Ranger Pro

Wireless condition monitoring system

Every asset is now within reach

Wireless is no longer a novelty. It's mainstream. Gone are the days of bulky devices with huge antennas, batteries that last weeks instead of years, unforgiving point-to-point transmission instead of robust mesh topologies, and data streams that allow for little more than trending instead of the rich spectral content suitable for true diagnostics and machinery insights. You can now embrace wireless without compromising your expectations.

Our Ranger Pro™ system represents more than a decade of refinement and innovation, taking all that we learned in our first generation of Ranger and EI.mesh devices, improving it, and offering the industry's most connected, capable, and comprehensive wireless solution. With our wireless Ranger Pro hardware, our broad portfolio of portable and wired condition monitoring hardware, and our System 1 ecosystem to bring it all together seamlessly, every asset is truly within reach.

The right data for the right results

When you look closely at many wireless offerings, you'll start to see a lot of "not exactlys":

- Not exactly the high-frequency range you need to do rolling element bearing diagnostics with acceleration-based measurements
- Not exactly the collection intervals you need to provide proper surveillance/condition monitoring
- Not exactly an open protocol that conforms to prevalent industrial wireless standards like ISA100 and WirelessHart™, allowing interoperability with other devices from other suppliers
- Not exactly integrated with an ecosystem capable of condition monitoring for all your various data streams, whether portable, wired, or wireless
- Not exactly the flexibility to choose a hosted subscription solution or an on-premises perpetual solution
- Not exactly the footprint you need for both triaxial vibration measurements and temperature from a single, compact device
- Not exactly the full dataset you expect with both overall and full waveform data

Why settle for "not exactly" when you can have exactly what you need with Ranger Pro.
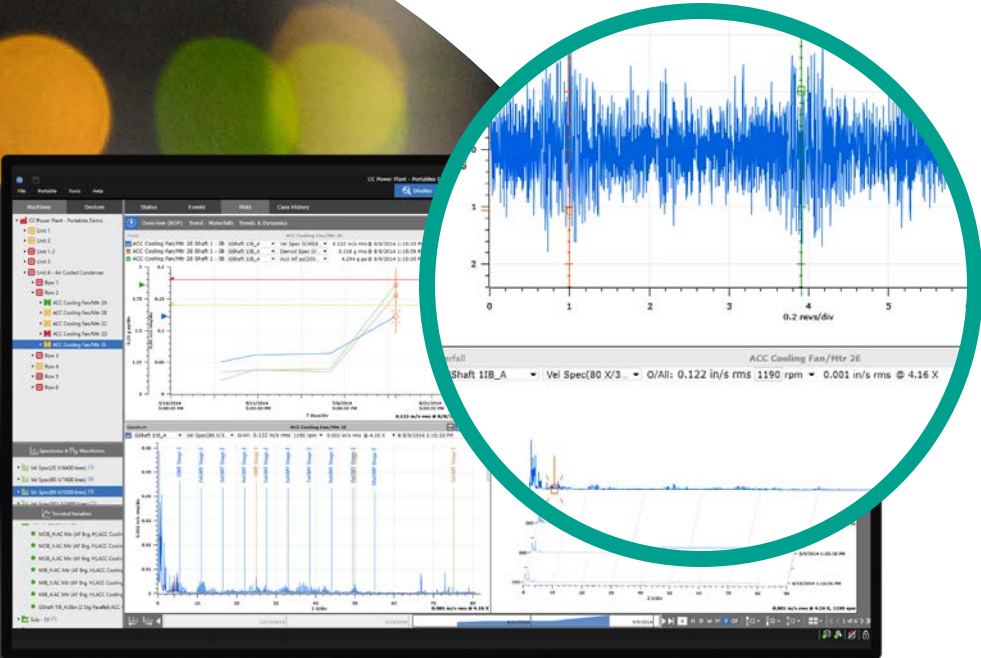
We deliver a rich dataset of both overall and waveform data from each Ranger Pro device—enabling real condition monitoring. Where others deliver data suitable only for trending and no waveforms at all or those with insufficient resolution, we deliver the goods. Up to 3200-line spectrums and frequency response from 5Hz to 10kHz from triaxial sensing elements. With Ranger Pro, you don't take a step backwards just for using a wireless sensor. Spectral averaging, acceleration enveloping, simultaneous collection of acceleration/velocity/peak demod, and the ability to correlate vibration data with available process data—it's all at your fingertips with Ranger Pro.

You spoke. We listened.

The design of Ranger Pro is the result of extensive customer feedback and more than a decade of experience with industrial wireless sensing. Ranger Pro gets it right.

A reliable, online solution to complement reliability/maintenance

Cost-effective entry to condition monitoring

Ranger Pro features

- Truly wireless: sensors, power, and radio embedded in a single package
- Velocity (5–1 kHz), acceleration (5–10 kHz)
- Supports both ISA100 and WirelessHART protocols
- Replaceable lithium-thionyl chloride battery
- IP67 hermitically sealed electronics
- CSA, ATEX, and IECEx approvals for Div 1 and Zone 0/1
- Temperature: -20°C to +85°C
- Range: 200 meters (line of sight)
- Security: 128-bit AES encryption
- Long battery life: up to 5 years
- System 1 connectivity—full dynamic and static data capture and display
- DCS connectivity via Modbus for static data

Wireless network personality module

Industry-standard, user-replaceable battery

Triaxial or uniaxial embedded vibration sensor

Open

A non-proprietary architecture that works with not just one but both of today's leading wireless standards: ISA100 and WirelessHART.

Approved

Hardware that delivers global Zone 0 and Div 1 hazardous area approvals so you can put wireless sensors wherever you need them, without restriction.

Configurable

Data can be collected at preset intervals, on-demand, on-vibration (machine on/off thresholds), and on-severity (alarm thresholds). Intervals are fully configurable with separately adjustable intervals for overall and waveform/spectrum data, helping maximize battery life and avoiding too much or too little data.

Comprehensive

Both overall and waveform/spectrum data can be collected from all three axes—in velocity (X/Y/Z), acceleration (X/Y/Z), and peak demodulation units (Z only)—along with temperature and battery level. That equates to 16 measurements from each sensor, providing comprehensive assessment of asset health and sensor readiness.

Low-maintenance

Battery life for typical configuration settings exceeds three years and can be as long as five years. Because the battery does not have to be removed and reinstalled to set up the device, the complications this creates for hazardous areas are eliminated.

Connected

Ranger Pro is part of our System 1 ecosystem, ensuring that every asset type can be addressed with a right-sized hardware solution while connecting seamlessly with all of the other assets in your plant.

Plays nicely with others

We get it

When it comes to wireless, interoperability is big deal. Different protocols, different gateways, and different topologies for different measurements just don't cut it. That's why we made absolutely certain that we embraced both of the leading industrial wireless standards—ISA100 and WirelessHART.

This flexibility means that regardless of who you use for wireless process measurements—Honeywell, Emerson, Yokogawa, or anyone else—if they conform to one of these two standards, Ranger Pro will fit right in.

And it means that as these standards grow and evolve over time to offer enhanced features and functionality, we'll grow right along with them.
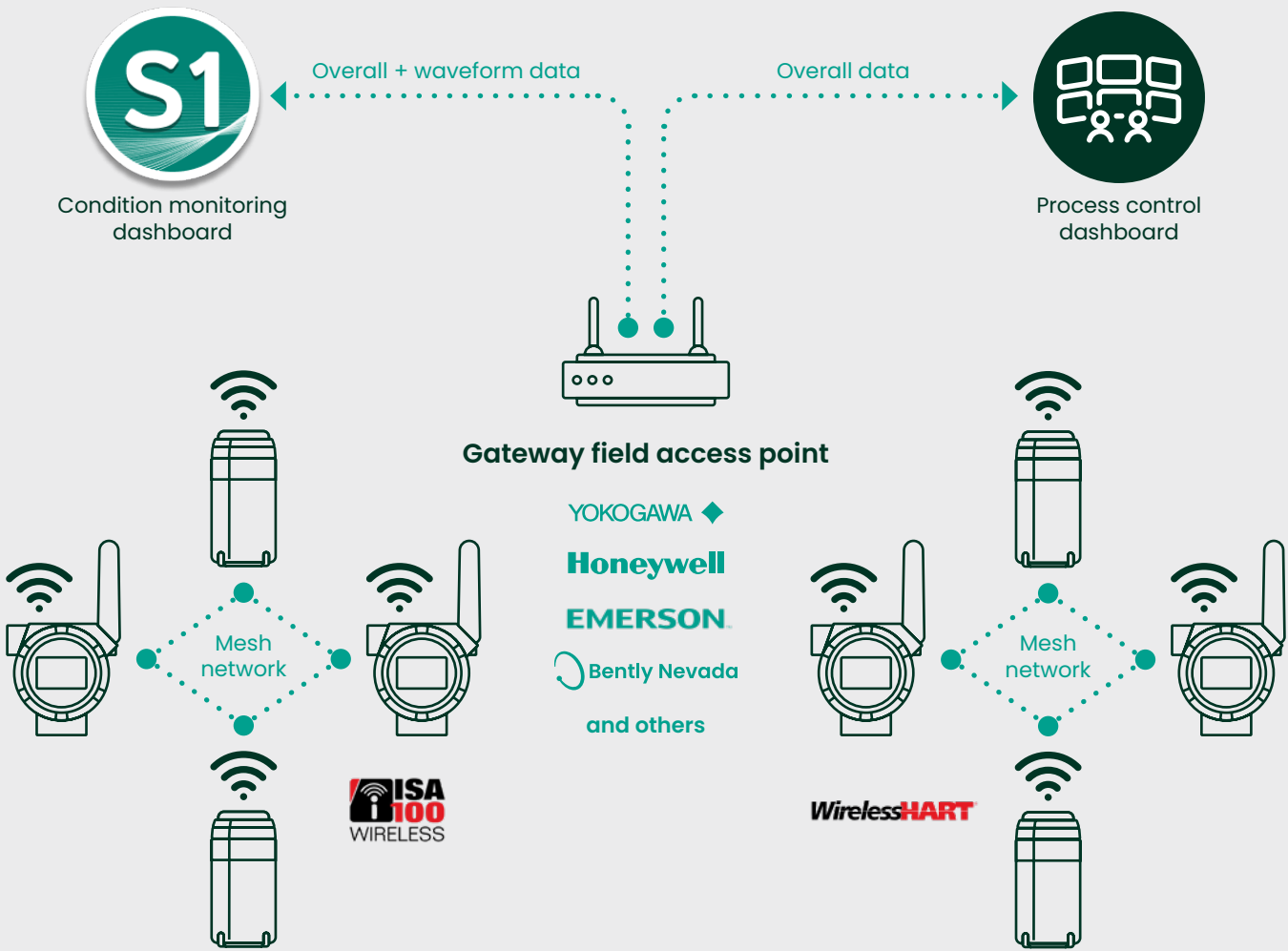
Vibration
Temperature
Flow
Pressure
Level
Corrosion
Gas leak
And many others

Because we support ISA100 and WirelessHART, your wireless infrastructure isn't limited to just our Ranger Pro sensors. You can select best-of-breed sensors, gateways, and other components from any manufacturer supporting these standards, confident that Ranger Pro will effortlessly co-exist. It moves wireless vibration from being yet another silo to being simply another point in a mixed-vendor infrastructure. And in addition to lowering the costs of building and maintaining a wireless infrastructure, it means that your wireless condition monitoring strategy can consist of more than just temperature and vibration to include other measurements and process conditions—with the diversity of choice afforded by dozens of global industrial automation suppliers.

Part of your plantwide ecosystem

Nobody wants dozens of systems. Instead, they tolerate them because, all too often, the integrated solution is either deficient and a best-of-breed solution is preferable, or no meaningful integration exists and it simply isn't an option.

The installation of wireless sensors is rarely a plantwide strategy in and of itself. You usually have a mix of assets, each with different data requirements and economic implications of failure. System 1 was designed to span all of your assets with a variety of hardware that is right-sized for the application. The result is a plantwide ecosystem

that allows you to manage every asset under a single software umbrella, fed by hardware that is specially designed to balance capabilities, cost, and asset failure modes. Each part of the ecosystem, from our portable data collectors to our API-670 compliant systems to our wireless Ranger Pro—and everything in between—is designed to deliver world-class, best-of-breed capabilities along with full System 1 integration. No longer do you need to compromise capabilities for integration. With Bently Nevada and System 1, you can have both.
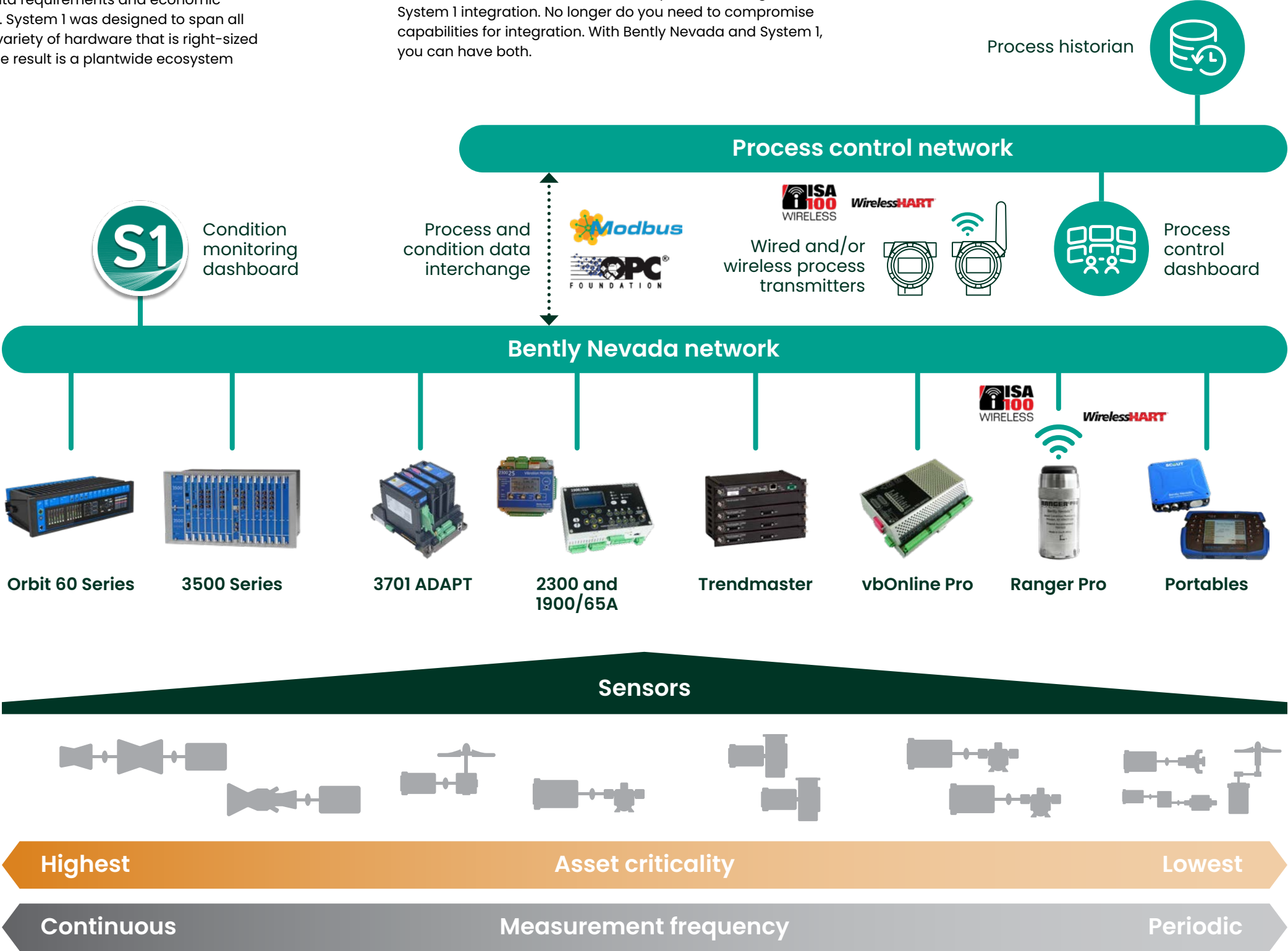
Process data

Very few machinery problems can be solved when armed only with vibration data. Only by understanding the conditions that surround the machine—pressures, temperatures, flows, levels, temperatures, viscosities, gas/fluid compositions, and other parameters—can the cause/effect interactions between process and asset be properly understood. In fact, one of our customers quipped "pumps don't die—they're killed" when commenting on off-design process conditions and their impact on machinery.

This is why we've taken such care to ensure you can easily get process data into System 1 where it can be compared and correlated with asset-related measurements like vibration and temperature. In many cases, the process measurements already exist in the DCS and can simply be shared with System 1. In other cases, a wireless process transmitter is the right answer. Regardless of where and how the process data originates and resides, System 1's open protocols allow it to be imported and form a vital part of your condition monitoring capabilities.

Process historian

Process control network

S1 Condition monitoring dashboard

Process and condition data interchange

Modbus
OPC FOUNDATION

ISA100 WIRELESS
WirelessHART
Wired and/or wireless process transmitters

Process control dashboard

Bently Nevada network

ISA100 WIRELESS
WirelessHART

Orbit 60 Series | 3500 Series | 3701 ADAPT | 2300 and 1900/65A | Trendmaster | vbOnline Pro | Ranger Pro | Portables

Sensors

| Highest | Asset criticality | Lowest |

| Continuous | Measurement frequency | Periodic |

Power tools

A system is only as strong as its weakest link. So no matter how capable a wireless sensing infrastructure might be, if it is tethered to mediocre software, it will equate to a mediocre solution.

System 1 software is designed to excel by delivering the richest, most capable toolset in the industry, along with a notification and decision support environment that doesn't require tedious manual review of data to spot anomalies. Instead, it can review the data for you—automatically and continuously. But even with all these automated analytics, we fully understand that there will always be a place for deep dives into the nuances of the data when solving especially difficult problems. System 1 delivers the power you need for such tasks.
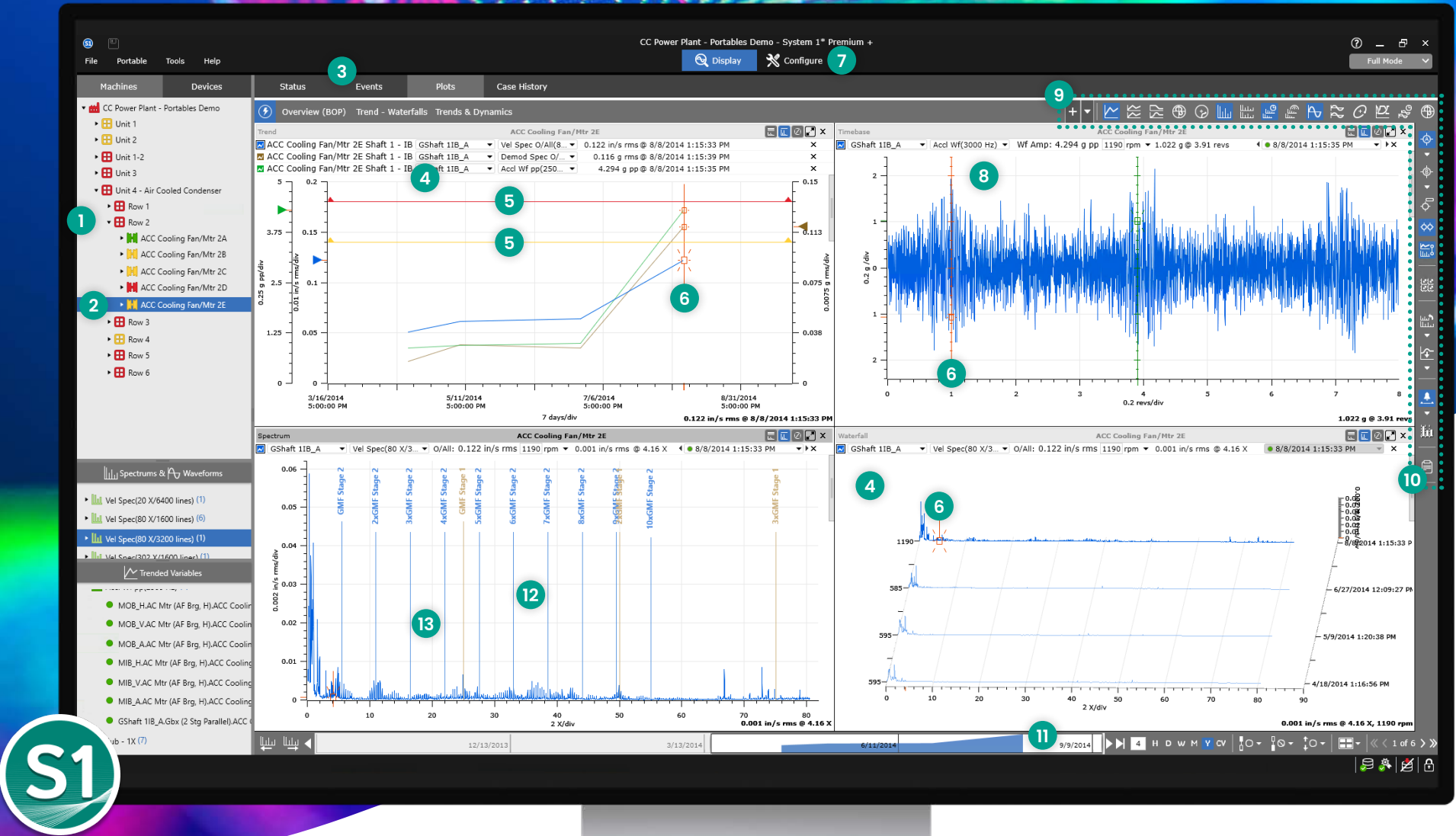
1. Industry-leading alarm management and navigation tools.

2. Statistical alarm capabilities remove the need for number crunching and manually fine-tuning thresholds.

3. No need to look at every spectrum, every plot. Use the Alarms or Events list to focus on machines with degrading conditions.

4. Industry-leading trend tools.

5. Industry-leading alarm setpoint and alarm event identification.

6. Easily synchronize cursors across plots.

7. Ultra-fast, ultra-easy setup using "Quick Config" to address measurement parameters, alarm bands, and initial thresholds.

8. Industry-leading time-waveform tools.

9. Industry-leading toolset and diagnostic capabilities for both rolling element and fluid-film bearings.

10. Comprehensive reporting of fault diagnosis, either within System 1 as Plot Records, or for sharing externally as professionally formatted Word documents.

11. Easily navigate to time period of interest using mini-trend.

12. Built-in rolling element bearing database with 30,000+ entries—configuration of cursors and spectral bands for bearing fault frequencies is a snap.

13. Industry-leading spectral tools.

Synergistic

In the ongoing battle of portable **or** wireless, we think there's a much better solution: **and**.

Even when wireless delivers all the data you need, there's still a viable place for portable instruments. Sometimes it's because you want to be machine-side to do analysis while process and other conditions are changing. Or perhaps you are balancing the machine in-situ. Or maybe you simply need to supplement your wireless data with measurements at locations where you don't have a sensor—such as a piping connection or a foundation bolt. Whatever the reason, System 1 brings our industry-leading data collectors and Ranger Pro sensors together in a unified environment so that no matter where the data originates, you can see it, analyze it, correlate it, and act on it.

Globally approved
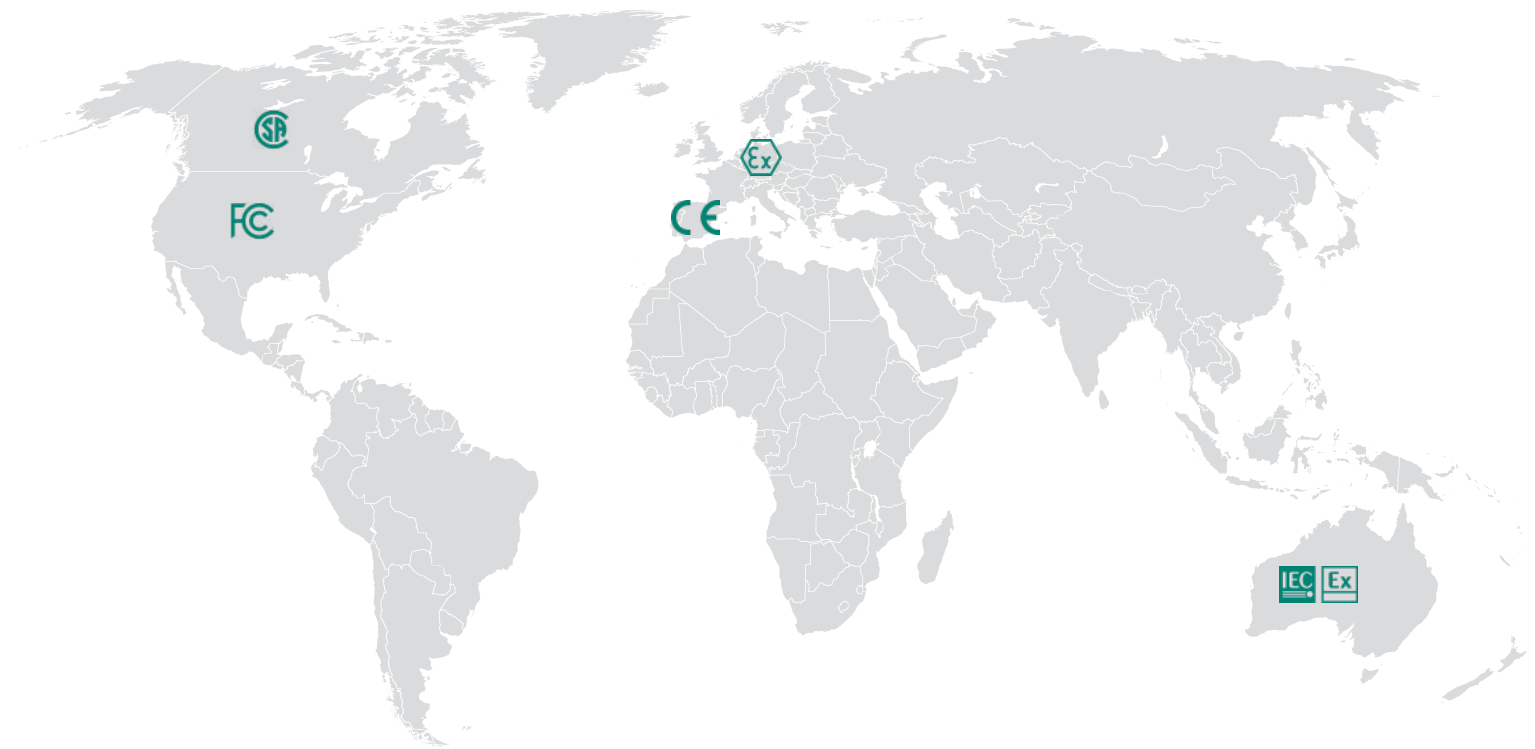
Approvals are not an afterthought at Bently Nevada. In fact, one of the very first design decisions we make with any hardware platform are the hazardous locations it needs to address based on the industries we serve.

Customers told us that one of the reasons they prefer wireless instead of manual data collection in some applications is precisely because they want to keep people out of areas where a flammable atmosphere is continuously or intermittently present during normal operations. That's why Ranger Pro sensors carry global Zone 0 and Div 1 approvals, allowing them to go where you don't want people—and where many other wireless systems can't because they lack approvals entirely or carry only Zone 2/Div 2 certifications. And, provisioning Ranger Pro doesn't require you to cycle power on sensors by removing and reinserting batteries—a difficult and expensive undertaking in a Zone 0/1 area.

- **CSA Class 1 Division 1**
- **ATEX/IECEx Zone 0**
- **Conformity compliant with all CE and FCC/IC requirements**

Easy.
Really easy.

Call us crazy, but we were under the impression that wireless should be easier and more cost-effective to deploy than a wired system, yet just as reliable and with all the flexibility you demand.

We understand you often have multiple use scenarios for your wireless systems. Sometimes you want a truly permanent solution that simply goes where the economics of a wired system won't allow. Battery life is paramount along with a rich dataset because supplementing the wireless readings with portable data may not be practical—or perhaps safe.

Other times you want something you can quickly deploy temporarily as a way to put problematic "bad actor" assets into intensive care where they can be monitored with intervals in hours instead of the weeks or months entailed by portable rounds. Battery life is far less important than frequent, comprehensive data.

Ranger Pro delivers both. You'll be up and running in no time at all, armed with the data you need to get the job done.

It goes where you can't

It isn't always desirable—or safe—to go where you need to make a measurement.

Whether it's the dryer end of a paper machine, a confined space, a hazardous atmosphere, a place that's impossible to access, or simply a location that's cumbersome to reach without special equipment or permits, Ranger Pro brings the data to you—safely and reliably.

Baker Hughes ≷

bently.com