Wind Solutions

BLADEcontrol ® Rotor Blade Monitoring
Reduce unplanned downtime, increase profitability

Weidmüller ⊃⊂

BLADEcontrol®
Intelligent rotor blade monitoring

Weidmuller's BLADEcontrol® rotor blade monitoring system has been successfully used to increase the yield of wind turbines since 2004.

Condition Monitoring System

With BLADEcontrol®, you can detect performance and structural-related issues such as aerodynamic imbalances, trailing edge cracks, spar web delamination, blade bearing damage and blade tip damage caused by lightning strikes by measuring the vibration response inside the blade.

- Optimized planning of repairs through condition based maintenance
- Detection of critical ice buildup
- Internal and external crack growth monitoring
- Automatic stop and restart minimizes yield loss
- Yield optimization through early detection of rotor blade misalignment
- Minimize unplanned downtime and reduce TCO

WebVis Data Visualization

Unlock turbine insights using our web-based visualization and analysis suite, WebVis. The overview dashboard highlights single turbine and fleet-wide diagnostics allowing you to identify anomalous behavior, minimize unplanned downtime and maximize productivity.

- Securely accessible data
- Streamlined UI/UX fast tracks diagnoses
- Real-time FFT analysis
- Multi-variant assessment (power, wind speed, pitch angle, etc.)
- Verification of structural integrity through continuous monitoring of natural frequencies

Custom Monitoring Services

Our team of blade engineers and data scientists integrate with your team to provide technical insight and analysis that keeps your rotor spinning. We create custom algorithms that fit your specific use case to increase yield and provide safe and efficient operation.

- Automated alarms and notifications that flag anomalous behavior
- Customer-specific analyses and insights related to turbine health and performance
- Updates and upgrades for seamless CI/CD
- Continuous 24/7 monitoring and analysis

Sensor

Access Point
Nacelle

Sensor

Hub
Measurement
Unit

Evaluation and
Communication
Unit
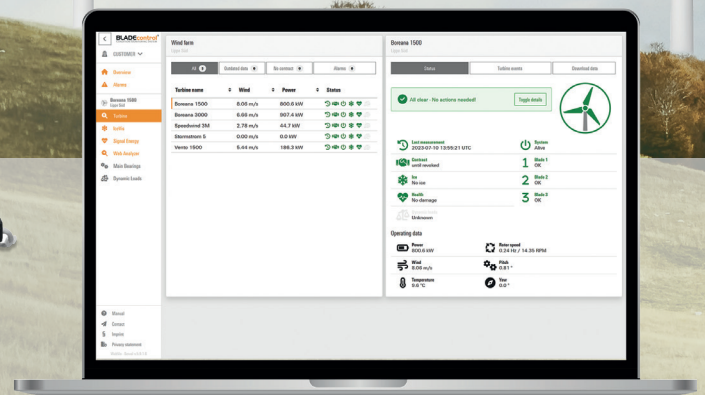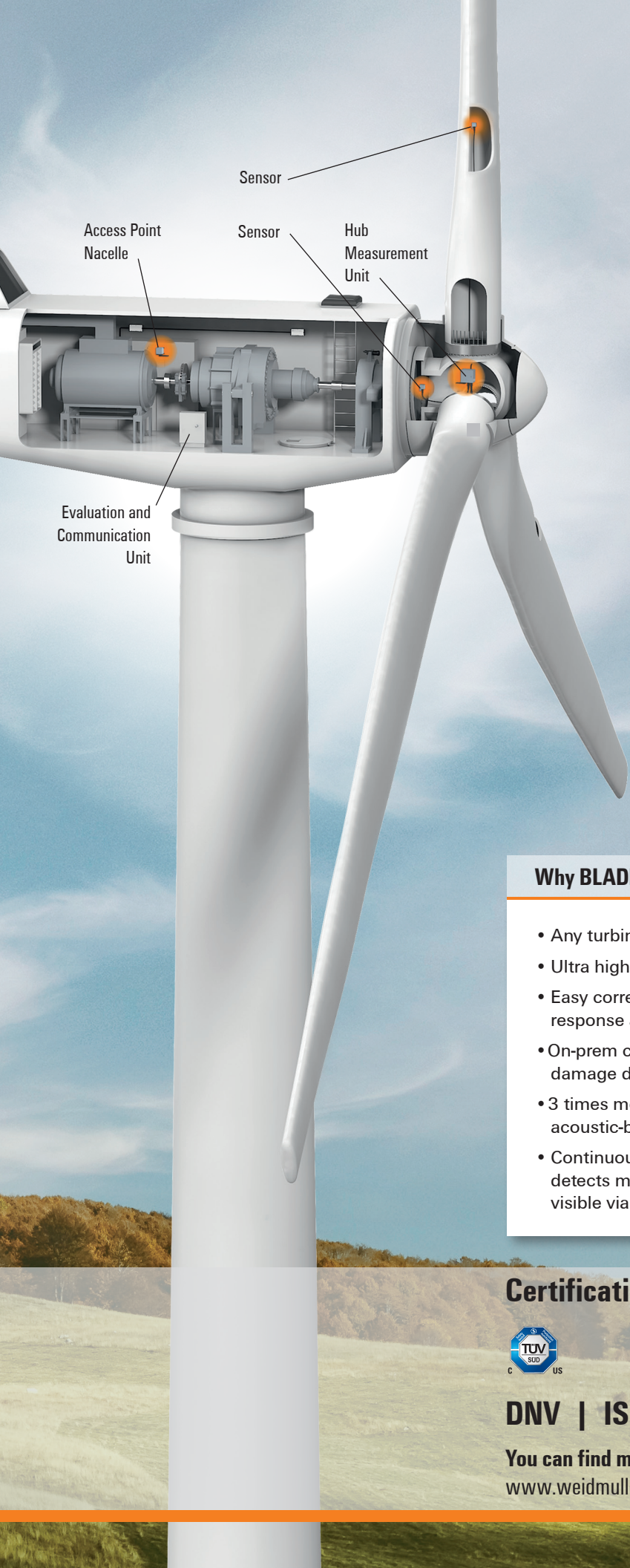
BLADEcontrol® at a glance
Our expertise - your success

450 Offshore

5,450 Onshore

More than **>24,200** machine years of **experience**

Certification **CMS system**

Global in over 30 countries

Certification **Ice detection**

>100 Blade types

>213 Turbine types

Why BLADEcontrol®?

- Any turbine/any blade
- Ultra high resolution data
- Easy correlation between vibration response and turbine metadata
- On-prem custom AI/ML models for damage detection and prediction
- 3 times more accurate than acoustic-based platforms
- Continuous vibration monitoring detects most cracks before they are visible via drone inspection

Certification:

TÜV SÜD C US

DNV | ISO 9001:2015

You can find more information on our certification here:
www.weidmuller.com/bladecontrol

BLADEcontrol®
Condition monitoring expertise

Turbine information dashboard
Detailed information is available for each turbine, including blade status, dynamic load indicators and overall system health.

Turbine QuickSwitch™

Custom Date Selection

Automatic Power Curve Visualization

Detailed evaluation
Custom user-selected filters enable easy trending of blade and turbine metadata.

BLADEcontrol®
Longitudinal crack detection

Longitudinal Crack - Blade 3 Progression
Vibrational energy in flapwise direction.

Legend:
- Blade 1
- Blade 2
- Blade 3

Y-axis: Normalized Signal Energy (50000, 100000, 150000, 200000, 250000)

X-axis: Date (Aug 24, Sept 7, Sep 21, Oct 5, Oct 19, Nov 02, Nov 16, Nov 30)
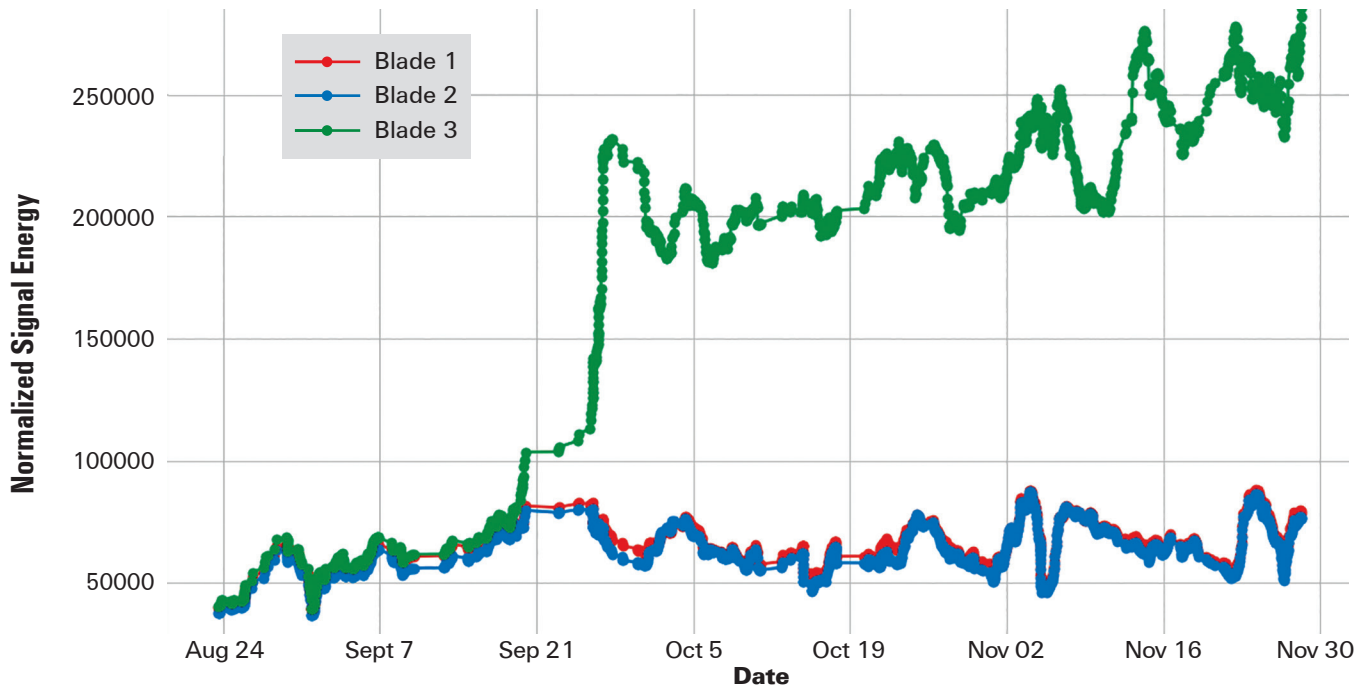
Energy spectrum
BLADEcontrol® detects initial crack formation and deterioration in blade 3.

2.5m
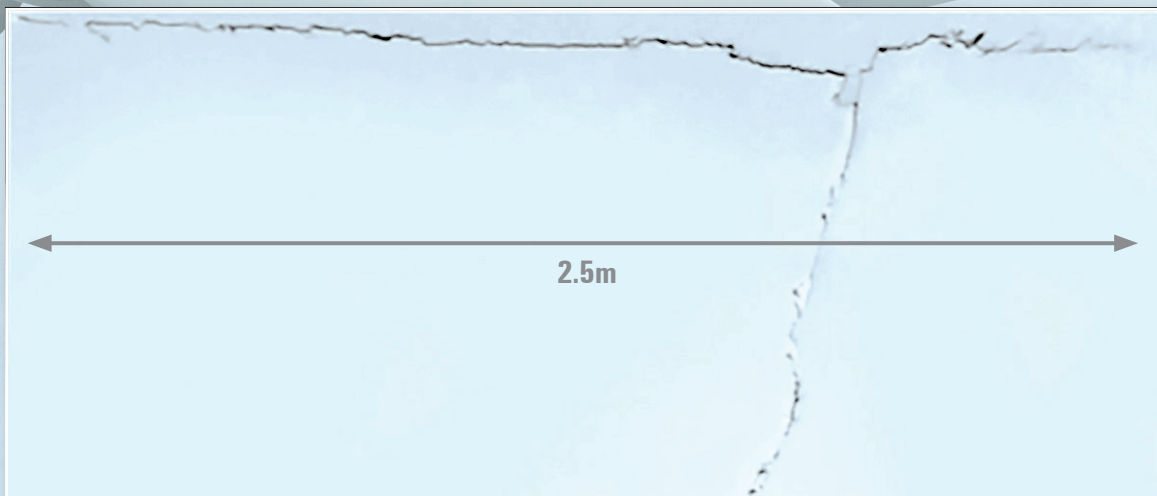
Visual inspection
Initial longitudinal crack grows and branches into chord-wise crack.

BLADEcontrol®
Catastrophic damage prevention

Chordwise Crack - Blade 3 Progression
Vibrational energy in edgewise direction.

Legend:
- Blade 1
- Blade 2
- Blade 3

Y-axis: Normalized Signal Energy (0.50, 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25)
X-axis: Date (Sep 03, Sep 17, Oct 01, Oct 15)
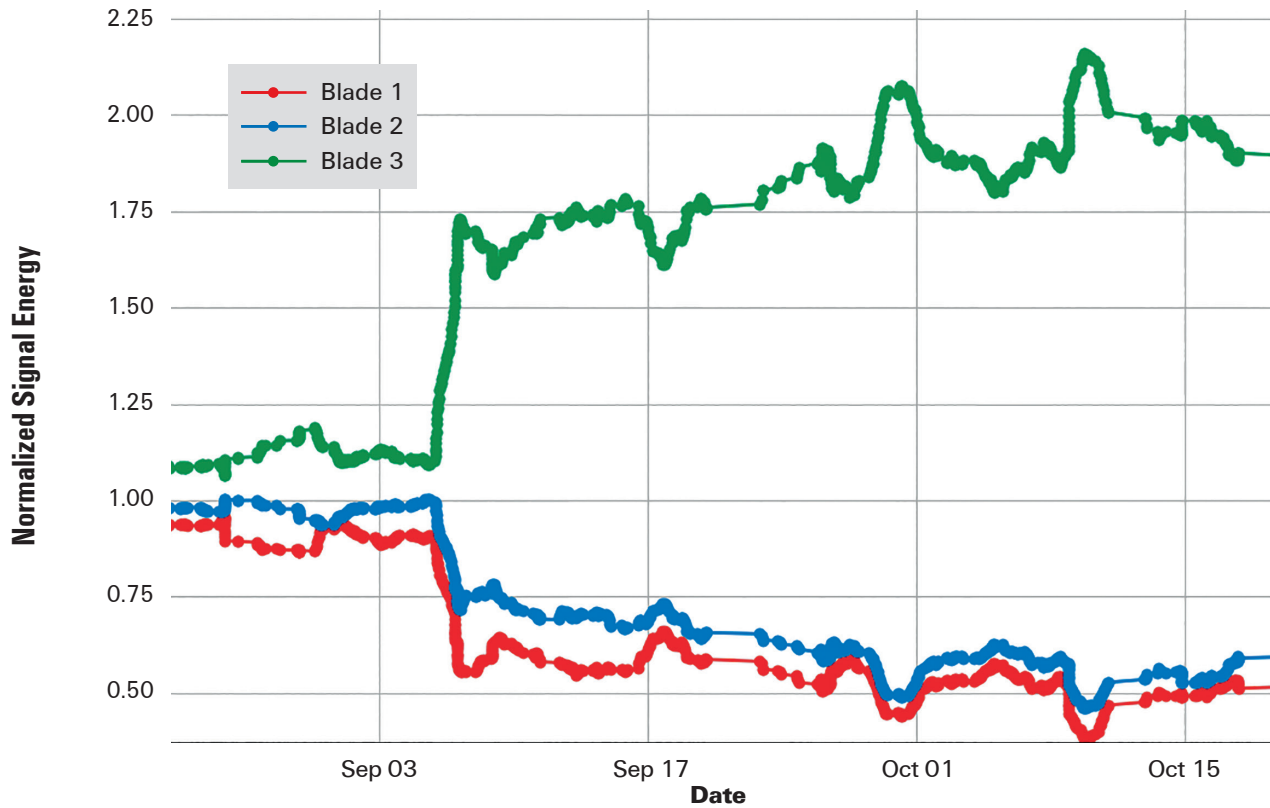
Critical damage detection
BLADEcontrol® can identify critical damage in rotor blades before catastrophic failure. Notice the increased vibrational response for blade 3 as the crack becomes more severe over time.

Identify damages before failure
Early detection of damage on major components increases turbine energy output and lowers the total lifetime cost of ownership.
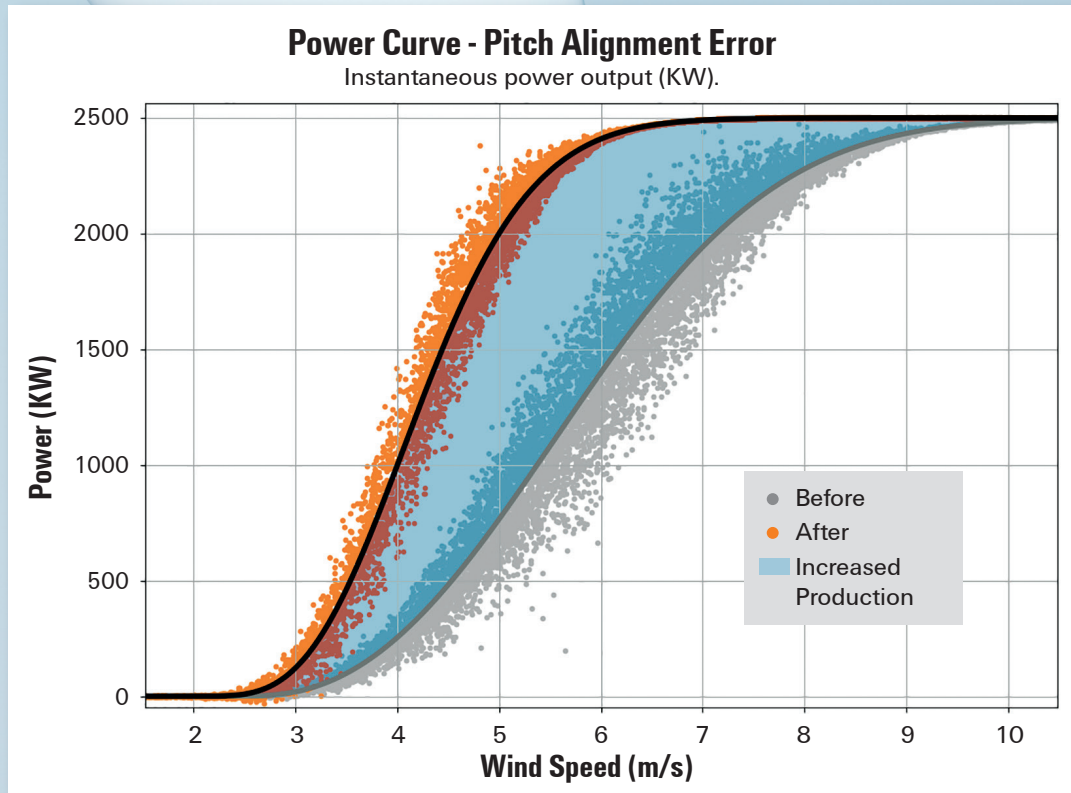
BLADEcontrol®
Performance optimization

Power Curve - Pitch Alignment Error
Instantaneous power output (KW).

Legend:
- Before
- After
- Increased Production

X-axis: Wind Speed (m/s)
Y-axis: Power (KW)

Aerodynamic imbalance detection
BLADEcontrol® can help increase your turbine's efficiency by detecting pitch and yaw alignment deviations.

Highly sensitive sensor technology – directly on the rotor blade

BLADEcontrol® continuously records the condition of each individual rotor blade and perceives even minor changes. The risk of expensive repairs is reduced and the economic efficiency of the entire wind turbine increases.

BLADEcontrol® advantages at a glance
- Increased turbine availability
- Extended service life of the rotor blades
- Reduced downtimes
- Ability to plan repairs
- Optimum turbine efficiency
- Optimized operation and extended service life
- Measurable increase in revenue

BLADEcontrol®
CONDITION MONITORING SYSTEM

Weidmuller – Your Partner in Smart Industrial Connectivity

As experienced experts we support our customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. We are at home in their industries and markets and know the technological challenges of tomorrow. We are therefore continuously developing innovative, sustainable and useful solutions for their individual needs.
Together we set standards in Smart Industrial Connectivity.

Have we made you curious? We would be happy to inform you on all innovations in the current version of our WebVis.

Let's discuss your specific project!
Make an appointment with us or send us an e-mail.

We look forward to a dialogue with you!

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