

High-Quality and Readiness Sets Magnetic Inspection Laboratory Up for Lasting Success

Lives are at stake. They hang in the balance between disaster and death, a pilot's skills, and the quality of their space or aircraft. That's the critical nature of work in the aerospace industry—the most important bottom line.

The high-quality design, engineering, and manufacture of parts for defense equipment and aerospace vehicles couldn't be more critical. Especially when:

- Rocketing in space at 24,791 mph
- Orbiting Earth at 4.76 miles/s
- Going supersonic at Mach 2.5
- Flying commercial transonic at 600 mph

The quality policy for Magnetic Inspection Laboratory (MIL) employees doesn't require this vital tone. Their mission-critical goal to provide life-preserving metal finishing is always top of mind. Since 1942, MIL has flourished boldly and nobly into the future of flight and space travel by focusing on the company's true value and impact.

Read how MIL works with Monnit® to monitor and manage crucial metal finishing and non-destructive testing (NDT) equipment, facilities, and processes for the defense, aerospace, and other industries in its Chicagoland plant.

Spoiler Alert: The return on investment (ROI) is significant. The MIL maintenance team has the data they need to ensure metal part processing facilities and equipment are ready for scheduled, drive-up, and just-in-time (JIT) orders. It's all easily managed using cloud-based sensor management and real-time monitoring software on mobile devices and computers. Plus, managers get instant alerts via email, text, or voice calls from various fast-install, easily configurable sensors connected to the Internet of Things (IoT).

Leading from World War II to Today

For more than 80 years, Magnetic Inspection Laboratory (MIL) in Elk Grove Village, IL, has honed its specialties of metal finishing, coatings, non-destructive testing (NDT), welding, and other services for the aerospace, defense, industrial, medical, and power market sectors.

Luminous in the critical industrial supply chain, MIL focuses on providing the best value, quality, and timeliness. The company owns over [2,500 prime process approvals](#) as the leading plant for prominent commercial, defense, and aerospace players.

“We’ve built our long-standing reputation as a highly reliable partner and subcontractor for these prime organizations and government contractors,” said MIL President Mark Sullivan. “We pride ourselves in being a one-stop shop to deliver innovative, high-quality products and services, not only for commercial, defense, and aerospace applications but other high-tolerance clientele and industries such as medical.”

Customers of MIL would agree that few businesses offer the same high-quality breadth and depth of services, featuring:

- **NDT processes**—Radiography, fluorescent dye penetrant, magnetic particle inspection (hence their company’s name), and others
- **Finishing services**—Anodizing, chem film, passivation, pre-penetrant etch processes, black oxide, dry and wet coatings, and welding.
- **Top certifications**—From the International Organization for Standardization (ISO), the National Aerospace and Defense Contractors Accreditation Program (Nadcap), the Federal Aviation Administration (FAA), and others



Challenges

To compete for decades and serve tens of thousands of industrial customers, MIL staff has found ways to solve problems quickly and overcome obstacles of seemingly every size. Possibly, no one knows this better than MIL Plant Maintenance Manager Jamie Soderberg.

“I’m spinning about 20 different plates on any given day,” said Soderberg. “We recently finished a multi-million dollar facility renovation, and our team is always juggling many projects. But the first and foremost challenge is our facility. We have to keep it ready. Our top priorities are plant, machinery, and equipment readiness and uptime.”

To that end, Soderberg lists the following challenges to MIL’s readiness:

1. Managing 500,000 cubic feet of air exchange in the metal finishing department. The plant’s air circulation system includes many air scrubbers, exhausters, and 10 make-up air units (MAUs).
2. Keeping more than 60 steam-pressured, tempered process tanks and boilers at optimized pressure and pace with demand.
3. Sizing heat exchangers to maintain tank temperature and reduce plant startup time, energy use, and labor costs.
4. Avoiding sump pump overload or failure and wastewater pit flooding.
5. Maintaining primary plant power and, if necessary, mobilizing inspection, repair, and restart crews quickly to avoid affecting plant startup and availability.
6. Measuring caustic demand in real time by consistently and correctly sizing pump capacity.

The Holiday Weekend Event That Led to Monnit IoT Solutions

Soderberg met Monnit after managing his plant's recovery from a burst frozen sprinkler pipe in the boiler room.

During New Year's Eve and Day, snow clogged some of the MAUs. This made the building's air differential pressure turn negative, with cold air flooding through an exhaust fan into the boiler room during several holiday weekend hours. The incident caused tens of thousands of dollars in damage.

Even though Soderberg and his crew got the plant up and running quickly and met the January 2 production demand, he said at that time, they decided they needed a real-time 24/7 monitoring system for many of their plant processes.



"This is where Monnit IoT Solutions have come through for us," said Soderberg. "They give us low-cost, high-value options for real-time data tracking and notifications of everything we want. We can make the best, most informed, and timely decisions."

Solutions

The MIL Maintenance Team's primary focus is ensuring the plant and its production lines are ready every morning. Following the negative air pressure and burst pipe incident, Soderberg monitors other processes and equipment to assess readiness and prevent problems in real time.

Soderberg and his team have reliable ways to monitor the plant onsite and remotely 24/7. Monnit Remote Monitoring Solutions are at the core of the team's predictive analytics and maintenance program. Currently, the Monnit Solutions that the team has installed include the following:

- An ALTA® Industrial Wireless Differential Air Pressure Sensor on a plant wall and four ALTA Industrial Wireless Standard Temperature Sensors around the plant for data logging climate and caustic soda conditions and sending alerts
- Two ALTA Industrial Wireless Thermocouple Sensors with K-Type Quick Connect and Probe to correctly size or assess how long it takes to heat a tank
- An ALTA Industrial Wireless 50 PSIG Pressure Meter to track the steam pipelines for 60+ multi-process tanks
- An ALTA Industrial Wireless 500 VAC Voltage Meter to monitor the line-powered status of the entire plant
- An ALTA Industrial Wireless Dry Contact Sensor connected to the sump pit float to measure wastewater level and pump status
- The iMonnit® Sensor Management and Remote Monitoring Software on manager and staff smartphones and computers
- An ALTA IoT Gateway to aggregate, protect, and communicate data sent from each ALTA Sensor to iMonnit

"We've solved multiple challenges over the past couple of years with Monnit devices and software," said Soderberg. "We'll continue to look for ways to grow our Monnit network to boost efficiency and prevent problems with the plethora of sensors you provide."

Results

When measuring plant readiness, the best formula the MIL Maintenance Team uses is the plant, and all of its equipment are capable of working all the time for every process. It's imperative, Soderberg says, that whether they use equipment and machinery nonstop for months or only occasionally, at a moment's notice, it must be ready to work reliably.

"Monnit Sensors are critical to our readiness," said Soderberg. "We have the data from these key devices right when we need it to maintain our uptime. Probably the best accolade I could give Monnit is that I take your sensors for granted. They just work."

Handle the Pressure and Heat of Multiple Process Lines

MIL runs more than six different process lines daily using more than 60 steam-heated tanks for anodizing, passivation, chem film, black oxide, cad plating, and etching. One of the big reasons for needing so many tanks is to support the specifications from many different companies, especially the primes.

As Soderberg's team starts the plant systems every workday, they track the steam pressure with an ALTA 50 PSIG Pressure Meter to ensure the pressurized lines reach and maintain a steady 25 PSI. Soderberg can watch the pressure increase in 10-minute increments on his smartphone from home at night as an onsite crewmember prepares for the next day's production.

Two ALTA Thermocouple Sensors help the team know how long it takes for the process tanks to heat, ensuring they have correctly sized the heat exchangers. Rather than connect to a programmable logic controller (PLC) using a USB drive or computer, Soderberg sets the thermocouples to monitor and moves them periodically from tank to tank while watching data trends in the cloud.



Real-Time Data Helps Sustain Maintenance and Conservation Programs

The ALTA Differential Air Pressure Sensor, Temperature Sensors, and Voltage Meter monitor plant environmental and power conditions. The ALTA Thermocouple Sensors and PSIG Pressure Meter track the heat and steam pressure processes. The ALTA Dry Contact Sensor works hard to assess MIL's wastewater pit treatment practices.

"Nothing goes out the door that isn't ready for the local authorities to handle," said Soderberg. "We neutralize the acids and remove any toxic heavy metals. So we go through a lot of caustic soda and monitor it." MIL's caustic soda has a freezing temperature of around 55°F. So if the stored caustic gets below 60°F, an ALTA Temperature Sensor notifies the team to correct the situation.



Additionally, with its environmental responsibilities, the team monitors the wastewater pit around the clock to prevent overflow or the smallest spillover of dangerous chemicals. The pit collects these chemicals before being pumped to the in-house wastewater treatment plant. The Dry Contact Sensor helps monitor the level of the pit contents and sends an alert if it's too high.



Which Sensor's Next?

Soderberg will soon install the Monnit ALTA Industrial Wireless 0–20mA Current Meter. He's planning to use the versatile interface meter to assess the status and production of diaphragm pumps that distribute caustic chemicals through MIL's wastewater treatment process.

ROI

Beyond helping ensure MIL's readiness, there are some intangibles that Soderberg credits Monnit for providing the company.

"By securing readiness, we receive more flexibility and peace of mind," said Soderberg. "The peace of mind is more valuable to me than anything. Sure, there are a lot of potential cost savings from using our network of Monnit Sensors and avoiding catastrophe or downtime. But with our data, we can quickly pivot when something stops or slows. We switch pumps or tanks, change direction, swap processes, and move forward knowing we're ready at any time to do great work."

Monnit Remote Monitoring Optimizes Plant Maintenance Management



Temperature Sensors

Track air and liquid temperatures in plant processing areas from -40°C to +125°C (-40°F to +257°F). Monitor higher machinery and process temperatures up to 400°C (752°F) with a Thermocouple Sensor.

Differential Air Pressure Sensors

Maintain proper airflow in your plant, factory, or any facility by measuring air circulation between two ports. Be alerted immediately when the air pressure changes from your preset parameters in iMonnit.

Pressure Meters

Choose from 50, 300, 750, and 3,000 PSIG meters to measure gas, liquid, or vapor line pressure. Monitor pressure to machines, pumps, or specialized areas and receive instant alerts via text, email, or voice call.

Voltage Meters

Measure the voltage of an AC power system up to 200 or 500 volts alternating current root mean square (VAC RMS) on specified intervals or Heartbeat. Know the power status of the power main or machinery.

Dry Contact Sensors

Deploy this broad-use interface sensor in many factory applications—track production lines, door status, machinery use, tank levels, and more—by detecting if contact is made or broken between two points.

10/2023

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