

5 InsightCM™ Features for Remote Diagnostics

Better Uptime Starts With Better Data

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Why Remote Diagnostics?

Reliability engineers can't be in two places at once. But this is the request when assets from two different plants are raising concern. Which one is more likely to contribute to an outage? If deciding between two assets is difficult, what about 10,000? Remote diagnostics help maintenance teams decide where to deploy valuable resources like subject matter experts, troubleshooting equipment, and spares.

What Is InsightCM?

InsightCM is condition monitoring software for reliability professionals who want to remotely diagnose equipment before deciding if an in-person trip to the asset is needed. InsightCM, along with NI monitoring devices, can catch more pre-failure indicators while helping to reduce, or eliminate, route-based data collection and replace it with more productive use of a subject matter expert's time in the field.

Five InsightCM Features for Remote Diagnostics

The following five features for remote diagnostics help InsightCM unlock maintenance team productivity.

1. Web Client Access

The core component of InsightCM is the server installed on a standard IT machine on-premises or in the cloud. Maintenance engineers log in to the server using a web browser (see Figure 1) to view and analyze data from any of the connected assets. This also means IT groups have fewer software installations to manage because no software is needed on user machines.



Figure 1. InsightCM is server-based, so users access all analysis functionality from a web browser.

2. Waveform Data for Vibration Analysis

InsightCM collects waveform data, as seen in Figure 2, so analysts can perform more detailed diagnostics without needing to travel to the asset or assume which machine requires the most attention. Some vibration data displays include trend views for standard calculated features as well as viewers for waveform and spectral analysis including orbit, bode, shaft centerline, waterfall, FFT, order, enveloping, and time synchronous averaging.



Figure 2. This vibration measurement layout shows RMS trend line, waveform, spectrum, and envelope analysis.

3. Ability to Convert Raw Accelerometer Data to a WAV File

InsightCM can convert raw accelerometer data into an audio quality WAV file to help experts recreate the experience of being in the plant, even if they are hours away.

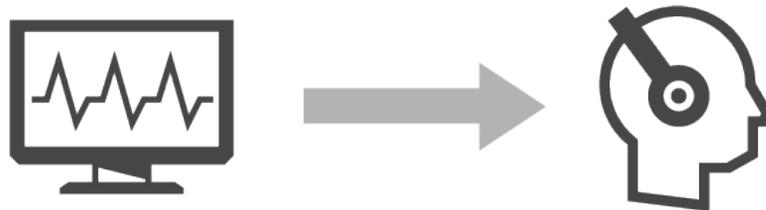


Figure 3. Experts can remotely listen for periodic phenomena because InsightCM can convert raw accelerometer data into a WAV file.

4. Multiple Measurement Technologies

Analysts use more than vibration to diagnose machine health problems. InsightCM supports multiple sensor technologies, so experts can monitor various failure modes and cross-check their diagnosis for greater confidence. Supported measurement technologies beyond the standard vibration measurements include:

- **Motor Current Signature Analysis (MCSA)**—InsightCM measures high-speed voltage and current from NI monitoring devices installed near the motor control cabinet to help maintenance teams monitor for inrush currents, phase unbalance, and broken rotor bars. (See Figure 4.)

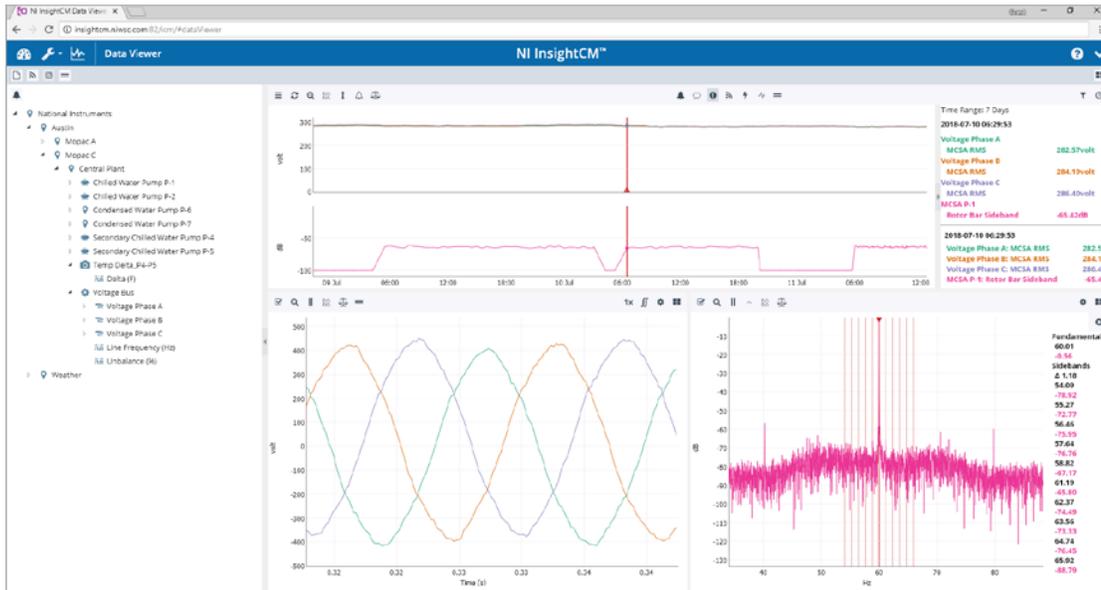


Figure 4. This InsightCM analysis view shows three-phase voltage and the MCSA spectrum.

- **Thermography**—InsightCM automates the process of collecting and monitoring images from infrared cameras, as seen in Figure 5. This helps analysts monitor trend data from pre-drawn regions of interest and alarm on hot spots on transformers, motor control centers, breaker boxes, and bus bars.

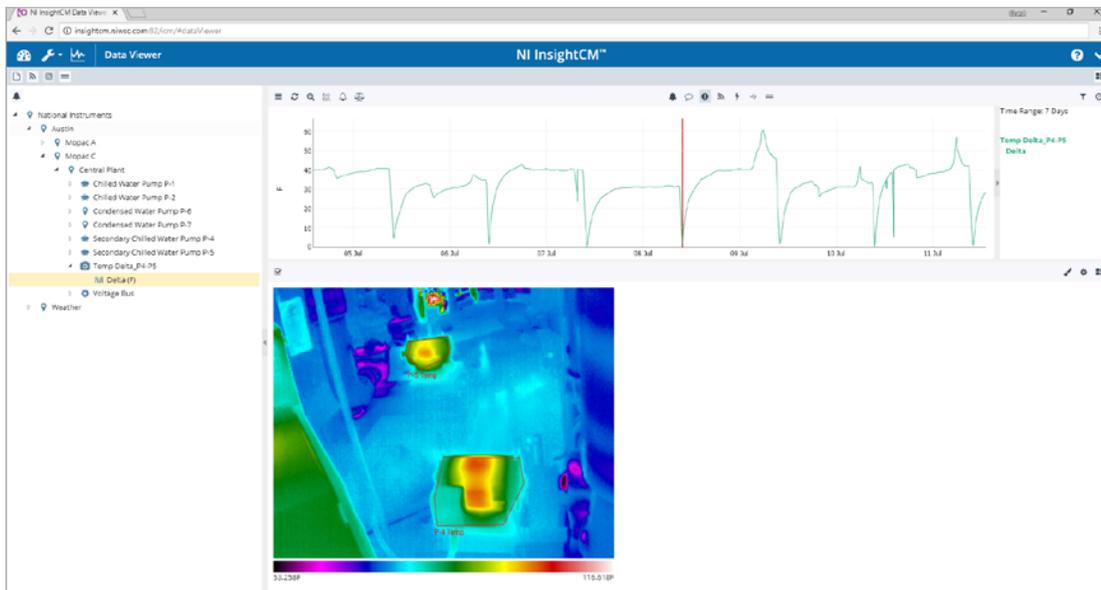


Figure 5. This InsightCM infrared thermography image shows two chilled-water pump-motor skids with a temperature differential trend line.

- **Electromagnetic Signature Analysis (EMSA)**—Maintenance engineers on-site often hear arcing and corona phenomena as “crackling bacon.” NI monitoring devices connect to radio frequency current transformers (RFCTs) to measure and alarm on arcing, coronas, gap discharges, noise, and sparking. This data is available in the same InsightCM environment from anywhere with network access. (See Figure 6.)

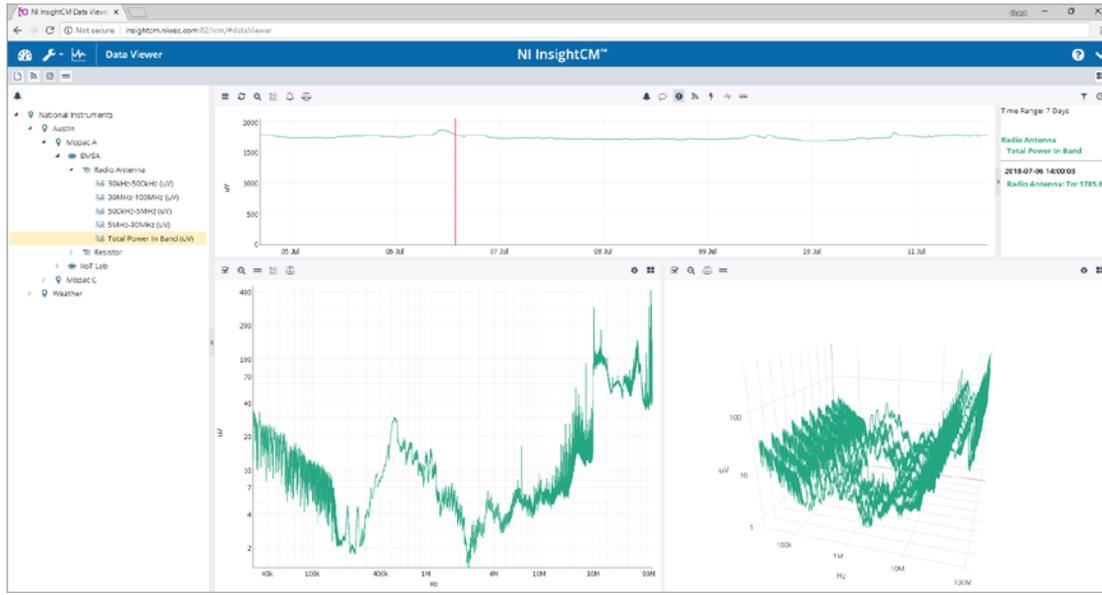


Figure 6. The EMSA layout shows total power in a band trend plot with spectrum and waterfall graphs.

- **Other Standard Sensor Inputs**—Figure 7 shows NI monitoring devices for InsightCM that can connect to additional sensors including thermocouples, resistance temperature detectors (RTDs), proximity probes, tachometers, as well as ± 30 V or 4–20 mA sensors often used for process measurements like pressure and flow. Beyond these, the software is open to using any of the over 100 measurement modules in the NI catalog with some level of contracted effort either through NI or a third-party member of the NI Alliance Partner Network.



Figure 7. NI monitoring devices work with over 100 modules to support a variety of sensor technologies.

5. Intelligent Alarming

Moving from route-based data collection that happens monthly or quarterly to an automated and connected system where data can come in multiple times an hour could overwhelm analysts without a way to intelligently screen data. InsightCM can help maintenance teams set alarms and data capture conditions for any of the available features. The screening can happen at the server or on intelligent NI monitoring devices already connected to sensors in the plant. InsightCM also has an alarm baselining feature that automatically sets statistics-based alarm points created from previously captured data from “known to be good” operating states.

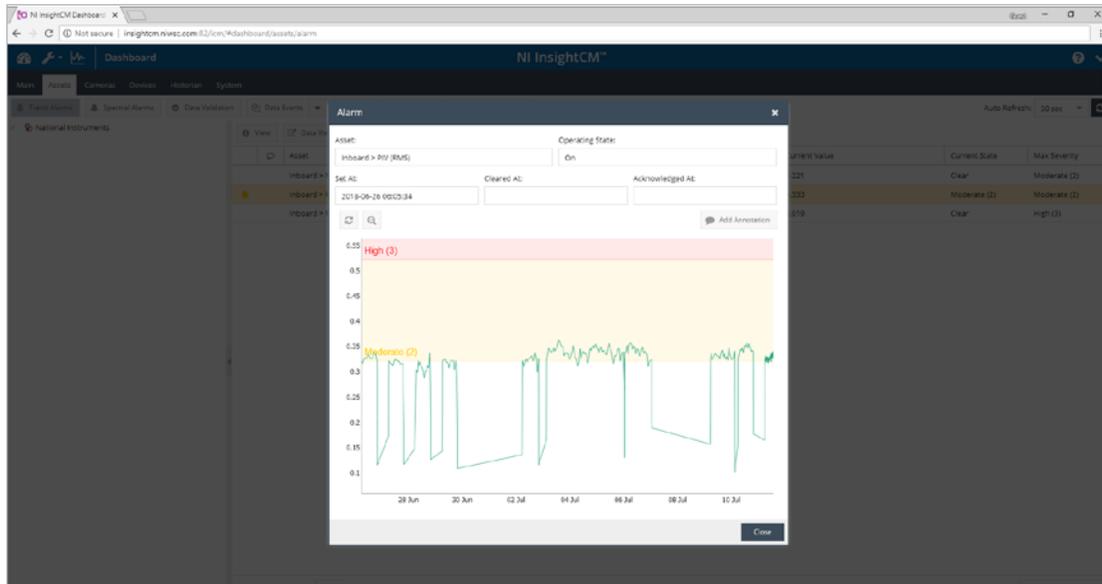


Figure 8. Users can access the InsightCM alarm viewer by drilling down from the dashboard.