



ISA100 WCI Webinar

Webinar date: 22 July 2020.

The presentation will begin at 0800 Pacific Time

Wireless Vibration: Overview & Applications

Presenters:  **Bently Nevada**
a Baker Hughes business

Chris McMillen

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Michael Thevanh

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Agenda

1. About the speakers
2. Introduction Industrial Wireless and ISA100
3. Bently Nevada Ranger Pro Overview
4. Bently Nevada Ranger Pro Wireless Vibration Applications
5. Summary
6. Q&A



About the speaker



Chris McMillen

Senior Product Manager - Sensors

Digital Solutions

Bently Nevada, a Baker Hughes business



Chris is the Senior Product Line Manager for Bently Nevada sensors. He is responsible for new developments and lifecycle management within the Bently Nevada sensor portfolio for both wired and wireless solutions. His 20+ years with the business have included roles within engineering, project management and leadership, and business acquisitions. Chris is a graduate of Washington State University in Pullman, Washington with a bachelor's degree in Mechanical Engineering.

About the speaker



Michael Thevanh

Application Solution Architect

Digital Solutions

Bently Nevada, a Baker Hughes business



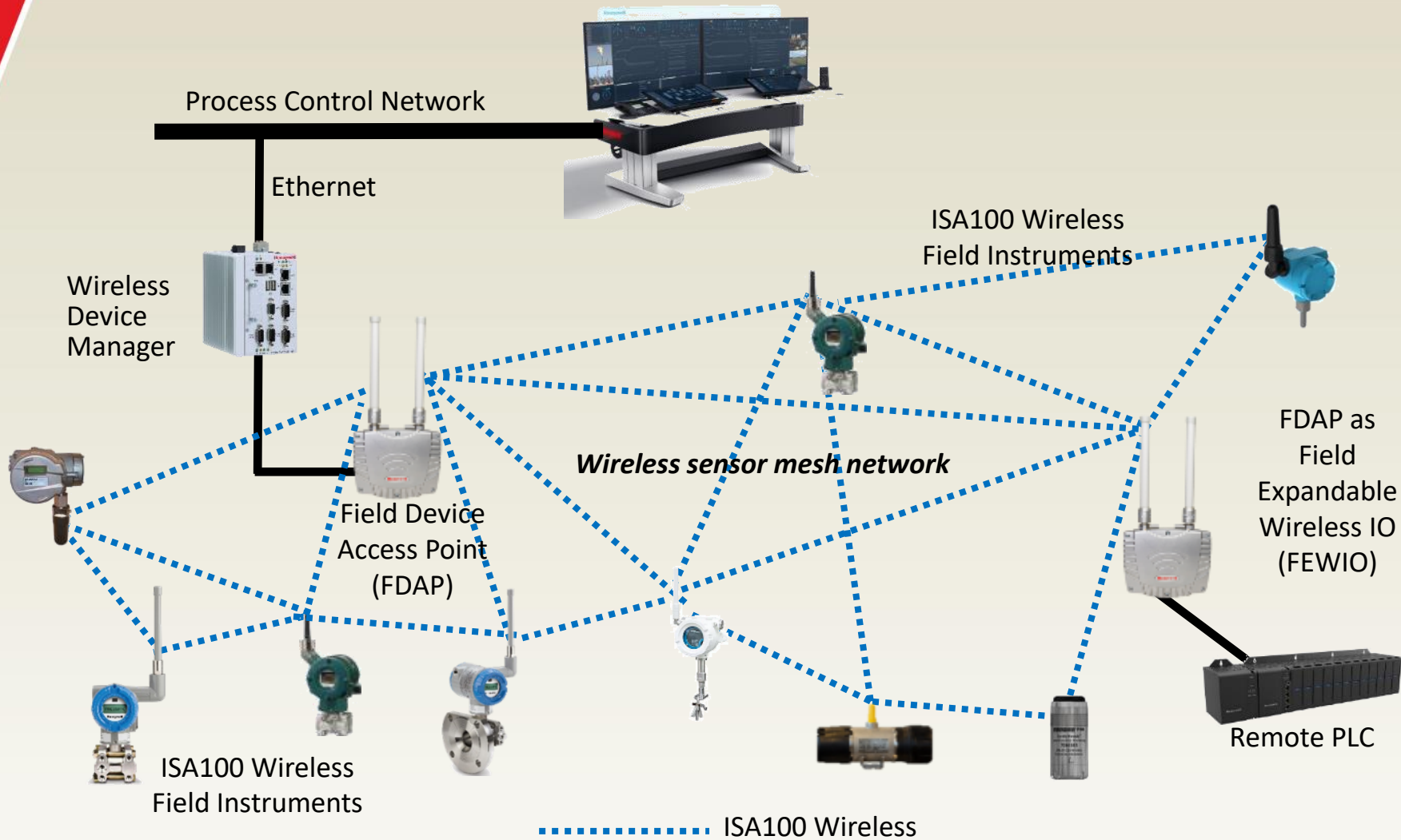
Michael is a Senior Application specialist with Bently Nevada. He works with customers to discover, demonstrate, and select the appropriate condition monitoring and protection solutions to best meet customer requests and needs. His 20+ years with the business have included roles within engineering, sales, and service. Michael is a graduate of Texas A&M University in College Station, Texas with a bachelor's degree in Electrical Engineering.

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Introduction to Industrial 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	<ul style="list-style-type: none">• Up to 90% of installed costs 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	<ul style="list-style-type: none">• Wireless sensors can be deployed in remote/difficult areas• Wireless can add redundancy to a wired solution
Improved Visibility	<ul style="list-style-type: none">• Condition monitoring of secondary and remote equipment• Process monitoring, fast additional data for trouble shooting

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

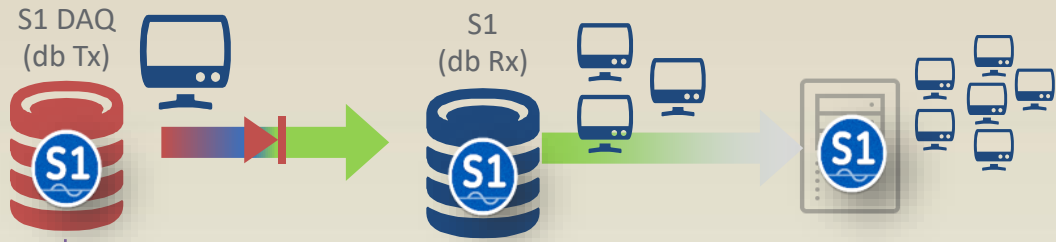
- 
Corrosion
 - RCS , Honeywell
- 
Steam Trap
 - Spirax Sarco, TLV, Armstrong, Bitherm
- 
Vibration + Temperature
 - Bently Nevada
- 
Gas
 - GasSecure, Scott Safety, New Cosmos, Riken Keiki
- 
pH
 - Honeywell, Yokogawa

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Bently Nevada Solutions



Criticality

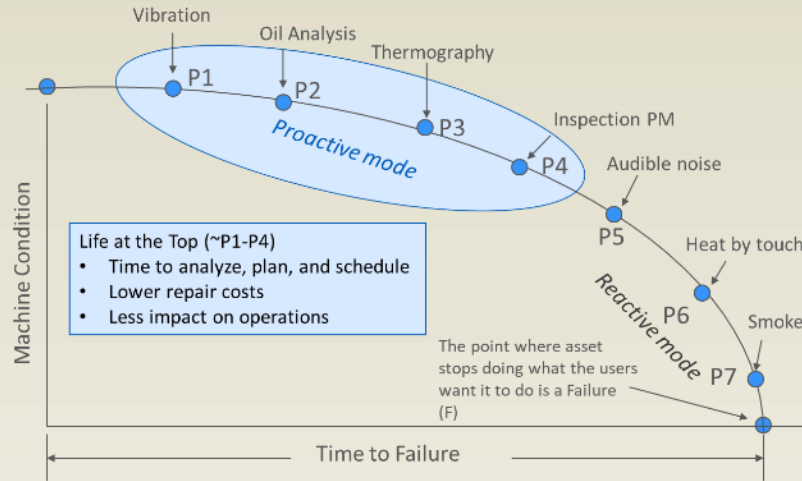
Bently Nevada network



- Installation services
- Machinery diagnostic services
- Technical training
- Product support
- Hosted monitoring and diagnostics

Condition Monitoring & Wireless

Condition Monitoring



Wireless Factors

- Range
Distance between sensor & gateway
- Protocol
Proprietary or open
- Data Bandwidth & Frequency
Simple/rich data & how often
- Power Source
Battery life, availability, ease of maintenance
- Security
Encryption methodology

CM Solutions

Wired

- ✓ Higher point counts
- ✓ Fastest sampling rates
- ✓ Protection capable
- ✓ More sensor types

Wireless

- ✓ Simple to deploy
- ✓ Fast to expand
- ✓ Cost effective

Portables

- ✓ Human element ... See, touch, smell
- ✓ Periodic measurements
- ✓ Many assets



Ranger Pro Solution

Wireless Sensor(s)

+

Advanced Features

+

System 1



Sensor

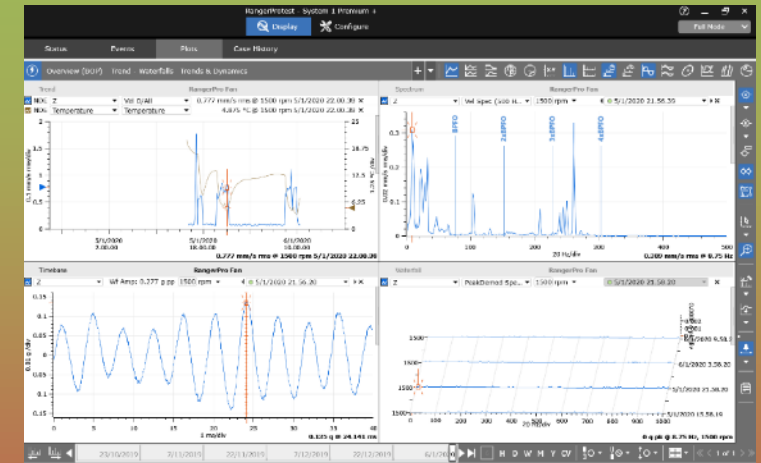
- Triaxial vibration + temperature
- Overall vibration + waveforms
- ATEX/IECEX Zone 0, CSA Cl1 Div1
- Replaceable battery

The screenshot shows a software interface for configuring the sensor. It has two main tabs: "Live Configuration" and "Privet Configuration". The "Live Configuration" tab is active, showing a table of settings for various parameters.

Measurement Trends	Period	Temperature	Setting	Acceleration Waveform	X	Y	Z
Temperature Process Value	10 min	Mode	Enabled	Mode	Enabled	Enabled	Enabled
Vibration Process Value	10 min	Units	g	Units	g	g	g
Acceleration Waveform	6 h	Overall Acceleration	X Y Z	Fmin	5	5	5
Velocity Spectrum	6 h	Mode	Enabled	Fmax	5000	5000	10000
Peak/Demod Spectrum	6 h	Units	g	Samples	4096	4096	4096
Measurement Schedule	Date/Time	Offset		Velocity Spectrum	X	Y	Z
Acquisition Start Time	2018/01/01 00:00	Sub Units	rms	Mode	Enabled	Enabled	Enabled
DDI Link Write	Setting	Mode	Enabled	Fmin	5	5	5
Mode	Enabled	Sub Units	rms	Fmax	5000	5000	10000
Data On Demand	Value	Control	Mode	Overall Velocity	X	Y	Z
Status / Mode	Idle	Acquire	Enabled	Units	mm/s	mm/s	mm/s
Data On Vibration	Value	Setting	Sub Units	rms	rms	rms	rms
Status / Mode	Unknown	Disabled	Mode	Mode	Enabled	Enabled	Enabled
Threshold / Axis	0.8000 mm/s rms	Z	Fmin	5	5	5	5
Data On Severity	Value	Setting	Fmax	1000	1000	1000	1000
Status / Mode	Unknown	Disabled	Overall Peak/Demod	Mode	Enabled	Enabled	Enabled
Level 2 / Axis	5.610 mm/s rms	XYZ	Mode	Enabled	Enabled	Enabled	Enabled
Level 4	0.1280 mm/s rms		Demod Band Min	Mode	Enabled	Enabled	Enabled
			Fmax	1600	1600	1600	1600
			Units	mm/s	mm/s	mm/s	mm/s
			Peak/Demod Spectrum	Mode	Enabled	Enabled	Enabled
			Units	mm/s	mm/s	mm/s	mm/s
			Demod Band Min	Mode	Enabled	Enabled	Enabled
			Fmax	1600	1600	1600	1600
			Units	mm/s	mm/s	mm/s	mm/s
			Peak/Demod Spectrum	Mode	Enabled	Enabled	Enabled
			Units	mm/s	mm/s	mm/s	mm/s
			Demod Band Min	Mode	Enabled	Enabled	Enabled
			Fmax	1600	1600	1600	1600
			Units	mm/s	mm/s	mm/s	mm/s

Configuration Setup

- User selectable parameters
- Sensor setup and provisioning, over the air updates
- Data on demand, on vibration, on severity

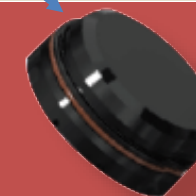
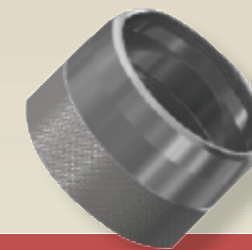


Display and Analytics

- Machine(s) hierarchy & sensors
- Trending overalls
- Analytics from spectrums/waveforms
- Setting alarm levels
- Reporting

Ranger Pro Sensor

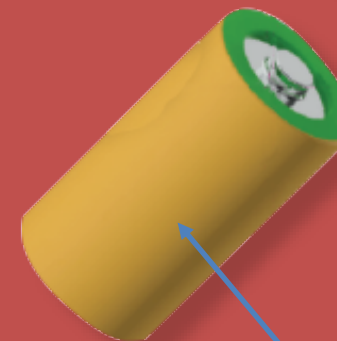
Radio E-module
ISA100



3.5" (89 mm)



1.6" (41 mm)



Triaxial vibration + Temperature
embedded sensors

Standard battery size ... Bently provided or
readily available for end user procurement

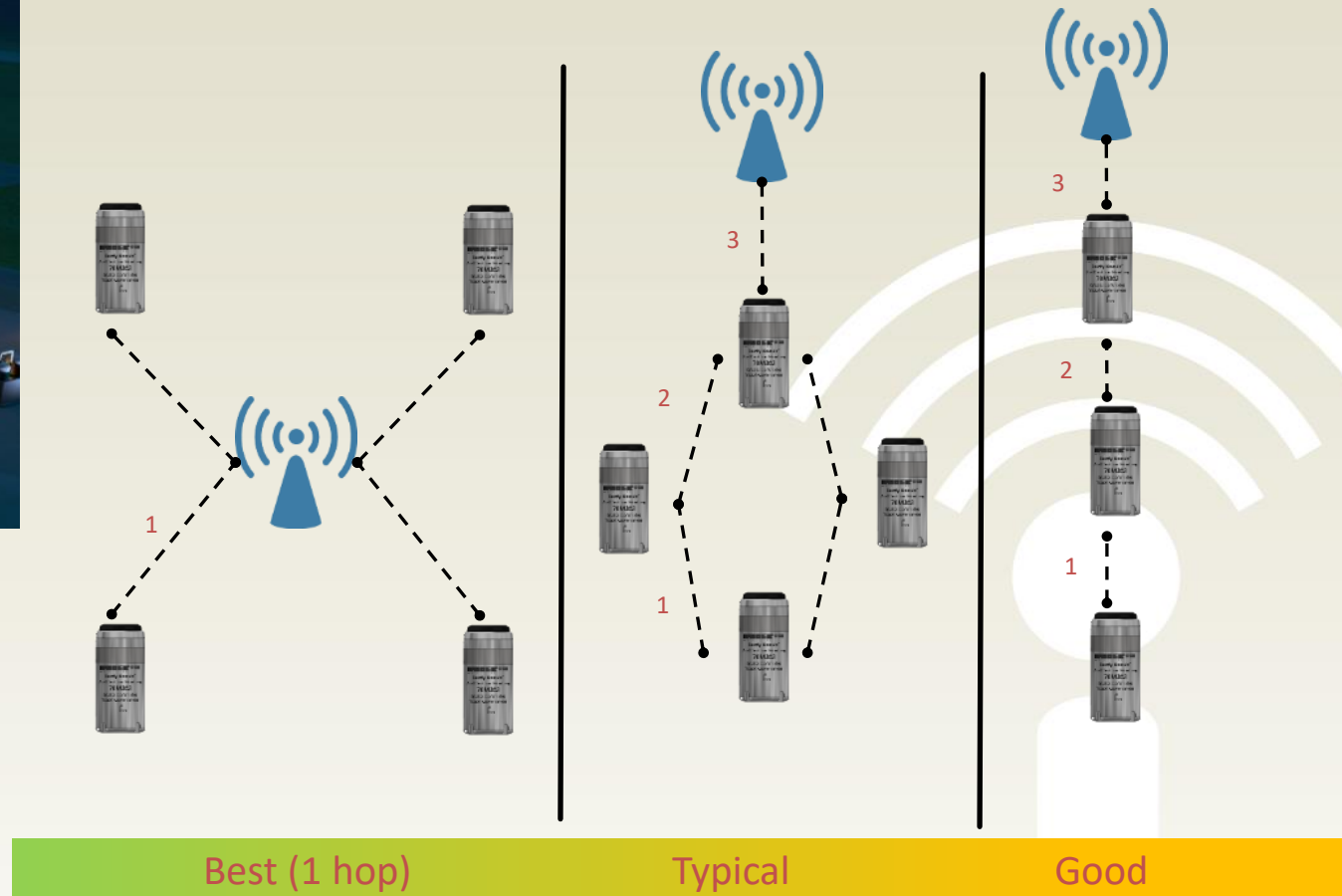
- ATEX/IECEX Zone 0 [ia I/IIC T4] Class 1 Div 1
- **Truly wireless:** sensors embedded in package
- **All in one** - Velocity (5-2kHz) + Acceleration (5-10kHz) + Temperature
- **Trended values + waveforms/spectrums**
- Full System 1 connectivity
- Auto forming, self healing **ISA100** Network Protocol
- **Replaceable** lithium-thionyl chloride battery
- IP67 hermetically sealed electronics
- Temperature: -40C to + 85C
- Range: 150 meters (line of sight), 100 meters typical industrial environment
- Security: 128-bit AES encryption
- Modbus output to **DCS or Plant Historian** trended values
- GCI interface trended values & waveforms to **System 1**
- **Battery life:** up to 5 years (depending upon data frequency/type configuration)

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Typical Network & Installation



Best (1 hop)

Typical

Good

Applications



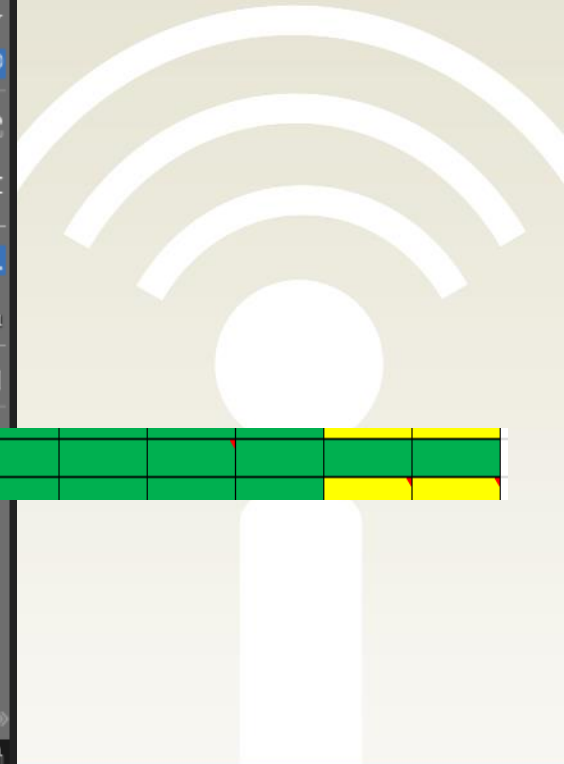
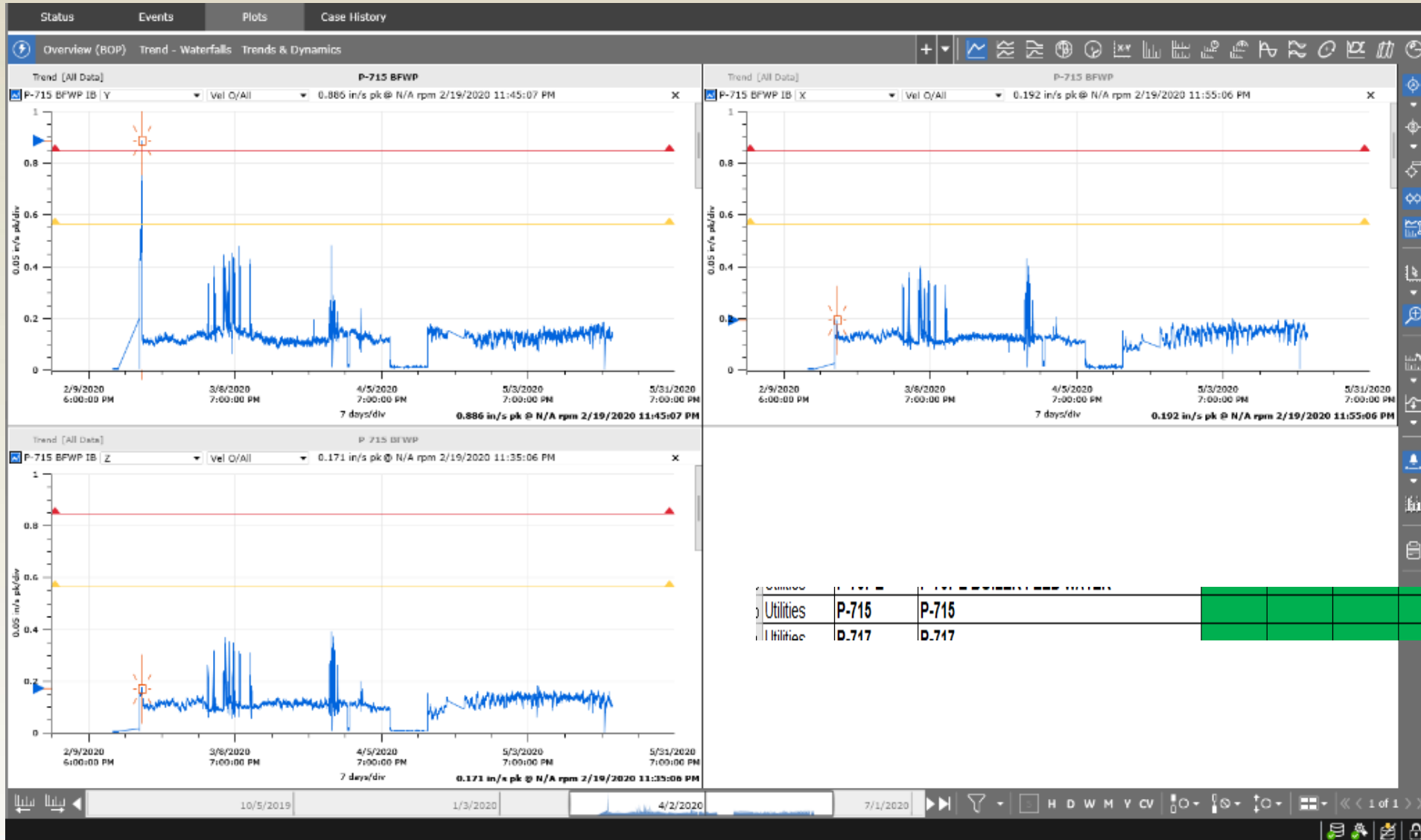
Pumps



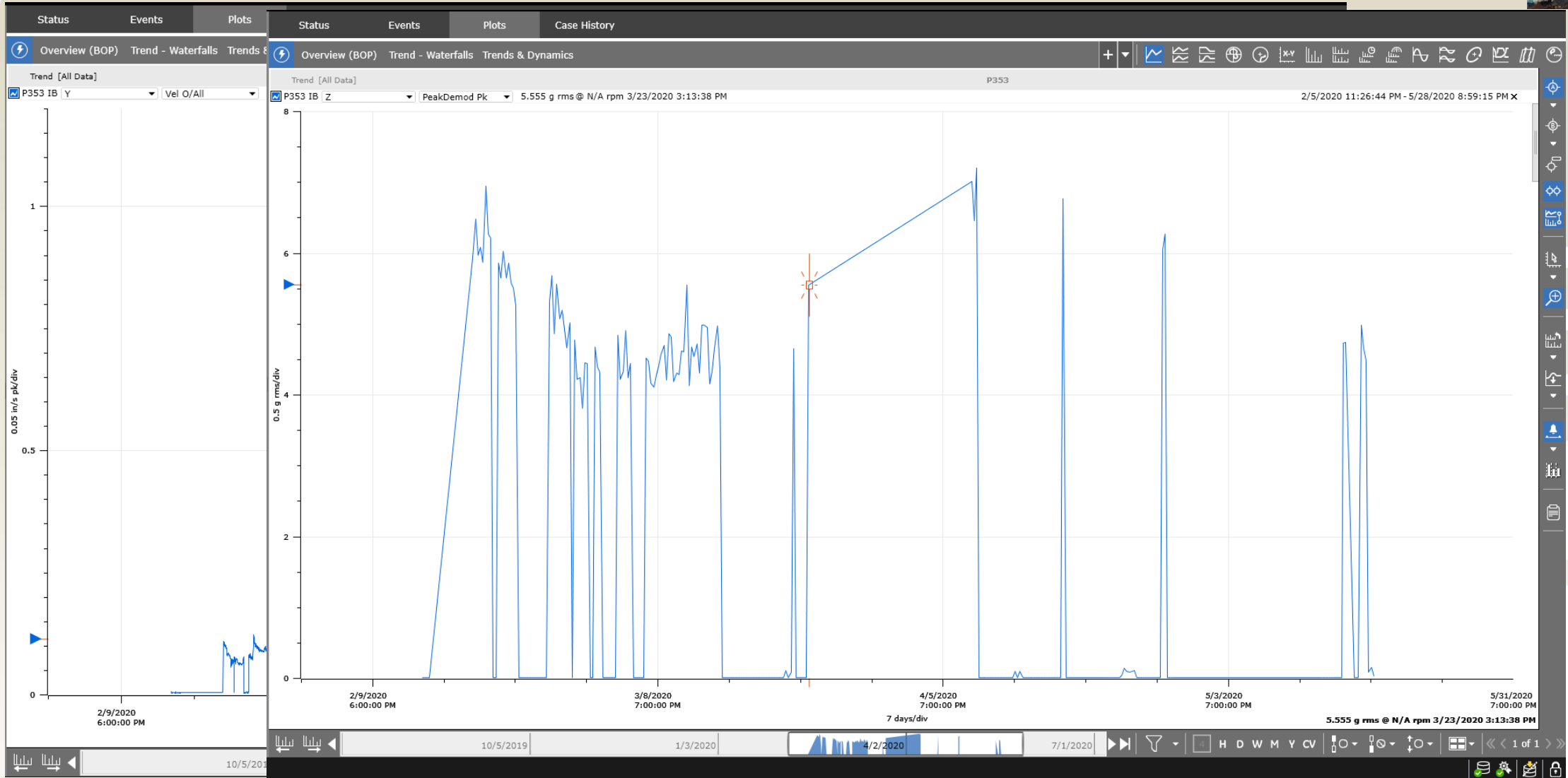
Motor/Fan



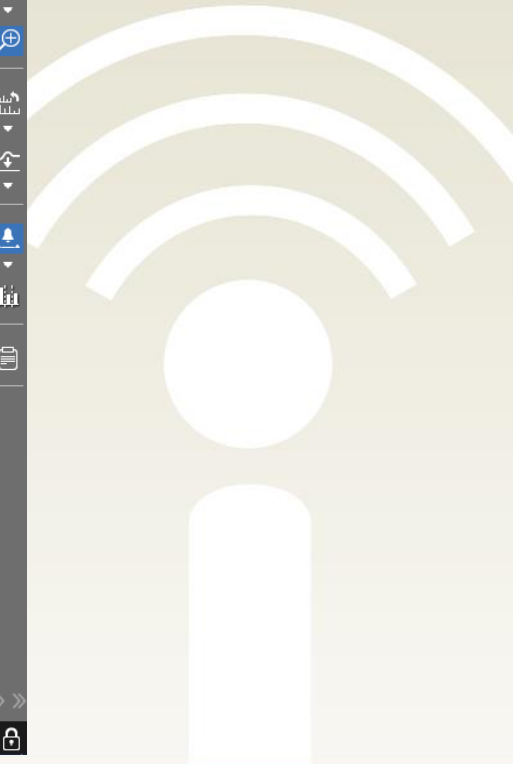
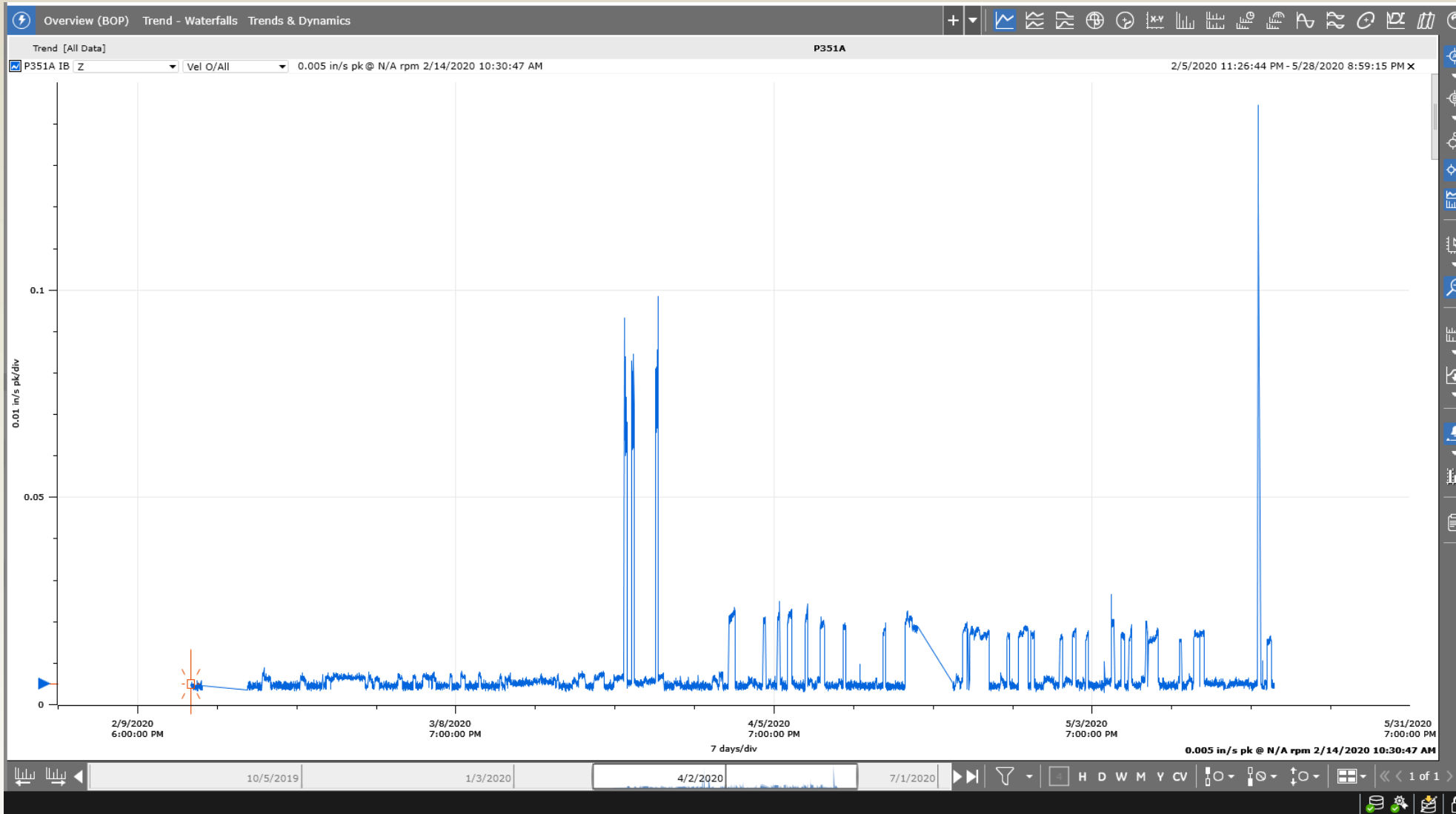
Boiler Feed Water Pump (Dead-Heading)



Scrubber Pump (Over Lubrication)



Scrubber Pump (Motor Failure)



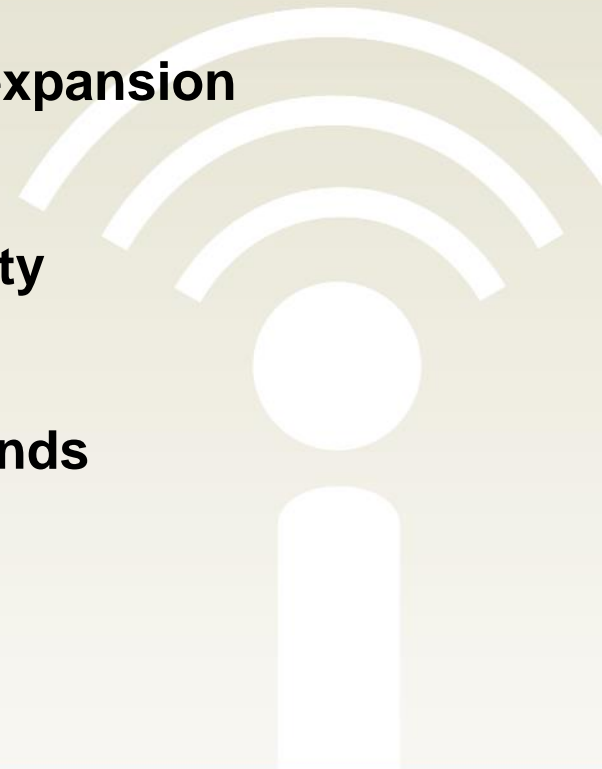
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Summary

- **Investment:** Cost effective for additional plant wide asset coverage
- **Installation and Deployment:** Ease of deployment and/or expansion
- **Performance:** ISA100 Wireless enables data integrity and security
- **Choice:** Large portfolio of other ISA100 Wireless devices measurands



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

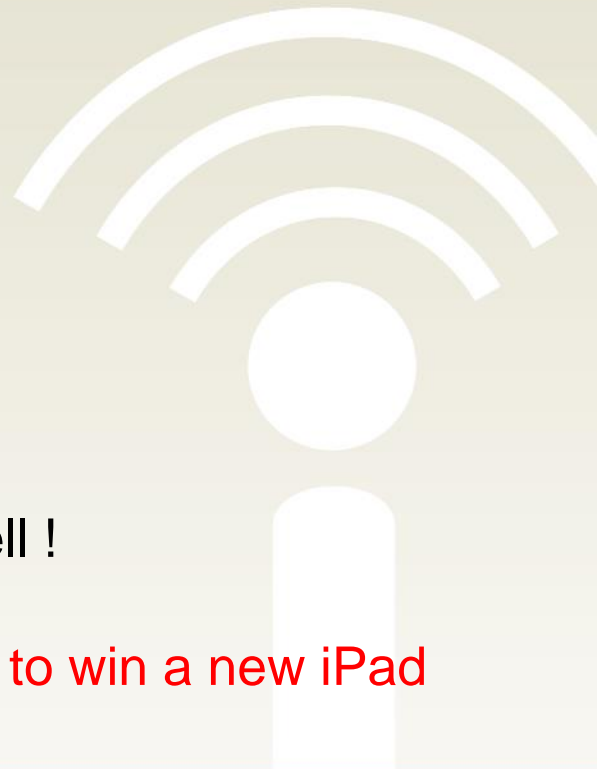


www.isa100wci.org

- 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

LinkedIn [ISA100 Wireless Interest Group](#)

- Latest news, end-user and expert discussions, insights
- 800 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 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!

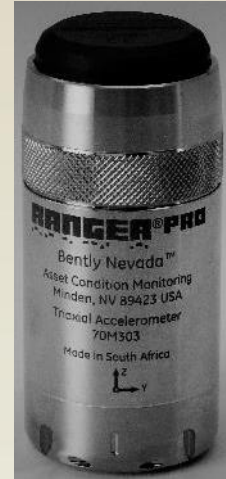


**THANK
YOU**

For Your Attention!



Questions?



[Ranger Pro](#)

Additional information and details

[Bently Nevada Interest Group](#)

8100+ members and growing



www.isa100wci.org



[ISA100 Wireless Interest Group](#) 

800+ members and growing; please join and invite your peers to join as well !

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