

# IPS WT

Intelligent failure prognostics for commercially optimal WT fleet reliability management

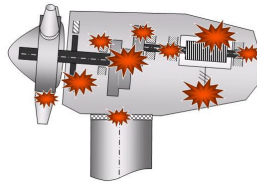


**CASSANTEC**

Zurich, Switzerland ♦ Cleveland, Ohio, U.S.A.

## What is at risk?

For many wind farm (WF) operators world-wide, profitability is at risk: with advancing wind turbine (WT) age, challenges of WT reliability jeopardize WF economics. The risk of wear-out failure increases for critical WT components. Yet, as failure is not an



event, but a gradual process, it can often be detected and intercepted at an early stage

through the right prognostic techniques:

- ▶ Drive train failure risk – 5% p.a.
- ▶ Gearbox failure risk – 10% p.a.
- ▶ Converter failure risk – 25% p.a.

With evolving WT technology, prognostic techniques are progressing as well. A new generation of intelligent prognostic systems (IPS) and automated services has entered the market, allowing WF operators to detect and prevent mechanical and electrical faults of WT earlier and with higher accuracy than traditional condition monitoring and diagnostic systems did.

Cost- and risk-related benefits of IPS WT:

- ▶ Reduced risk and cost of WT malfunction, failure and damage;
- ▶ Reduced risk and cost of downtime and lost power output;
- ▶ Reduced preventive maintenance and life cycle cost;
- ▶ Reduced safety risk and insurance costs.

## Who is Cassantec?

Cassantec (= Cassandra Technologies) is a leader in prognostic technologies for industrial reliability management. We



Cassandra, prophet of critical future events in the Greek mythology

provide customized and fully automated state-of-the-art solutions for failure prognostics in wind power assets, extending far beyond traditional condition monitoring and diagnostic systems.

Our unique and protected technology is based on a novel blend of best-practice

techniques from Artificial Intelligence, Data Mining and Machine Learning, allowing WF operators to achieve their full potential of technical and commercial reliability.

Our key differentiators are:

- ▶ Extended prognostic accuracy and horizon through detailed stochastic models – *no predictive guesswork*;
- ▶ Unique diagnostic scope through automated learning of entire WT fleet – *no simple, static alert rules*;
- ▶ Ultimate focus on prospective commercial results – *no focus on retrospective data and trends*;

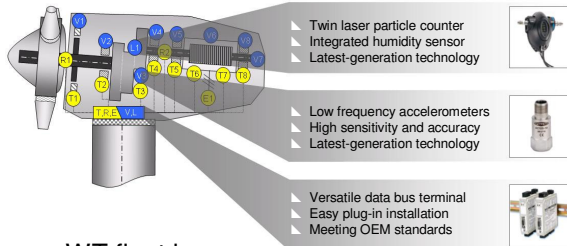
Cassantec cooperates with renowned universities and specialized consulting firms world-wide. Reference clients include leading power, chemical and steel corporations in Europe and North America.

## How does IPS WT work?

The commercial and technical benefits of IPS WT can be achieved in three steps.

### Step 1: Hardware Customization

Much of the data required by IPS WT, such as speed, thermal and electrical parameters, may be provided by the control system (SCADA) of your WT already. Further data such as vibration and lubricant parameters need to be captured by additional sensors customized to your WT. These sensors are based on the latest technologies and integrate into your WT without hardware redundancies. All sensors, related power and data connectors are included in the IPS WT package.

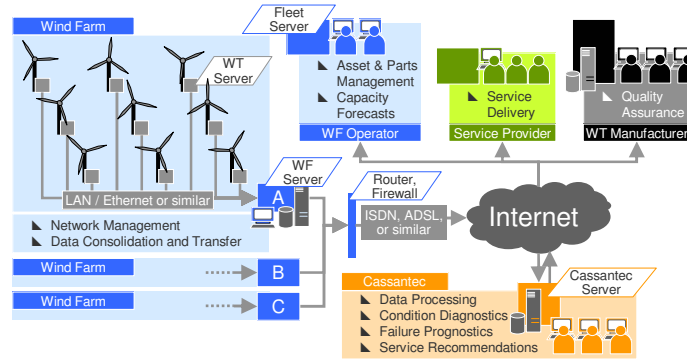


If your WT fleet has already been equipped with a condition monitoring system (CMS), we may be able to utilize some or all of its installed hardware components for IPS WT.

### Step 2: Intelligent Data Analysis

Once the customized hardware is installed, critical condition and process data of your WT is captured, bundled and transferred in periodical intervals by your WF server, and analyzed by Cassantec. The computational analysis utilizes data histories of the entire WT fleet. Intelligent condition diagnostics

and failure prognostics are supported through automated, distributed learning.

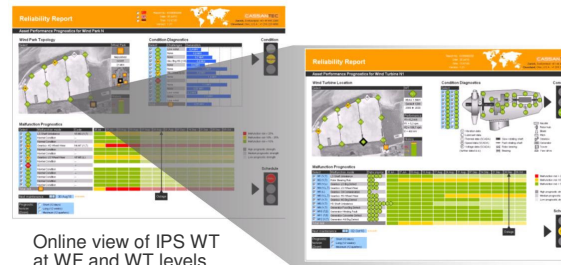


### Step 3: Optimal Asset Management

Diagnostic and prognostic results are being delivered through online Reliability Reports at WF and WT levels, including

- ▲ Commercially optimal fleet maintenance schedule;
- ▲ Detailed and justified service recommendations;
- ▲ Configurable prognostic alerting and alarming via e-mail and SMS.

Reliability Reports can be accessed via web browser, and offer interactive functions such as selection of data sources or prognostic horizon (10, 100, 1000 days).



## Where can you find us?

We are co-located in Europe and North America, and deliver our products including hardware components and multi-lingual online services world-wide.

Servers, data repositories and support staff for our online services are located in our headquarters in Zurich, Switzerland. We offer service levels tailored to your needs, and also provide onsite support if required.

Please contact us by e-mail or telephone to schedule a free half-hour web demo of IPS WT, to obtain a price quote or to set up a pilot application. For customization of IPS WT, please be prepared to provide a technical specification of your WT models.

### Zurich Office

Cassantec Ltd.  
 Technopark Zurich  
 Technoparkstrasse 1  
 CH-8005 Zurich  
 Switzerland  
 T: +41 44 445 2260  
 F: +41 44 445 2261



### Cleveland Office

Cassantec U.S. Office  
 Insight Services Center  
 20338 Progress Drive  
 Cleveland, OH 44149  
 U.S.A.  
 T: +1 216 220 4890  
 F: +1 216 251 2515  
 E: info@cassantec.com  
 W: www.cassantec.com

