



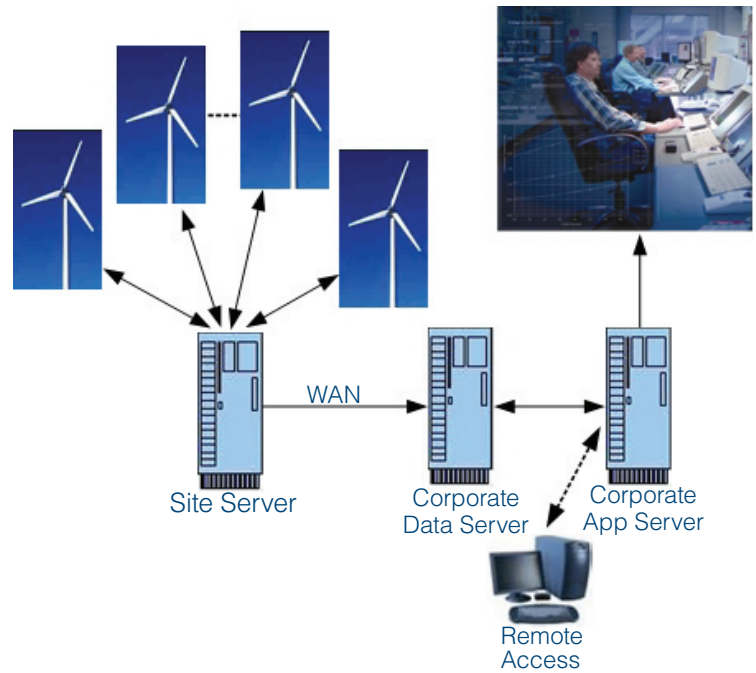
The Wind Turbine Monitoring Solution

Wind turbine condition monitoring has become a valuable and necessary activity to best manage the asset's availability and reliability. Because of the unique operation of this type of equipment and the specific fault situations that may develop, wind turbine operators have turned to advanced monitoring technologies to aid in the overall understanding of their equipment's condition.

Scientech provides the type of technologies and tools that can make a significant difference in a successful condition monitoring initiative.

The key element of the Scientech wind turbine monitoring solution is our PdP (Predictive Pattern recognition) application. When combined with Scientech's Rules Engine application, automated condition assessments of the monitoring results are delivered. Adding Scientech's CMAX product provides integration with other periodic technologies for a thoroughly integrated approach to equipment health prognosis.

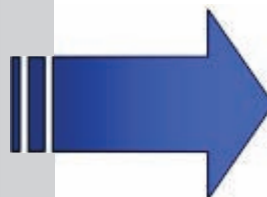
Sensor	Description	Unit	Actual	Predicted	Variance	Residual	Res. High	Res. Low	Active	In Alarm	Trend
3P02105A	UZ A BFP PREL OIL PRESS	P035	15.828	16.641	6.553	-0.812	0	0	Yes	Yes	Trend
3P12102A1	A BFP DR SW TEMP	DEG F	0	150.639	13.268	-150.639	0	0	Yes	Yes	Trend
3P12102A0	A BFP DR SW TEMP	DEG F	0	140.339	9.909	-140.339	0	0	Yes	Yes	Trend
3P11201A	UZ A BFP SUCTION FLOW	KL8/H	1414.097	1331.453	0.227	67.904	0	0	Yes	No	Trend
3P11201A	UZ A BFP SUCTION PRESS	P030	524.821	546.542	0.347	-27.353	0	0	Yes	No	Trend
3P11204A	UZ A BFP SUCTION TEMP	DEG F	318.281	307.33	0.371	10.952	0	0	Yes	No	Trend
3P11202A	UZ A BFP DISCHARGE PRESS	P035	2336.523	2357.74	0.119	-21.217	0	0	Yes	No	Trend



Scientech's monitoring tools are focused at providing early insight into developing problem situations and component anomalies. Scientech's applications are directly aimed at the wind turbine's components that can benefit from advanced monitoring:

- Rotor
- Blades
- Bearings
- Generator
- Hydraulic System
- Pitch Control
- Main Gear
- Gear Box
- Yaw System
- Nacelle

With wind turbine reliability being a key operator concern, Scientech's tools add value and provide the results that are needed. Early warning capability combined with flexible data integration and alarm processing provides the comprehensive, real-time monitoring needed to minimize unplanned maintenance and reduce operational risk.



Signal Drill-Down
Information Visualization
Trending and Reporting
Results Interpretation

Scientech's Solution Technologies

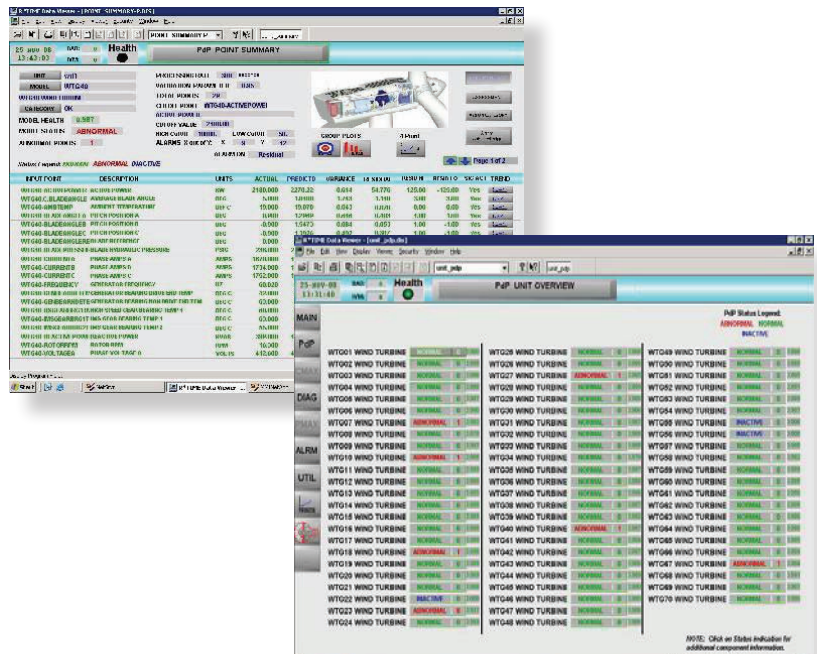
- **PdP** is a real-time, continuous, advanced pattern recognition application that relies on uniquely configured, component based models that provides early identification of developing problems and in-depth review of normal and abnormal operating conditions.

- **CMAx** is a component monitoring, integration, visualization, and assessment tool that provides a portal to various monitored data sources. CMAx enables you to monitor equipment condition at your site(s) on an independent real-time platform to provide additional insight to developing problems.

- **Rules Engine** is our automated condition assessment application that utilizes all configured data information to provide real-time component specific fault analysis utilizing "logic tree" functionality. All assessment rules are completely user configurable and easily applied to any and all monitored components.



*Deployment of Scientech's tools is simple. All of Scientech's real-time monitoring applications utilize existing data signals available thru installed SCADA, DCS systems, historians, and other installed data monitoring systems. As such, Scientech's tools can utilize just about any configured data signal. We have developed interfaces for nearly all of the available control systems, so reliable installation of Scientech's tools is well established. With a common R*TIME database platform underlying all applications, seamless integration of all the Scientech's tools is realized.*



PdP, CMAx, and Rules Engine are part of Scientech's FAMOS (Fleet Asset Management Optimization Solutions) which also include:

- **PMAX** – On-Line Thermal Performance Maximization application
- **PEPSE** – Performance Evaluation of Power System Efficiencies application for assessing integrated heat balances for an entire plant

Scientech's vision of a truly effective and optimized equipment condition monitoring initiative relies on the following:

- Leveraging available monitoring information
- True integration of all applied technologies
- Real-time indication of equipment health

Scientech's wind turbine condition monitoring solution fulfills these objectives very effectively.

The Scientech wind turbine condition monitoring solution is but one of Scientech's FAMOS tool applications focused on providing early insight into developing problem situations and component anomalies.

For additional information contact Scientech at 208-524-9200 or visit <http://famos.scientech.us>.

