

Medical Device Manufacturer Improves OEE with a Modern SCADA Solution

PAR Systems partnered to create a unified visualization platform that delivered measurable improvements in wearable device production.

Introduction

A leading med-tech manufacturer needed a SCADA system for a high-volume wearable device production line. Prior automation lines relied on custom data logging tools that generated .csv files and required manual collection and post-processing.

The current data logging process was:

- » Time consuming to obtain meaningful statistic about line operations
- » Limited in terms of available station-level information, which could help steer line improvements and increase OEE
- » Incapable of modifying data in the existing polling architecture, which limited OEE calculations or data analysis flexibility
- » Difficult to scale and modify

The manufacturer needed to:

- » Replace manual logging and analysis operations with a comprehensive data collection and visualization solution
- » Provide comparable charting capabilities in one central location
- » Gain actionable data quickly, so teams could identify performance opportunities and improve OEE in their high production environment

System at a Glance

» Data Ingestion

- 2000 fields for each final assembly (26 unique physical components)
- 220 station cycle-time fields
- 370 fail code fields for dispositioning parts
- 150 reject code fields for rejecting input components
- 900 process data fields
- 2000 unique downtime reasons
- 4 million tags / hour with machine running at production rate

» Visualization

- 6 line-level views
- 75 machine-level views
- 7 dedicated plant floor Perspective clients
- 10+ remote Perspective clients

» Scalable Schema Pattern

- Part tables ranging from 90 PLC fields to 671 PLC fields all reporting to the same chart components



SCADA Design and Development

The data logging process needed an entire overhaul with better data collection, intelligent reporting, and faster insights. To meet the manufacturer's needs, PAR developed a SCADA solution built on Ignition® architecture.

As a full-service systems integrator, PAR offers a unique approach to SCADA design. By applying our three core SCADA methodologies, we were able to create an effective and cohesive visualization solution.

Equipment-First Approach

SCADA systems are often retrofitted to an existing system without full understanding of the equipment operations or data needs.

As a machine builder and full-service integrator, we can leverage our deep understanding of how product moves through our systems, what associated process data can be captured, and how the equipment reacts and recovers from abnormal conditions.

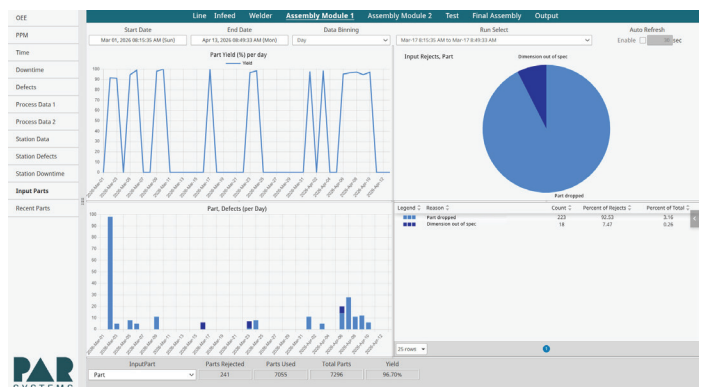
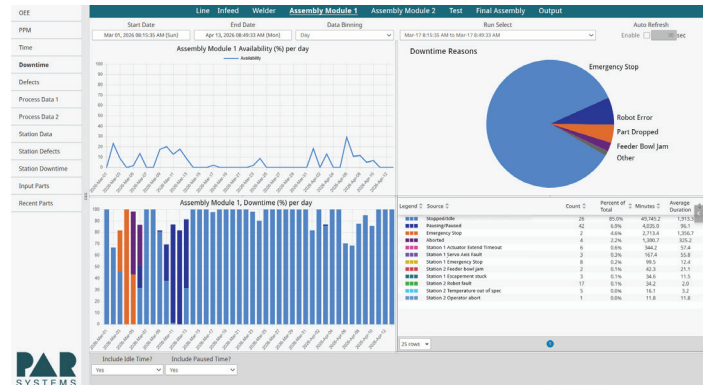
Keeping SCADA in mind during machine development, we can embed the required logic, state tracking, and data models into the machine control framework enabling:

- » A single source of truth
- » Increased reliability
- » Accurate, complete event definitions
- » Consistent data models across equipment
- » Transactions aligned to operational behavior
- » Faster time to insights
- » A stronger, more scalable system foundation

Parallel Development

Furthermore, by developing SCADA dashboards and equipment control code in parallel, PAR can dramatically reduce the overall time from equipment startup to actionable data. A typical SCADA integration project of this magnitude may take a 3rd party, or end-customer, 6-8 months to develop and test. With the traditional model, this time is often added onto the overall program timeline after equipment delivery. By allowing PAR to develop this in parallel with machine debug and testing, months of time was saved.

Additional benefits were discovered when the project team and customers were able to leverage the SCADA solution during pre-FAT runs and early process development to find bottlenecks and performance issues—all before final acceptance.



Web-based dashboards developed for a wide range of users: from plant floor technicians to C-suite executives. Our tiered layout enables users to find the right data for their needs.

Event-Based Architecture

Many SCADA systems rely on passive polling where calculations are performed in a PLC and consumed by external systems. This can lead to bottlenecks, bandwidth concerns, and calculation limitations. To address the shortcomings of passive polling, we developed a logging architecture based on transactions and events.



The architecture provides a record of all parts, their associated process data, and critical machine events enabling a wide range of calculations that live at the SCADA layer instead of the PLC layer. Additional calculations now available include:

- » Downtime codes and durations
- » Multiple reject codes per part
- » Per station cycle times, yield, and reject codes
- » Custom time-binning and aggregations
- » Run-specific statistics

While providing increased data flexibility and calculation options, the event-based architecture also helps reduce network overhead and increase responsiveness.

Benefits

By leveraging a few unique approaches, PAR developed a new SCADA solution that:

- » Eliminates disparate data concerns
- » Improves flexibility of data calculations and analysis
- » Removes complicated calculations from PLC
- » Substantially decreases manual data collection and post-processing

Since implementation, the med-tech manufacturer has gained clear visibility into equipment behavior and has identified the stations contributing to yield loss. The SCADA solution has also uncovered process drift that was previously understood only through anecdotal observations. Lastly, by leveraging modern commercial technology built on Ignition, the SCADA system has integrated directly with the customer's existing manufacturing technology stack.

About Us

PAR Systems has spent more than 65 years engineering solutions that bring innovation to life. The company partners with customers in highly regulated and precision industries including Life Sciences, Aerospace, Nuclear, and advanced industrial sectors to design and integrate custom automation systems that scale ideas into reliable production.

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