

Detect and Identify the Onset of Component Failures

ACMwt™ | Asset Condition Monitoring for Wind Turbines



Site Overview



Fleet Overview Screen



Structure Overview Screen

OVERVIEW

The ACMwt™ (Asset Condition Monitoring for Wind Turbines) is an online real time condition monitoring system that incorporates the industries best of breed features and functions.

The ACMwt™ for Wind Turbines has been exclusively developed for monitoring critical wind turbine components. The system integrates two sensor technologies, acoustic emission detection and conventional vibration monitoring. The advantage of using both technologies together is that neither technology on its own has been shown to detect 100% of critical defects or provide indications of impending failure with adequate advanced warning. This is an import breakthrough in the wind turbine economics because of the need to reduced operation costs and increase component reliability.

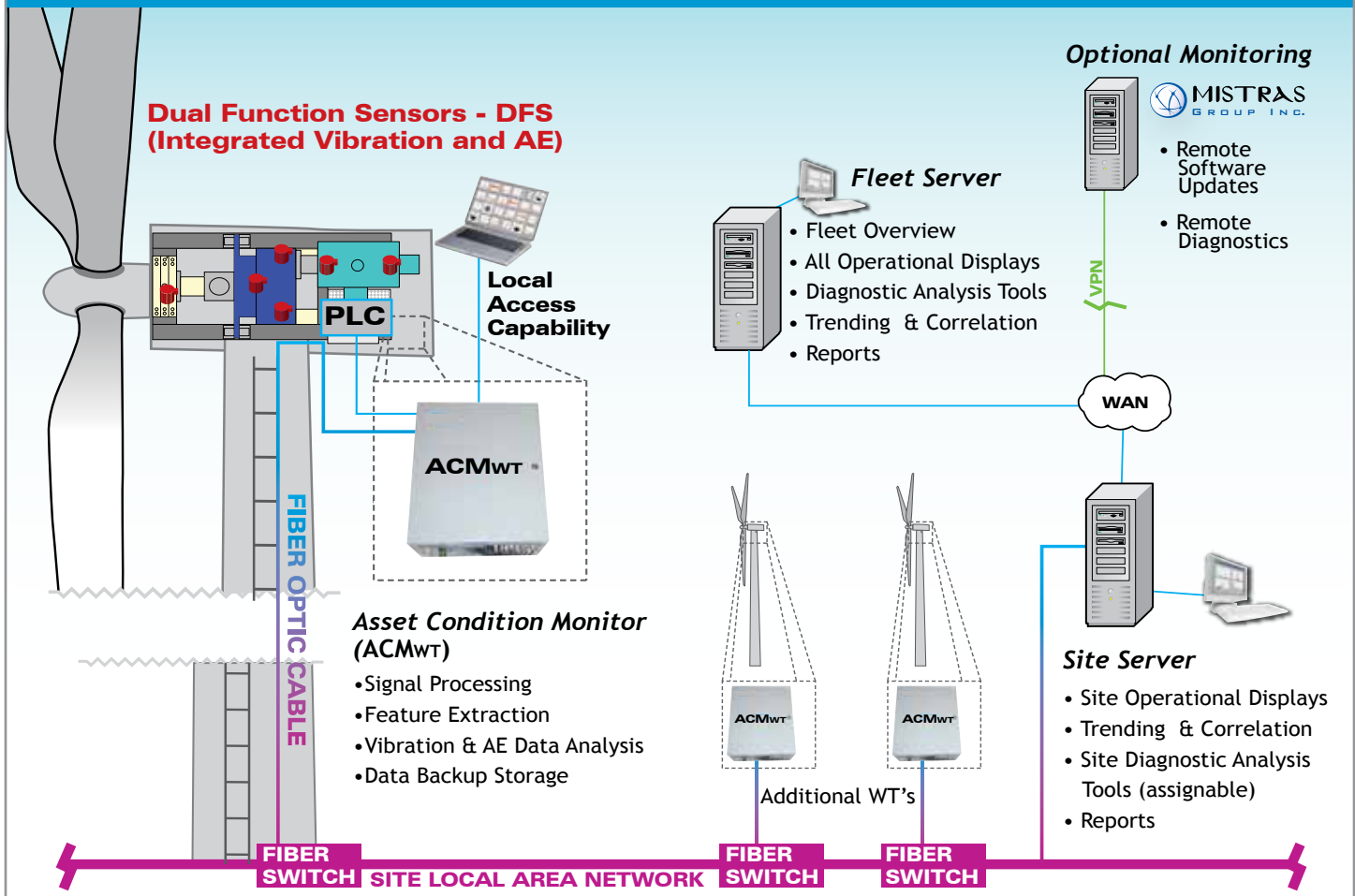
ACMwt™ FEATURES

- **Vibration & AE technology:** Early wear, fault detection & fault isolation
- **Dual Function Sensor:** True accelerometer and AE sensor, recording low frequencies (less than 20 kHz) and high frequencies (greater than 200 kHz) simultaneously in one sensor body
- All signal processing, e.g. FFT, feature extraction, and alarm determination, is performed within the Asset Condition Monitor (ACMwt™) module requiring only a limited data set to be moved across network connections. Local direct laptop connection display capability through the ACMwt™ module
- **Sensor Data Fusion:** Integrates and correlates analog & digital parametric signals
- Web based system access with configurable MS Windows™ display & navigation.
- Competitive price point

MONITORING SOLUTIONS

- **Dynamic Load:** Stress loads (torque, rpm, lubricant, angular momentum, etc.
- **Electrical Faults:** Arcing, grounding, rub and electrical load imbalance
- **Rotor Imbalance:** Asymmetric pitch, blade cracking, imbalance, misalignment and eccentricity
- **Surface Defects:** Bearing faults (location & isolation), gear faults and shaft faults
- **Lubricant:** Effectiveness and breakdown
- **Wear:** Mechanical wear cracks and spalls, looseness, rubbing and seals

ASSET CONDITION MONITORING FOR WIND TURBINES (ACM_{WT})



EASY TO NAVIGATE DISPLAYS

Fleet Display: The fleet level display shows all assets within a Regional organization and the current operational condition status and availability. Within the Dashboard area, the alarm status of every asset is summarized for all combined regions. In addition the alarm status of every asset is displayed and is broken down by individual Region. Color coded icons graphically represent the alarm status (as described below) by category clearly alerting operations personnel to a potential need for attention at the highest level. Four color categories are provided

- Red – Critical Alarm
- Yellow – Non-Critical Alarm (Warning)
- Green – Indicates an “all-OK”
- Black – Turbines in outage or on turning gear

Site Display: Selection of a site from the fleet or regional overview pages opens the site overview display. The site overview shows the alarm status of each wind turbine asset using the same color code convention used in the fleet display and for all displays in the hierarchy. The dashboard display on this page can also be used to provide a summary of the total number of alarms on all turbines at this site. Within this Site Display, the data inside a Black box takes on a different meaning than in the Fleet/Regions display mode. In the Site display, the numeric data contained inside a Black box represents the total number of hours that this turbine has been in outage or on turning gear.

Detail & Analysis Display: Selection of an individual wind turbine from the site display navigates to that specific wind turbine providing key information displayed in 2 sections;



ACM_{WT}: Asset Condition Monitor

1. Cut away graphic representation of a wind turbine drive train showing the dual function sensor locations and their individual status.
2. User selectable multiple trending and correlation displays

In these displays, the analyst will see what parameters are in alarm, what that level is, what the set points are for Alert, Fault, and Statistical Alarms.

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**Local Presence,
Global Reach!**