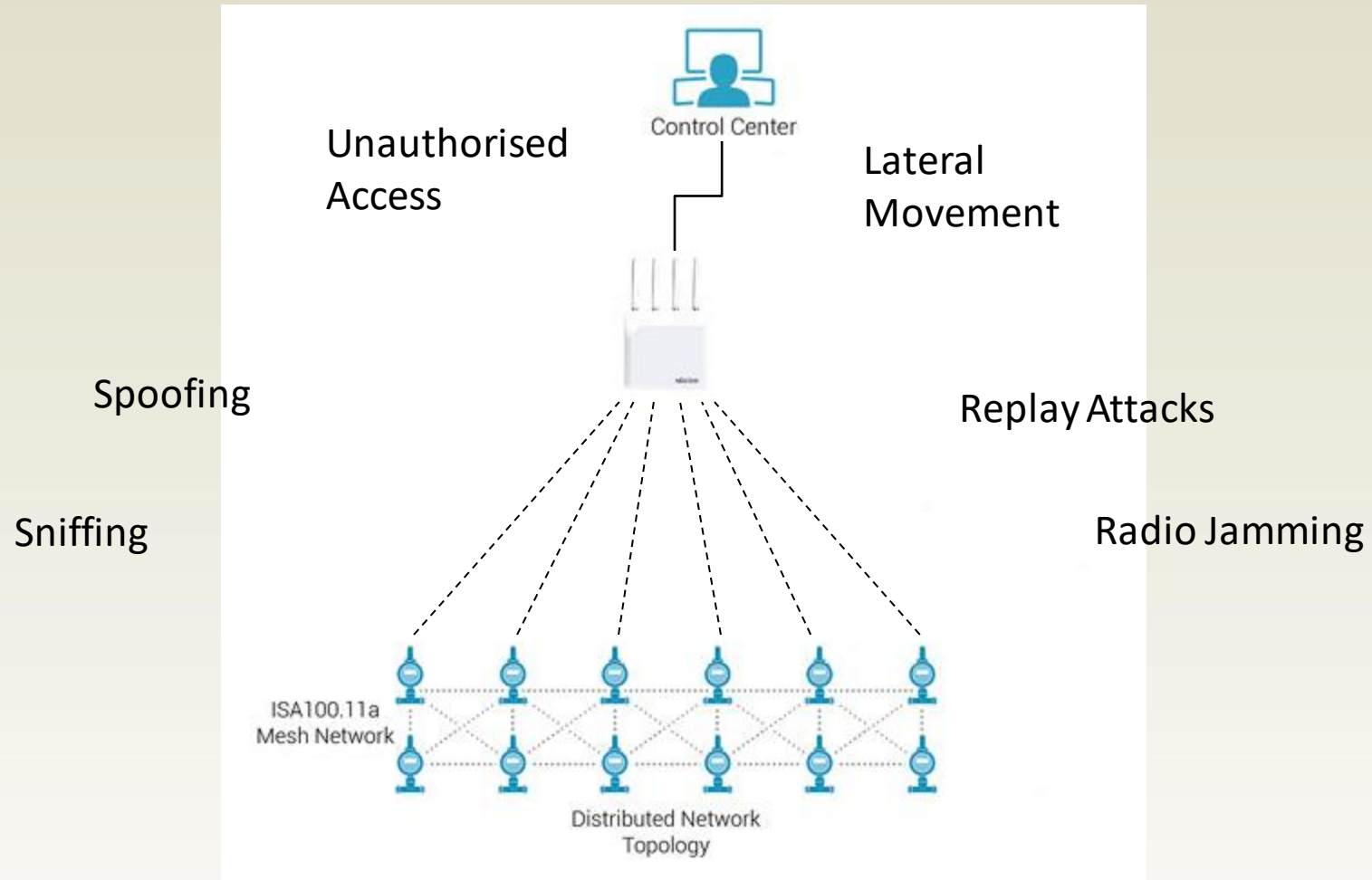Secure Bootstrapping

Wireless Intrusion Detection System (WIDS)

Time Synchronization

Network Segmentation

Defense
Typical installation

Potential Threats

Unauthorised Access

Lateral Movement

Spoofing

Replay Attacks

Sniffing

Radio Jamming

Control Center

ISA100.11a
Mesh Network

Distributed Network
Topology

Defense

OT Network

Control Center

Unauthorised Access
- Access Control

Lateral Movement
- Segmentation

Spoofing
- WIDS

Replay Attacks
- Time Synchronisation

Sniffing
- Encryption

Radio Jamming
- Channel Hopping

ISA100.11a Mesh Network

Distributed Network Topology

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Security functions of ISA100

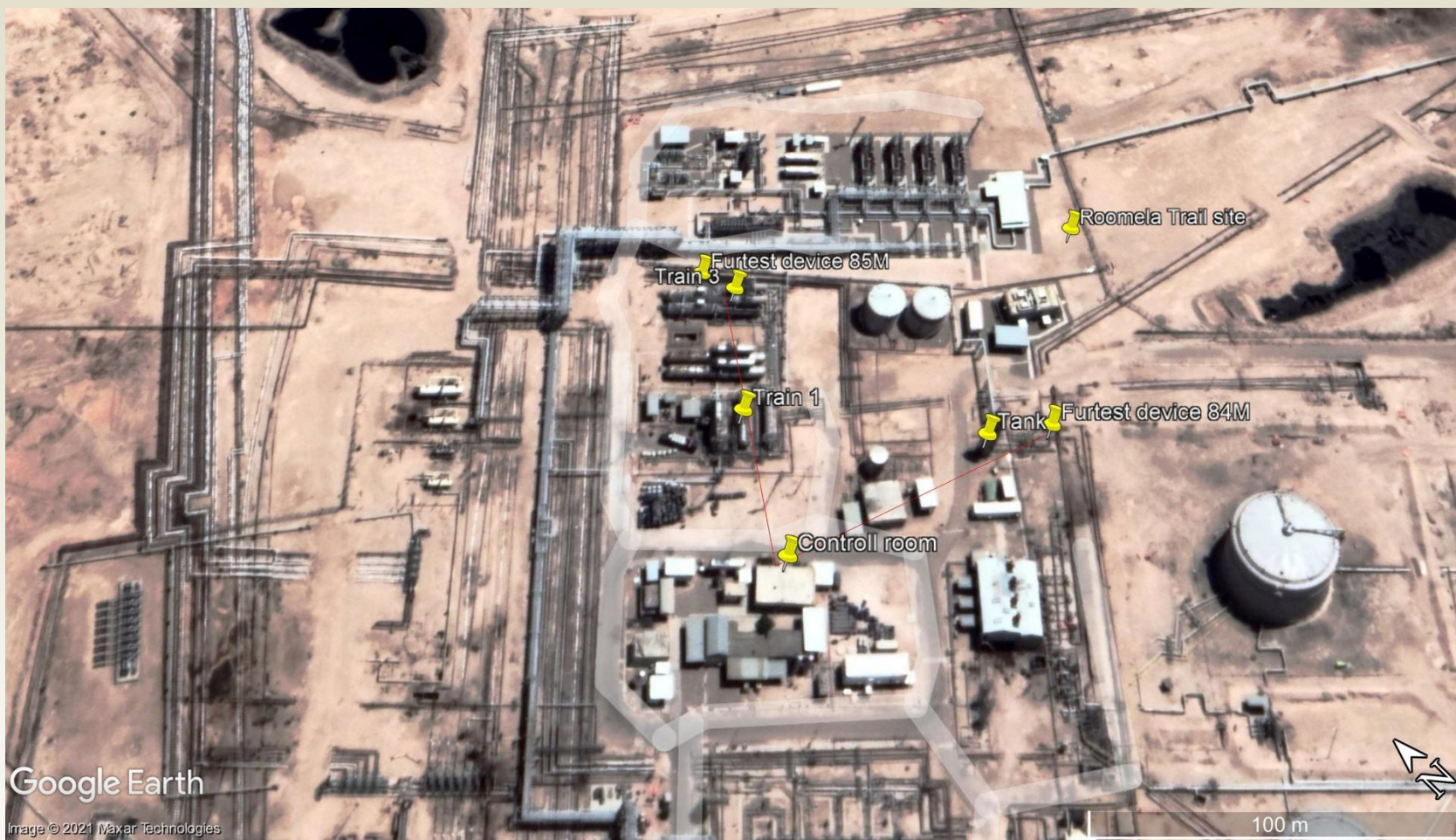| Wireless Defence	Wireless Threats			
	Data Sniffing	Data Delay / Replay	Data Falsification	Data Spoofing
Data Encryption	Secure	Not Secure	Not Secure	Not Secure
Device Authentication	Secure	Not Secure	Secure	Secure
Data Authentication	Secure	Secure	Secure	Secure
Data Freshness	Not Secure	Secure	Not Secure	Not Secure

Communication

Detector   Accesspoint   Gateway   Safety Controller   Control room

ISA 100.11a   Modbus/OPC   «Everyone»

PROFINET   ABB

PROFIsafe   Siemens

HIMA   SIL2

Yokogawa

Phoenix

Can combine with other ISA100
supported instruments.
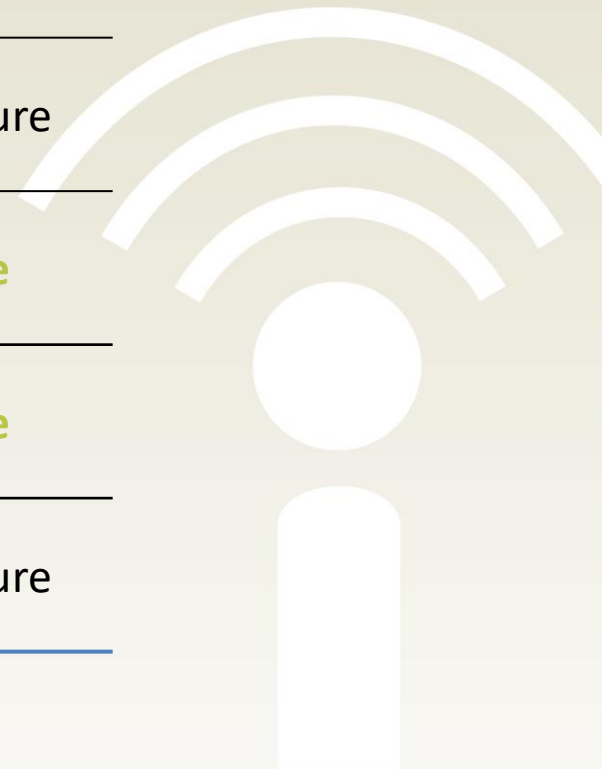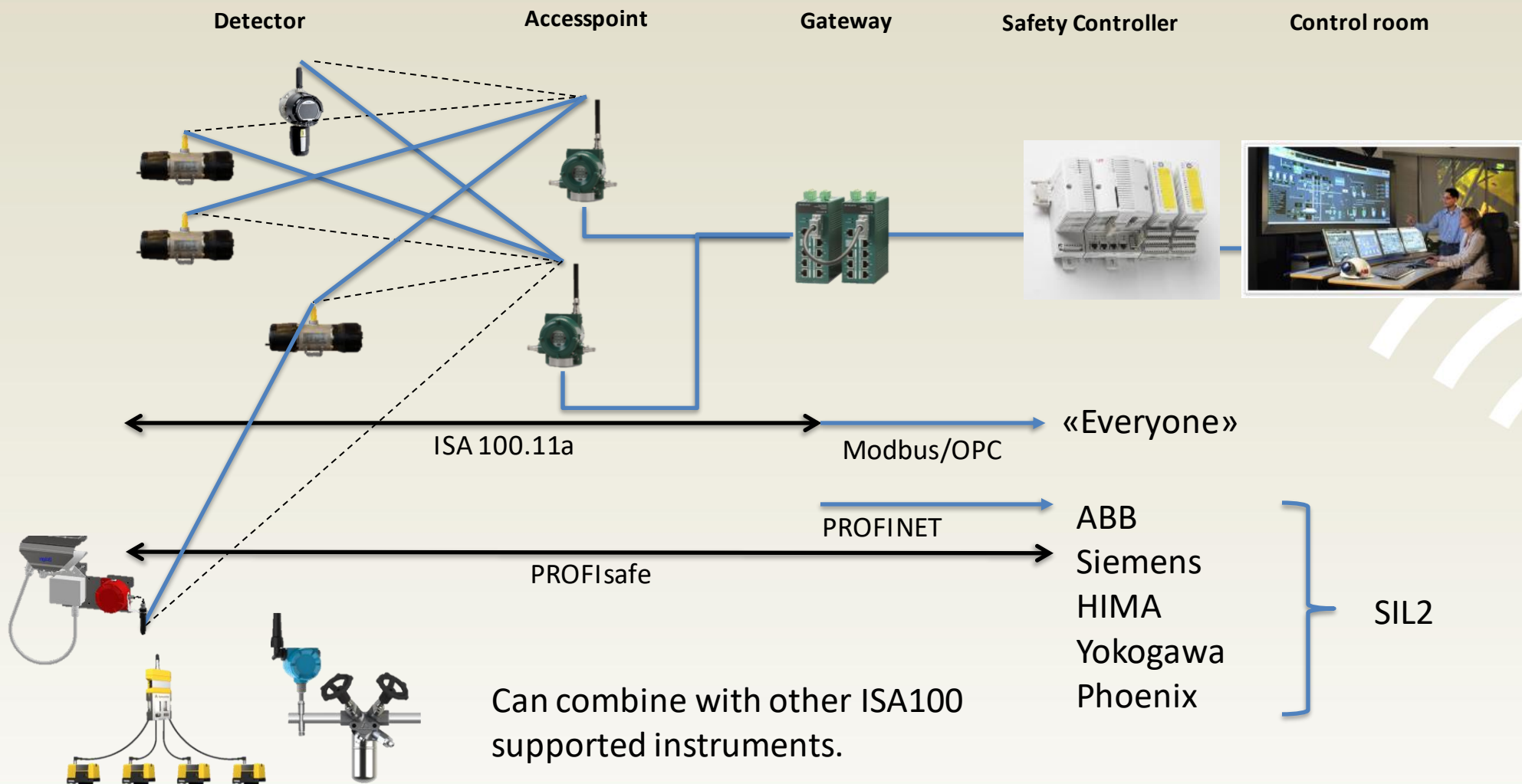
Case study

Requirement for fast deployment

Wireless Gas Detectors   Access Point   Control System

* Optional mobile radio antenna for remote access

Cyberceurity penetration test

Scope of the test:
- Intercepting, decrypting and or tampering with ISA100 signals
- Sending fake device messages (Replay attacks)
- Disrupting communication with Jamming
- Spoofing

After successful Trial

Battery Powered / Wireless Communication

Locally Powered / Wireless Communication

New Products for Wireless Solutions

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
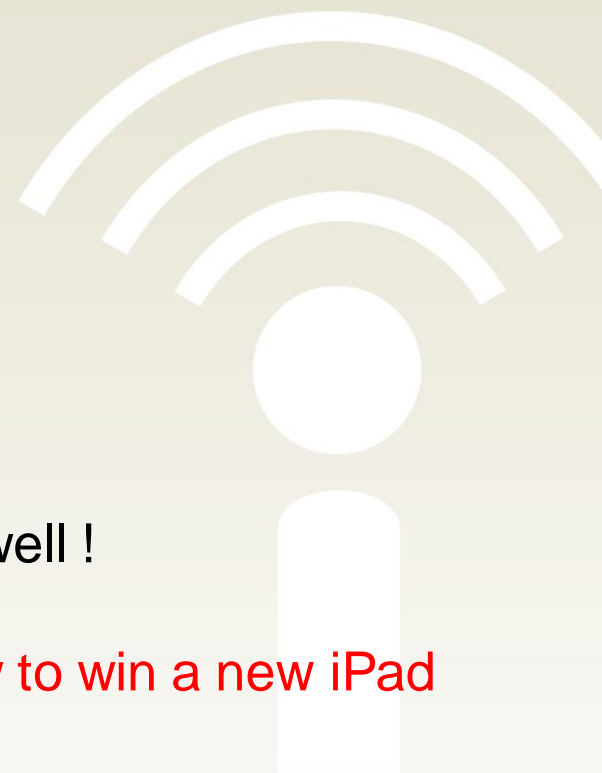- User friendly SPiN development board includes OLED display and a large variety of sensors

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

Online Resources

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

ISA100 Wireless Linked in Interest Group

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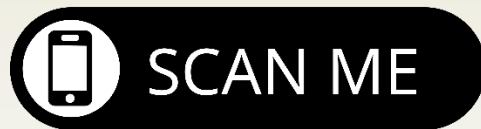
Scan the QR code and join the ISA100 Wireless Linkedin group. **If you join during our limited time offer**, you will be entered in a prize draw to win a new iPad!

SCAN ME

For Your Attention!

THANK YOU

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Questions?

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