OneWireless Multiprotocol Network and Solutions

Diederik Mols
Thursday October 4, 2018
Agenda

• Introduction
• Multiprotocol Wireless I/O & System
• Sensor portfolio
• Applications
• Use cases
• Summary
• OneWireless @ EMEA HUG
• Q&A
Typical Needs and Challenges in the Industry

• HSE Compliancy
• Improve
  - workforce efficiency
  - productivity
  - asset availability
• Reliable, cyber secure infrastructure
• Fast and cost-effective commissioning
• Tight budgets to execute projects
Introduction to industrial Wireless

Application 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
• Safety shower monitoring
• And more

Wireless typically is a Cost Efficient way to connect Field Instruments
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OneWireless™ Network – Multiprotocol Wireless I/O & System

Delivering More Value on CAPEX and Future Expansion

No Hardware Change!

Software Innovation

Field Upgradable!

Up to 25% More Cost Effective relative to Separate Networks!

Up to 50% More Cost Effective relative to Separate Networks!
Latest innovations of OneWireless R310 (2018)

• Wireless Device Manager (WDM) enhanced Capacity & Performance
  - 500 devices @ >= 4 / 5 secs / 200 devices @ 1 secs / 100 devices @ 0.5 secs
  - ISA100 Publish Rates – 0.5, 1, 2, 5, 10, 30 secs, 1, 15, 30, 60 mins
  - WirelessHART Publish Rates – 0.5, 1, 2, 4, 8, 16, 30 secs, 1, 15, 30, 60 mins

• Field Expandable Wireless IO (FEWIO) - a new device type
  - FDAP as router can be converted to a Field Expandable Wireless IO (FEWIO)
  - Data collected over RS485 & transmitted to control room over wireless
  - FEWIO Supports
    ▪ Modbus RTU
      - RS-485 serial Interface used for connecting to serial interface devices
    ▪ Modbus TCP
Latest innovations of OneWireless R310 (2018)

• Special Interface Network (SIN)
  - Segregate Data From PCN Network – IIOT and Asset Management solutions
  - External Interfaces allowed over SIN – Modbus, Enraf, OPC, GCI, HART

• WirelessHART Over The Air (RE)-Provisioning (Patented Honeywell innovation)
  - WirelessHART devices can be re-provisioned using OTA method (No Handhelds Needed)
  - WirelessHART devices come out of factory having a pre-assigned join key and a pre-assigned network ID
  - Enter device default Join Key as Common Join Key under WDM Property Tab

• WDM User Password Policy enhancement
  - Minimum 8 characters, 1 Uppercase, 1 Lowercase, 1 Numeric, 1 Special Character
Multiprotocol OneWireless Network with FEWIO

- ISA100 Wireless
- WirelessHART
- IEEE Backhaul
- IEEE Wi-Fi

- Managed Switch
- Mobile Station
- Wireless Device Manager
- OneWireless Cisco 1552S Access Point
- Wireless LAN Controller
- Remote PLC
- ConneXt Personal Safety Wireless 4-Gas Monitor
- Wireless Collaboration Camera
- Wireless Intelligent Wearable
- WirelessHART Field Instruments
Multiprotocol OneWireless Network with FEWIO – no Wi-Fi

- ISA100 Wireless
- WirelessHART

FDAP as an Access Point

FDAP as a Router

ISA100 Wireless and WirelessHART Field Instruments

Managed Switch

Wireless Device Manager

Remote PLC

Managed Switch
Just a sensor mesh network versus ....... OneWireless

Sensor mesh network

Transmitter

Transmitter

Transmitter

Transmitter

Transmitter

Gateway

0.5 km

OneWireless

Transmitter

Gateway

Different solution .............. Different performance
OneWireless versus next best alternative (1552S vs 1552WU)

OneWireless Network

- Cisco 1552S
- True redundant mesh connections to multiple access points
- 1 sec updates

SmartWireless Network

- Cisco 1552WU
- No ISA100 Wireless connectivity
- 5 sec updates

Comparisons:

- ISA100 Wireless
- WirelessHART
- IEEE Backhaul
- IEEE Wi-Fi

Networks:
- Network 1
- Network 2
- Network 3

Honeywell SmartWireless Network Overview:

- Islands of sensor mesh networks. If an access point fails, all associated sensors are lost for communication.
OneWireless™ Network – Multiprotocol Wireless I/O & System

- Native integration into Experion DCS
- Cyber Secure in every aspect
- End to end redundant
- Scalable to thousands of wireless IO
Experion Integrated OneWireless Multiprotocol Network
Configuration of Protocols
Experion Native Integration
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## FI Product Portfolio – ISA100 Wireless Compliant

### XYR 6000 Product Portfolio

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Temperature and I/O</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>STDW100 series</td>
<td>Differential pressure</td>
<td>OWA100</td>
</tr>
<tr>
<td>STGW100 series</td>
<td>Gauge and In-Line pressure</td>
<td>SmartCET® Corrosion Sensor</td>
</tr>
<tr>
<td>STDW900 series</td>
<td>Differential pressure</td>
<td>WCX</td>
</tr>
<tr>
<td>STGW900 series</td>
<td>Gauge and In-Line pressure</td>
<td>WPS</td>
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<tr>
<td></td>
<td>STTW401 Temp and DI</td>
<td>WBX</td>
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<tr>
<td></td>
<td>STTW600 HLAI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STTW700 Universal I/O: AI, DI</td>
<td></td>
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<tr>
<td></td>
<td>STTW701 Universal I/O: AI, DI and DO</td>
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</tbody>
</table>
Full FI Product Portfolio – Wireless Adapters

- SmartLine Pressure and SMV
- SmartLine Level
- SmartLine Temperature

OneWireless Adapter
- HART adapter for ISA100 Wireless Protocol

ISA100 Wireless

WDM

FDAP

WirelessHART

Pepperl+Fuchs Bullet
- HART adapters for WirelessHART Protocol

Powers the device

Experion® Orion Console

Pepperl+Fuchs WHA-ADP

Honeywell

THE POWER OF CONNECTED
Wireless Tank Gauging

**SmartRadar FlexLine**
- Meshing capability
- Seamless integration with Entis Pro / Engauge / CIU
- Suitable for custody transfer (W&M approved)
- Highest accuracy over 75m (250 feet)
- Also transmits other local tank measurements over ISA100 Wireless
- Software upgrade over the air
- Provisioning over the air

**Wireless Field Interface**
- Able to connect existing gauging equipment to ISA100 Wireless network
- Zone1 capable hub
- Support for 854, 97x, 873, 811 GPU, 877 indicator
- Seamless integration with Entis Pro / Engauge / CIU
- Freedom of selecting appropriate gauge (Radar or Servo)
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**User Benefits of OneWireless**

- Typically half the cost relative to the wiring
- 25% Cost savings compared to separate wireless networks (Field Instruments, Wi-Fi)
- Recurring yearly productivity gains of 10% or more
  - Network and Instruments maintenance costs
  - Inventory loss control
  - Storage capacity optimization
  - Increased blending performance
  - Improved workforce efficiency
- Significant improvements in HSE compliance
- Monitor remote locations and previously unmonitored areas
- Cyber secure in every aspect
- Manage your 2.4 GHz spectrum – No congestions!
<table>
<thead>
<tr>
<th>Application examples Industrial Wireless</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Machine health monitoring</td>
</tr>
<tr>
<td>• Basic process control</td>
</tr>
<tr>
<td>• Corrosion Monitoring</td>
</tr>
<tr>
<td>• Remote process monitoring</td>
</tr>
<tr>
<td>• Condition monitoring of equipment</td>
</tr>
<tr>
<td>• Environmental monitoring</td>
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<tr>
<td>• Steam trap monitoring</td>
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<td>• Perimeter gas monitoring</td>
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<td>• Fuel tank gauging</td>
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<td>• Remote monitoring of well heads</td>
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<td>• Diagnosis of field devices</td>
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<tr>
<td>• Stranded data capture</td>
</tr>
<tr>
<td>• Safety shower monitoring</td>
</tr>
<tr>
<td>• And more</td>
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</tbody>
</table>
Wireless Steam Trap Monitoring

Energy Saving Potential of up to 3.500 USD per day = 1.000.000 USD per Year

- Accurate and rapid leak detection
- Accurate diagnostic algorithm
  - Trap performance
  - Steam loss data
- Lower installation costs
- Long-life battery
- Robust construction

Experion® Orion Console
Wireless Device Manager
Spirax Sarco STAPS
Armstrong ST6700
Wireless Vibration Monitoring

SKF CMWA 8800

GE’s Bently Nevada Ranger Pro

Experion® Orion Console

Vibration Analysis

WirelessHART

ISA 100 WIRELESS
Real-Time Corrosion Monitoring: SmartCET®

- The first online, real-time corrosion monitor
- Direct connection to DCS
- Accurate corrosion rate & assessment of pitting
- IChemE awards Winner
Active Worker Personal Gas Safety

- Near real-time visibility on the safety and location of your active workers, so you can protect your people, assets and reputation.

- In case of an accident every second counts.

- Enhance your current solution with superior emergency response, improved access, and incident reporting.

<table>
<thead>
<tr>
<th><strong>LocaXion Manager™ Software</strong></th>
<th><strong>Gas Detectors</strong></th>
<th><strong>Wireless Infrastructure</strong></th>
<th><strong>IntelliDoX™ Docking Stations</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows based Location software that displays and archives actual readings and location per operator</td>
<td>Single-Gas and Multi-Gas Wireless monitoring instruments</td>
<td>Wireless beacon to provide increased level of location accuracy in WiFi-based applications</td>
<td>Networkable docking system for high volume users to automate the daily maintenance of their instrument fleets</td>
</tr>
<tr>
<td>Text Messaging capability to communicate with the operators</td>
<td>WiFi mode of location calculation &amp; data transfer</td>
<td>In Zones where greater accuracy is required, beacons will provide more Wi-Fi nodes to calculate the triangulation sequence</td>
<td>Fleet Manager Software for automated fleet maintenance</td>
</tr>
<tr>
<td>Data reporting software suite -- Reports &amp; alerts to suit application</td>
<td>Man Down and Panic Alarms</td>
<td>2-way text (preset message library within unit)</td>
<td>-</td>
</tr>
<tr>
<td>OPC interface option to connect with additional value add software</td>
<td>Available in Client-Server multi-user version</td>
<td>Available in Client-Server multi-user version</td>
<td>Wbaecon eliminates</td>
</tr>
<tr>
<td>Available in Client-Server multi-user version</td>
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</table>
Safety shower monitoring

• We ask a lot of our employees when we ask them to work with hazardous chemicals and products during their workday.

• Need for emergency response?

• In case of an accident every second counts.

• Enhance your current solution with superior emergency response, improved access, and incident reporting.
Wireless Wellhead Monitoring

- CE RTU with Wireless I/O
- Powerful process control environment
- Non wireless AOs / Dos
- Comm Interfaces to MPFM, ESP, Downhole gauge, Solar panel

Backhaul Network

ISA100 Wireless Wellhead Pressure Transmitter
ISA100 Wireless Flowline Temperature Transmitter
ISA100 Wireless SSV Status Discrete Transmitter
ISA100 Wireless Downstream Pressure Transmitter
ISA100 Wireless Flowline Transmitter
ISA100 Wireless Pressure Transmitter
ISA100 Wireless Pressure Transmitter
ISA100 Wireless Pressure Transmitter
Wireless Wellhead Monitoring

Combined Wells

Master Well

FDAP

CE RTU with Wireless I/O

Well #1

Well #2

Well #3
OneWireless Terminal Solution

Tank level gauging
Overfill alarming
Process monitoring
Floating roof monitoring

Gas leak monitoring
Safety shower monitoring
Vibration monitoring
Valve position monitoring
Personnel Gas Safety
Mobile applications
Remote area & perimeter video monitoring

Wireless applications beyond tank gauging
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Reduce project costs, increase blending performance

<table>
<thead>
<tr>
<th>Challenges</th>
</tr>
</thead>
</table>
| • Maintenance and obsolescence issues of  
  • Tank gauging equipment and  
  • Inventory management system  
• Tank farm spread over large 7 square miles area  
• Migrate to new system under 48 hour cutover |

<table>
<thead>
<tr>
<th>Solution</th>
</tr>
</thead>
</table>
| • OneWireless Network  
• 147 Wireless FlexLine Radar & Servo Gauges  
• 137 XYR 6000 Multi-channel transmitters  
• 60 Floating roof Tuning Fork & Float Switches  
• Mobile Station (planned for 2018 roll-out) |

<table>
<thead>
<tr>
<th>Results</th>
</tr>
</thead>
</table>
| • 30% Project Cost Saving relative to traditional wiring  
• Increased System Reliability  
• Increased Speed of Data to the operator - minutes to seconds  
• Blending Performance Increased 18% (# of Blends per week) |
Reduce project costs, increase safety and efficiency

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solution</th>
<th>Results</th>
</tr>
</thead>
</table>
| • Provide an engineered, secured, managed & integrated wireless network into Alcoa Alumina refineries process areas.  
• Supporting ISA100 Wireless instruments and sensors  
• Supporting mobile operators using handheld devices  
• Allow for wireless connectivity of mobile PCS/EHM equipment  
• Enabling IIOT and IOT in the future | • Site wide OneWireless networks at 7 refineries around the globe  
• Light weight wireless pressure transmitters  
• Wireless safety shower panic buttons  
• Wireless push button for operator rounds timestamping  
• ISA100 wireless serial interface to connect remote PLCs | • Typical conservative cost saving of $10k per wireless instrument over traditional hardwired installation  
• Speed of deployment – process data in just one day.  
• Mobility of sensors and instruments to be moved around to troubleshoot or perform trials as required  
• Support mobile operators out in the refinery process areas  
• Monitor moving equipment now possible with standard devices  
• New opportunities waiting to be found |

“Installing wireless device to having process data: duration one day”
## Reduce Resources - Time and People

### NOC in Scandinavia - Greenfield

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solution</th>
<th>Results</th>
</tr>
</thead>
</table>
| • Mobile computing and CCTV required during the startup and commissioning phases.  
• Constraints on the weight and footprint of the solution due to offshore platform.  
• Tracking personnel movement | • OneWireless Network  
• 35 marine grade access points  
• OneWireless XYR 6000 transmitters. | • Remote collaboration enabled by wireless and mobility reduce personnel on the platform.  
• Personnel tracking solution using Wi-Fi.  
• Reduced the commissioning, startup and troubleshooting time. |
**Personnel Safety - Reduce Response Time**

**Gas Field in Middle East - Greenfield**

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solution</th>
<th>Results</th>
</tr>
</thead>
</table>
| • Safeguard personnel from sour gas leak.  
  • Identify the location of personnel in case of a gas leak event / man down situation.  
  • Preparedness of first time responders. | • Active Worker Personal Gas Safety  
  • Site wide OneWireless Network. | • Risk level brought under acceptable limits.  
  • Better prepared emergency responders.  
  • Location identification and 2-way communications. |
## Enhanced Emergency Response Command
### Refinery in Middle East - Brownfield

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Get emergency response command better situational aware of the scene of action.</td>
<td></td>
</tr>
<tr>
<td>• Accommodate better informed decision making.</td>
<td>• Site wide OneWireless Network</td>
</tr>
<tr>
<td>• Increase effectiveness on emergency response.</td>
<td>• Vehicle mounted PTZ cameras</td>
</tr>
<tr>
<td></td>
<td>• Fixed mounted cameras</td>
</tr>
<tr>
<td></td>
<td>• Mobile computers</td>
</tr>
<tr>
<td></td>
<td>• DVM solution.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Live feeds from incident commander vehicles help the remote command address the situation more effectively.</td>
<td></td>
</tr>
<tr>
<td>• Improved plant safety performance.</td>
<td>• Recording of the incidents and response helps continuous improvement (training).</td>
</tr>
</tbody>
</table>
## Perimeter Monitoring – Time Critical

### LNG Facility in Middle East - Brownfield

### Challenges
- Cost effective alarming system for detection of gas leaks
- Quickest deployment time
- Limited to no cabling
- Meet 3 seconds end to end alarm requirement.

### Solution
- OneWireless network based on FDAPs
- Solar power panels
- XYR6000 Universal Transmitters
- Sounders, beacons

### Results
- Improved site safety system on time and within budget.
- 3 seconds alarming requirement consistently met.
- Compliance to government regulations for HSE within given timeframe.
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Summary

OneWireless Multiprotocol Network and Solutions

- Solve problems at half the costs relative to wiring
- Wireless applications typically have an under 1 year ROI
- Quickest installation time - data in just 1 day
- Native integration into Experion DCS
- End to end redundant
- Cyber Secure in every aspect
- Scalable to thousands of wireless IO
- Unmatched flexibility and freedom of choice
- Large portfolio of Wireless devices by multiple vendors

Tap Value Now! Integrate OneWireless in your current and next projects!
OneWireless @ EMEA HUG 2018

WEDNESDAY, OCTOBER 3

HONEYWELL TECHNOLOGY SESSIONS
11.00-11.45 ControlEdge RTU: Wireless I/O Improves Wellhead Performance, Paul Vellacott, Honeywell

THURSDAY, OCTOBER 4

HONEYWELL TECHNOLOGY SESSIONS
09.25-10.10 OneWireless Multiprotocol Network and Solutions, Diederik Mols, Honeywell

CUSTOMER SESSIONS
10.15-11.00 Wireless Applications for Alcoa Alumina Refineries, Robert Polinelli, Alcoa

WORKSHOPS AND TRAINING
14.00-16.00 Deploying a Multiprotocol – Multi-Application OneWireless Network, Rossen Krastev, Honeywell

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• It Is For Free!
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Cisco Aironet 1552S Access Point
ISA100 WCI

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