

A Process Analytics and Optimization System for a Composites Parts Manufacturer

Overview

Nagarro helped the client, a joint venture between two of the world's leading aerospace companies, by creating a process informatics system to analyze data and optimize the manufacturing process for its composites based product, thus helping the company improve its product quality and process yield.

Problem Description

Nagarro's client manufactures a high value composite material product that requires a complex manufacturing process with multiple steps. Slight changes in the material composition, history, environmental conditions, or process variables strongly affect the finished part quality and make the manufacturing process difficult to control. The client needed an intelligent analysis system that would acquire and manage process information, perform automated data analyses using statistical techniques, and determine relationships between key input variables and process quality. This would allow the client to control the key variables to the required specifications and maintain quality. Also, the system needed to integrate with a new MRP system installed in the plant to exchange and synchronize information.

Solution

Nagarro's team worked together with the client's engineering teams to design a scalable, comprehensive, web-based solution to meet the client's needs. The solution allowed shop floor personnel to enter information, engineers to analyze and download data, and managers to monitor overall performance of the process using color coded dashboards. The system also interfaced with multiple process equipment to acquire data, run statistical analysis, and generate periodic reports on individual process steps.

Specific features of the system:

- Data acquisition, management and archiving from multiple process steps
- Generic and scalable analysis framework system, that allowed different types of statistical analyses to be integrated into the system
- Scheduling module that executed programmed analyses at periodic intervals as defined by users, and emailed results to each user
- Dashboard views for managers with full drill down of each process step, as well as product and process variables to monitor performance
- Email notification system to monitor key process variables and provide warning when they were out of specification
- Comprehensive role and group based security system, to provide restricted access to employees, vendors, and customers
- Specialized modules to optimize key

process steps with custom algorithms to control process variables

- Integration with single sign-on using the client's active directory implementation and with the MRP system to exchange data

Benefits

- Faster response to critical issues through real-time process monitoring and automated alerts (savings exceeded \$1 million in the first six months from reduced downtime and improved yield)
- Improved process quality and product yield (currently over 95%)
- Reduced time-to-market for new products due to accelerated process development cycle.
- Early warning of potential issues through automated analysis system providing unified platform for engineers to analyze, share, and monitor process performance
- Ability to grow with client's future needs through use of generic and scalable data collection and analysis frameworks
- Clear understanding of the impact of process variables from analysis of prototype and test information
- Allows client to collaborate with customers and vendors through a secure environment
- Enables client to comply with government regulations relating to data security and archiving