



# PREVENTIVE MAINTENANCE MONITORING SYSTEM

## THE CHALLENGES

In process and manufacturing plants, facilities unplanned equipment shutdowns can be very costly. Often equipment failures can be predicted or prevented completely if key parameters are identified and monitored properly. Reducing unplanned equipment down time and the high costs associated with them has been a long term goal of our customer, one of the world's largest processors of agricultural goods. Currently, our customer monitors vibration of key equipment using handheld measurement systems; they would like to use a permanent, less labor intensive solution

Key Issues were:

- Avoid modification of equipment components
- System must be wireless and use existing HART wireless network.
- Allow monitored parameters to be displayed on current NovaTech D/3 DCS.

## THE SOLUTION

L&T Technology Services provided a cost effective monitoring system to record and analyze vibration and temperature data for bearings on process fans. The system provided by LTTS was scalable for monitoring a single or multiple fans. The system could also be easily modified to measure other parameters if so desired in the future.

LTTS's engineers provided all system specifications, drawings, and software:

- Concept Design and Validation
- Custom Software Development
- Project Management
- System Installation

## BENEFITS DELIVERED

LTTS delivered the following results:

- Monitoring system which performed all necessary data analysis avoiding increased processor burden on customer's DCS.
- Initial reduction in labor of 50% with potential for future reduction.
- Improved maintenance planning and reduction in unplanned equipment downtime.

## TEST AND AUTOMATION SERVICES

### Mechanical & Electro-Mechanical System

- Mechanical System Engineering & Design
- Mathematical Model Development
- Test Stand Development
- Actuator Requirements / Specifications

### Engineering Application Development

- LabVIEW, MATLAB, Simulink, Stateflow
- Excel (VBA), Java, C++, Python
- HTML, PHP, .NET

### Data Acquisition

- Data Acquisition / Data Analysis
  - eDAQ, National Instruments, Arduino, Labjack
  - Vector CANcase
- Instrument Test
- Test Stand Development

### Control System Development

- Automation
- Signal Processing

### Power Systems

- Engine Performance Analysis & Simulation
- Emissions Simulation
- Test Cell Design

### Multiple Applications

- Heavy Equipment
- Agriculture
- Electronics
- Automotive
- Consumer Products
- Industrial Processes

### Simulation / Analysis Process Streamlining

- MATLAB scripting to automatically process large batches of data
- Integrate modular MATLAB and Python GUI applications for complete Windows based automation and optimization of complex simulations in a single unified user environment.

### Web Based Interfaces to Databases

- Project Tracking
- Part Information
- Inventory and Asset tracking

### Mechanical Design CAD Scripting Bench Software Validation

Compact measurement and control solutions that allow software engineers the ability to quickly validate the affects of code changes on the target ECM's right at their desktop or workstation.

- Connectivity to multiple communication buses
- Stand Alone processor options
- Analog, PWM, and Digital signals
- Powered by NI VeriStand / Test Stand for fast configuration
- FPGA capability for high speed complex solutions
- Automated Test Sequences for repeatability

### Software Issue Prevention & Root Cause Analysis

- Model based control for true Model-, Software-, and Hardware-in-the-Loop Solutions
- Turnkey systems with the capability of integration of external components
- Software regression testing/results linked to bug tracking & reliability software
- Fault insertion and load-based testing of circuits

