



RISK INFRASTRUCTURE

Built for owners and operators. Trusted by insurers.

WIND ENERGY GROWTH BRINGS ESCALATING RISKS.

Aging fleets, bigger wind turbines, rising insurance costs, and volatile energy markets threaten the operational and financial health of wind park owners. Traditional solutions can't keep up.



INCREASING DOWNTIME COSTS

Longer lead and production times for spare parts increase downtime risks.



CONTRACTUAL RISK OFFLOADING

Modern Full Service Agreements (FSAs) have limited liabilities for new, bigger and aging wind turbines.



SKILLED LABOUR SHORTAGE

Reduced workforce intensifies workload and operational complexities.

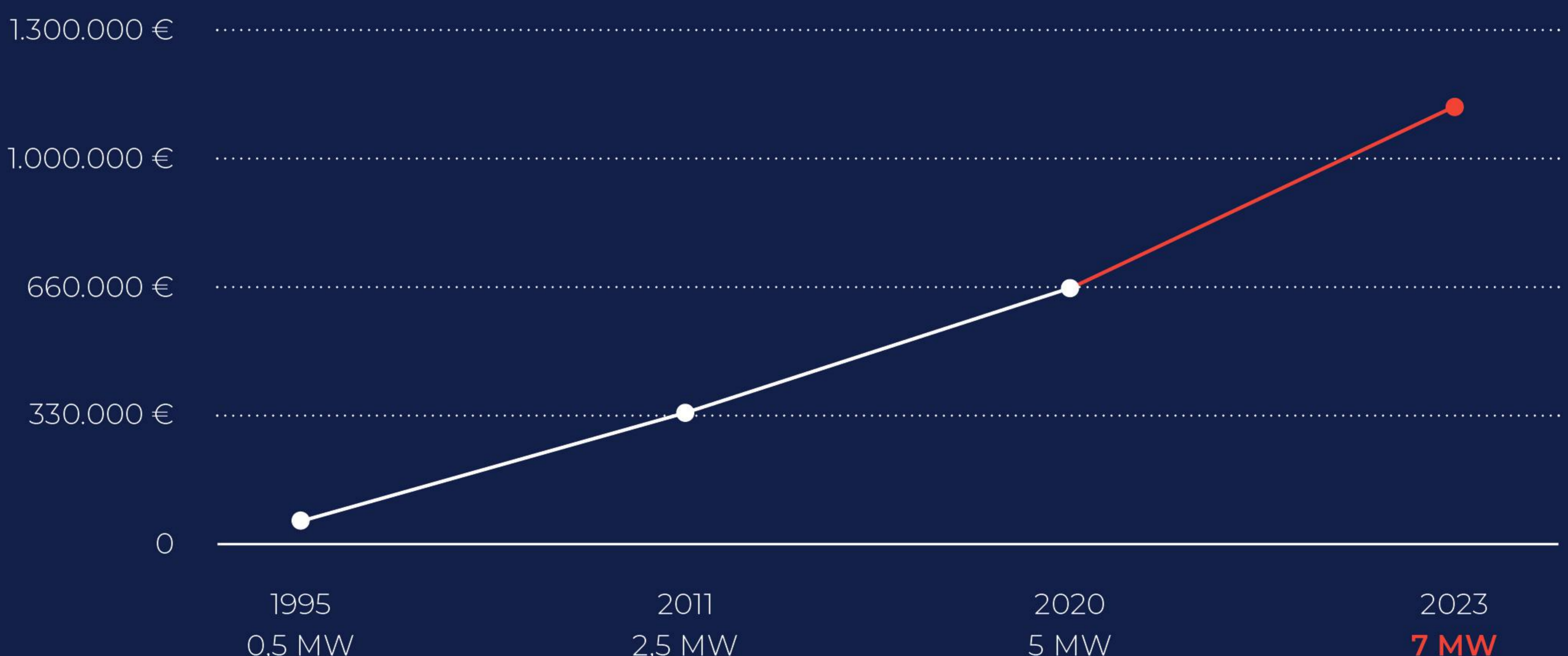
TRADITIONAL FSA GUARANTEES DON'T SCALE WITH TURBINE SIZE.

Wind turbines have become larger and more complex, but the financial protection in traditional FSAs hasn't kept pace. As downtime per incident has risen sharply, liability caps are reached faster, exposing owners to higher losses.

The result is greater financial risk, threatening profitability and long-term stability for wind park operations.

**LIABILITY CAPS
FILL UP FASTER.
LEAVING THE OWNER AT RISK.**

Downtime costs per turbine for 12 months per MW class.



HOW THE MARKET REACTS.

The wind energy market is structured around five closely connected actors: manufacturers, insurers, operators, banks, and brokers, whose business models are tightly interlinked through financing and contractual structures. This creates rigidity that limits active risk mitigation during contract periods, while operational risks continue to increase over the lifetime of wind turbines.

IN PRACTICE, THIS MEANS:

MANUFACTURERS

externalize operational risks.

INSURERS

avoid underwriting certain types of wind turbines, increase premiums, or withdraw from the market.

OPERATORS

bear higher deductibles or complete losses.

BANKS

face a dilemma: Those who act today lose business. Those who wait it out face the risk of major losses tomorrow.

BROKERS

demand longer detention periods from the insurer on behalf of the operator. Currently, 18-24 months is the market standard.

THE CORE OF THE PROBLEM.

Today, increasing risks are being passed on rather than reduced.

Currently, the industry fails to reduce risk. Instead, manufacturers, banks, operators, and insurers systematically transfer the risks to one another, moving from stakeholder to stakeholder.



TURBIT RISK INFRASTRUCTURE FOR WIND ENERGY.

Turbit streamlines operational and financial risk management for owners and operators.

By embedding intelligence directly into operational and maintenance workflows and related contracts such as insurance, Turbit transforms raw machine data into actionable insights. As a result, owners and operators strengthen control and decision-making, optimize maintenance strategies, and reduce financial exposure from downtime and operational expenses (OPEX).



TURBIT MONITORING

Predict turbine failures months
in advance.



TURBIT ASSISTANT

Automate and support daily work
with a fine-tuned AI for O&M.



TURBIT DATAHUB

Centralize and safeguard all
data at scale.



TURBIT BLUE

Minimize risks and reduce
OPEX with AI insurance.



TURBIT MONITORING

Data-driven, highly sensitive,
and trusted by insurers.

Turbit's self-learning AI tool uses a continuously growing operational database to detect early signs of component failures, performance issues, and turbine health risks. It delivers precise, actionable alerts, giving operators unmatched clarity, improving efficiency, and enabling smarter decisions.



SELF-LEARNING AI

Continuously improves with a growing operational database (7+ years labelled data) - trusted by insurers.



DATA-DRIVEN

Adapts to diverse portfolios to strengthen performance.



CLARITY OVER NOISE

Provides AI prioritized alerts with context and root cause analysis.



PROACTIVE MAINTENANCE

Offers months of lead time for planning and decision-making.

Case Information

Display Name
Zephyrus_VES-4_Generator

Creation Date
March 12, 2023, 5:25 PM

Last Update Date
May 8, 2023, 8:41 AM

Anomaly Analysis

VES-4

- temperature_generatorbearing_1.val
- temperature_transformerphase_2.val
- temperature_transformerphase_3.val

Turbine Comparison

VES-4

Windpark comparison over time

- tempera_ture_generatorbearing_1.val
- temperature_transformerphase_2.val
- temperature_transformerphase_3.val

Turbine benchmark over power

- temperature_generatorbearing_1.val
- temperature_transformerphase_2.val
- temperature_transformerphase_3.val

Tracking

Case Summary

Generator bearing and transformer overtemperature; bearing replacement, anomaly resolved by OEM. Value: €26.061.

Resolution History

Anomaly resolved by OEM/Service



1. MARCH 2023

Turbit detected abnormal temperature in the generator bearing and transformer phases, reaching 90 °C. Planned maintenance was scheduled for July.

2. APRIL 2023

As conditions worsened, the issue was raised again with the Service Provider.

3. MAY 2023

Inspection revealed abnormal noises in the generator.

4. RESOLUTION

Generator bearing replaced within 5 days. No further anomalies since.



AI MONITORING BACKTEST

Proven predictive maintenance performance on your historical data.

Turbit runs its AI Monitoring models on historical data, without live integration or operational changes. The analysis identifies historical underperformance and component failures, showing how early anomalies could have been detected. This provides portfolio-specific validation and enables evidence-based decisions before committing to long-term deployment.



ASSESS ROI IN NO TIME

Validate monitoring capability and relevance in two months.



TRAVEL BACK IN TIME

Replay your asset history and see exactly what happened with your turbines.



FULL MONITORING EXPERIENCE

Same technology and features as live Turbit Monitoring, applied to historical data.

Case Information

Display Name

Backtest-Windpark-6_Generator

Creation Date

March 10, 2026, 1:31 PM

Last Update Date

Apr 2, 2026, 12:11 AM

Anomaly Analysis

Backtest-Windpark-6

temperature_generator_2.val

temperature_generator_1.val

Turbine Comparison

Backtest-Windpark-6

Windpark comparison over time

temperature_generator_2.val

temperature_generator_1.val

Turbine benchmark over power

temperature_generator_2.val

temperature_generator_1.val

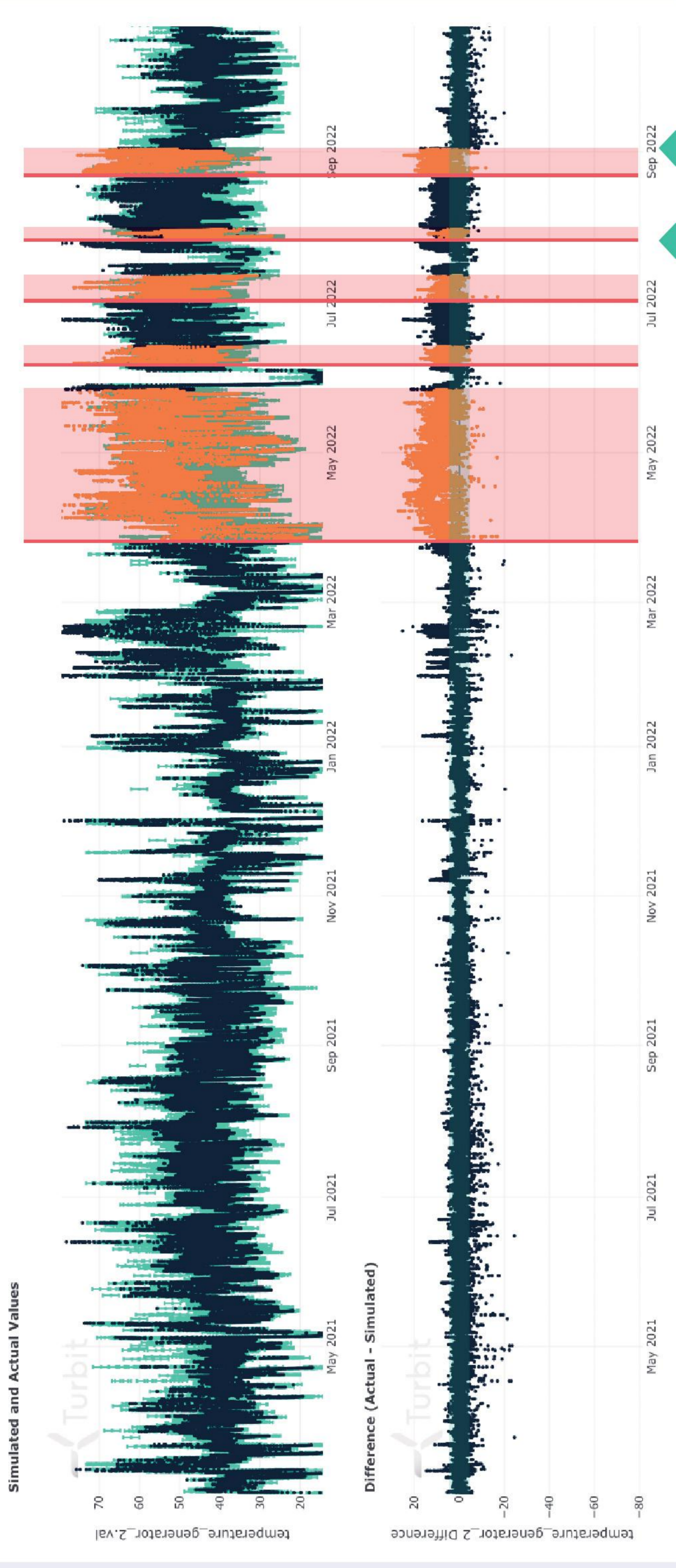
Tracking

Case Summary

Not enough information to summary.
Please add more description.

Resolution History

OEM/Service has not been informed



1. AUGUST 2022

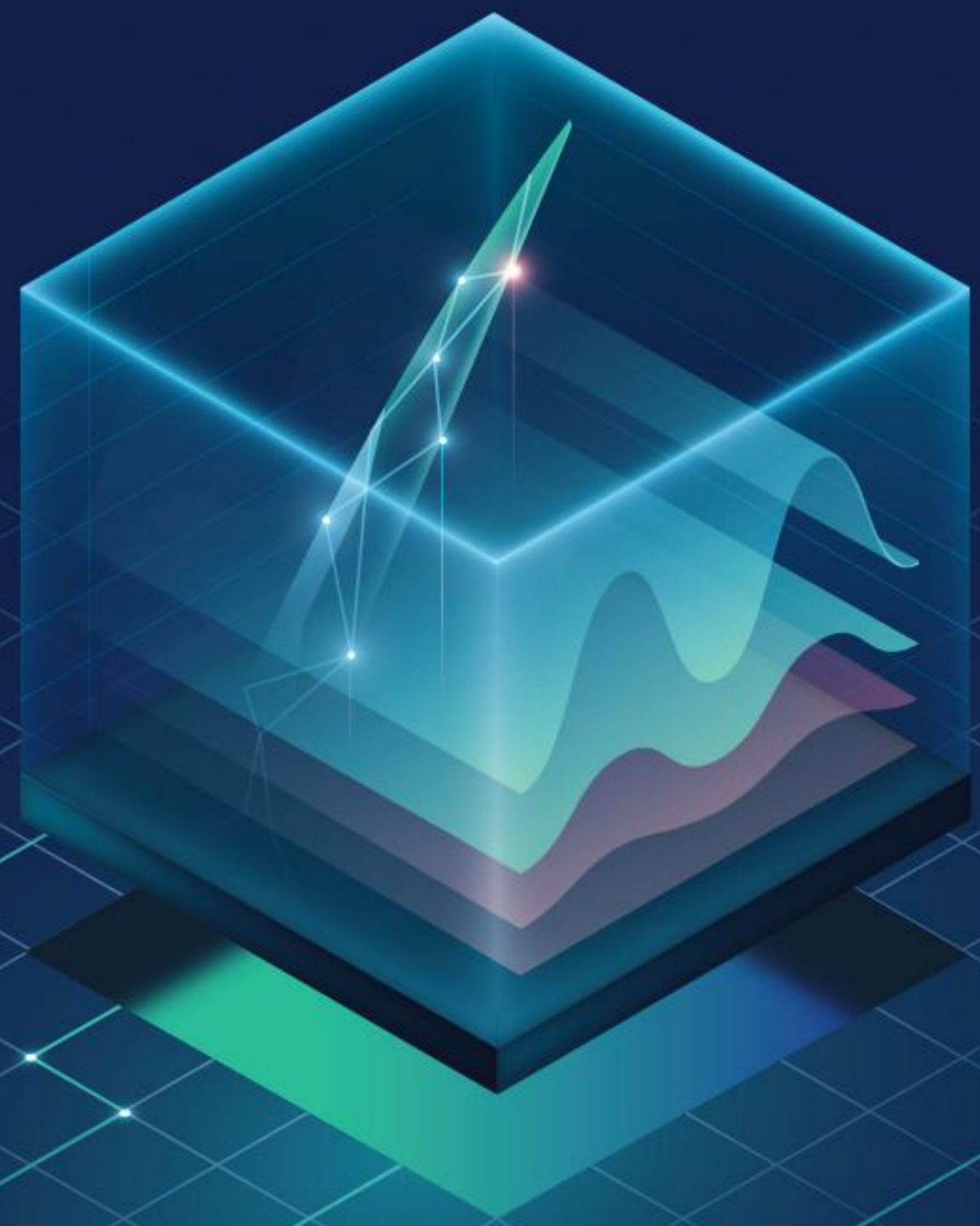
Turbit flags an anomaly in the stator winding temperatures starting in March 2022.

2. SEPTEMBER 2022

The temperature anomaly resolves, and the temperature behavior returns to normal. The wind turbine has behaved normally since then.

WHAT HAPPENED:

The reactive power setpoint was incorrectly configured in March 2022 across the entire wind park and was not reset (human error). This led to increased generator temperatures throughout the wind park and caused a complete generator failure in another wind turbine due to prolonged exposure to reactive power. After the issue was identified, the reactive power setpoint was corrected, and generator behavior returned to normal.



BLADE MONITORING

Reduce blade failure risk with
unmatched detection precision.

Weidmüller 

Blade Monitoring is a first-of-its-kind integration that combines advanced AI analytics with high-frequency sensor data from Weidmüller's BladeControl. By analyzing flap and edge vibrations in real time, it detects early-stage blade damage - the most common and costly failure in wind turbines. Beyond blade health, Blade Monitoring can also help identify issues in the drivetrain. If all blades exhibit similar anomalous behavior, this can indicate a potential drivetrain issue, whereas unexpected vibration in one single blade may point to blade-specific irregularities. By detecting such patterns at an early stage, operators can prevent cascading damage, reduce unplanned downtime, and extend the overall lifetime of the turbine.



LESS TOOL CLUTTER

Combines Blade and SCADA
Monitoring in one platform.



CUTTING-EDGE AI

Real-Time Spectrogram Analysis
with AI brings deeper context
for faster, more accurate failure
analysis.



TURBIT BLUE INTEGRATION

Enables holistic risk coverage
and potential OPEX reduction.

Case Information

Display Name
VES73891_Blades_12053

Creation Date

Jun 6, 2025, 3:26 PM

Last Update Date

Apr 9, 2026, 3:05 PM

Anomaly Analysis

blade_1

direction_edge

direction_edge

blade_2

direction_edge

direction_edge

blade_3

direction_edge

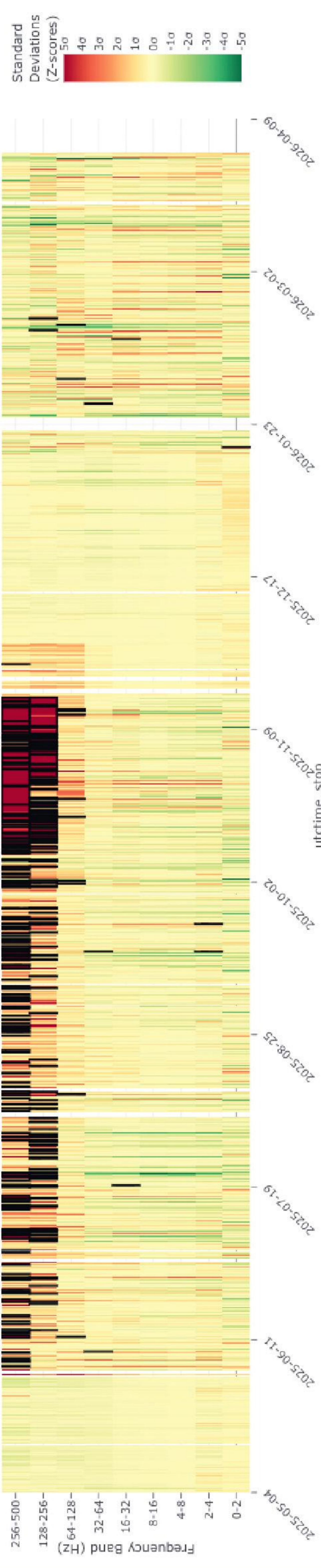
direction_edge

Tracking

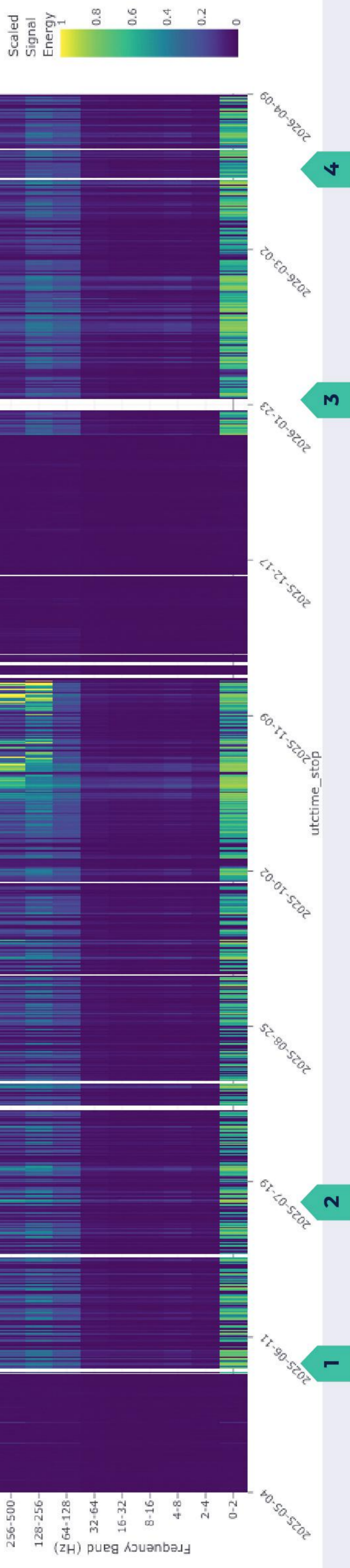
Case Summary

Geartrain jerking and blade 3 sensor defect previously investigated; case closed, OEM uninformed

Difference Spectrogram



Real Data Spectrogram



1. JUNE 2025 - FIRST ALARMS TRIGGERED

Turbit triggered the first alarms when unusual vibration behavior appeared in the Weidmüller sensors. The highest frequency bands (128–256 Hz and 256–500 Hz) showed abnormally strong vibrations across all three blades, particularly at high rotor speeds.

2. JULY 2025 - ANOMALY CONFIRMED

Weidmüller validates the anomaly using a separate analytical method. Turbit supports the OEM notification with comprehensive technical documentation, including the difference and real data spectrograms, and rotor speed correlation.

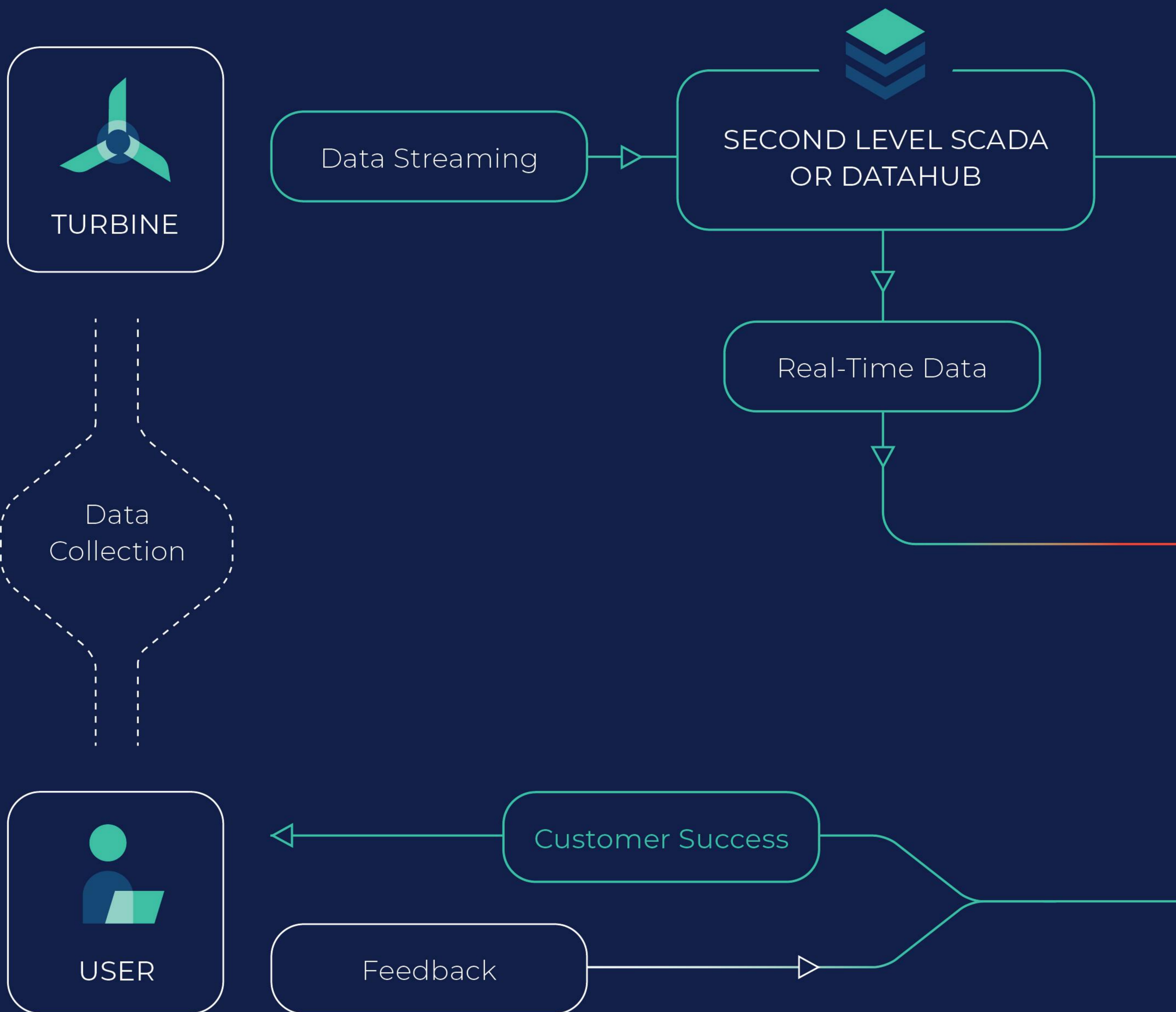
3. JANUARY 2026 - ISSUE RESOLVED

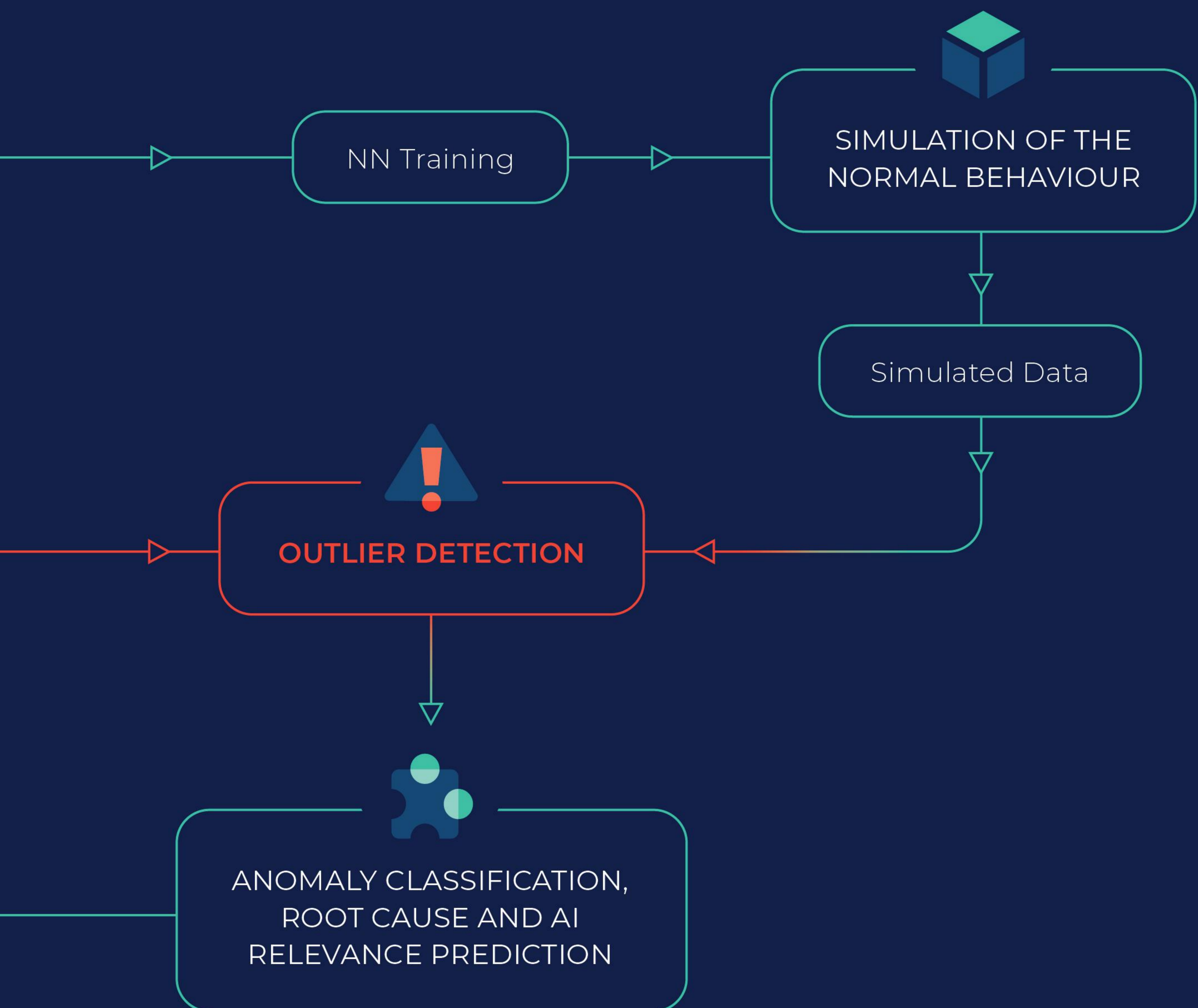
OEM replaces the high-speed shaft rear-end bearing, repairs the cooling system, and re-aligns the generator. The data had pointed to the right component, months earlier.

4. RESOLUTION

Turbine is now operating normally, producing power without anomalies. Vibration levels are within expected ranges.

TURBIT AI INFRASTRUCTURE.







TURBIT ASSISTANT

Turn your documents into actionable clarity while streamlining daily workflows.

This fine-tuned AI parses all your operational documentation to automatically identify and classify technical issues. It structures them by turbine and component, keeps track of their status over time, and reduces manual follow-up effort. Your team gains clear priorities, full clarity, and less complexity in day-to-day operations.



DOCUMENT MANAGER

Categorize and summarize documents automatically.



DEFECT TRACKING

Instantly identify and classify technical defects across turbines and sites.



AUTOMATED WORKFLOWS

Automate tasks and insights from documents, with no manual input required.

W03 | W03T02

Search defects

Defect details >

Aggregated Defects
(7)



- 2022-11-16 [303.pdf](#)
- 2021-05-11 [346.pdf](#)
- 2017-06-27 [310.pdf](#)
- 2017-03-27 [327.pdf](#)
- 2015-04-05 [319.pdf](#)
- 2014-09-26 [334.pdf](#)
- 2013-06-12 [323.pdf](#)
- 2012-07-24 [325.pdf](#)

Main/rotor bearing

2017-05-07T00:00:00 - Oil cleanliness below manufacturer recommendation; ISO 4406 = 22/20/17 with elevate...

open

Main/rotor bearing (oil-lubricated)

2022-05-11T00:00:00 - Elevated iron and copper wear metals; zinc is also elevated. Possible causes include mixi...

open

Main/rotor bearing

2017-05-07T00:00:00 - Copper wear metal increased (Cu = 15 mg/kg; previously 5-6 mg/kg).

open

Haupt-/Rotorlager

2017-05-07T00:00:00 - Öreinheit schlechter als empfohlen (ISO 22/20/17); Anzahl der Gleitverschleißpartikel lei...

open

Main/Rotor Bearing

2013-07-10T00:00:00 - Additive level in the main bearing oil is lower than expected, indicating possible mixing ...

open

Main/rotor bearing

2017-05-07T00:00:00 - Sliding wear particles slightly elevated per OPA (169 particles $\geq 20 \mu\text{m}$ characteristic of sil...

open

Haupt-/Rotorlager

2013-07-10T00:00:00 - Additivniveau im Öl niedriger als erwartet; mögliche Vermischung mit einem anderen S...

closed

Title

Oil cleanliness below manufacturer recommendation; ISO 4406 = 22/20/17 with elevated particle counts.

Issue Description

2017-05-07: Oil cleanliness below manufacturer recommendation; ISO 4406 = 22/20/17 with elevated particle counts.

Recommended action

Improve oil cleanliness (change/upgrade filters or perform offline filtration); send next sample at next maintenance to monitor trend.

Source defects

5/7/2017 327.pdf

6/27/2017 310.pdf

Add comment

Add comment



TURBIT DATAHUB

Unlock the full potential
of your data.

High-frequency, real-time data is essential for every AI model, business case and operational decision. Turbit Datahub keeps your data complete, consistent, and trustworthy - ready to share with monitoring providers, insurers, or your in-house analytics team. Centralizing your data helps you improve operational reliability, demonstrate value to stakeholders, and get more from every tool you use.



CENTRALIZED DATA

Centralizes all your renewables data, from solar, wind and battery in one place.



AI-READY DATA QUALITY

Ensures every data point is accurate, complete, and reliable, maximizing the value of analytics, AI, and business decisions.



DATA POWERTRAIN

Stream high-frequency data to third parties, Turbit Monitoring and Insurance.



TURBIT DATAHUB PRODUCTS.



DATAHUB CORE

- Multiple connections (OPC, SCADA)
- 10-minute average values
- Secure data streaming pipeline and storage (ISO certified, WIP)
- Reliable data availability for Turbit suite



DATAHUB CORE +

Everything in Datahub Core, plus:

- High frequency data
- Data ingestion with Status Codes



DATAHUB FULL VERSION

Everything in Datahub Core +, plus:

- Streaming data to 3rd parties



TURBIT BLUE

Cut operational risk from day one while strengthening your financial stability.

Developed in partnership with HDI Global SE, Turbit Blue combines AI-driven risk prevention with tailored insurance coverage, bringing a new level of protection to wind parks. Risk prevention is embedded directly into operations without changing how claims are handled. Owners can now enjoy a seamless way to safeguard performance and profitability.



OPEX REDUCTION

Protects your portfolio while potentially reducing OPEX by up to 30%.



COMPREHENSIVE COVERAGE

Provides extensive coverage for uncapped risks in modern FSAs, addressing contemporary needs and evolving challenges.

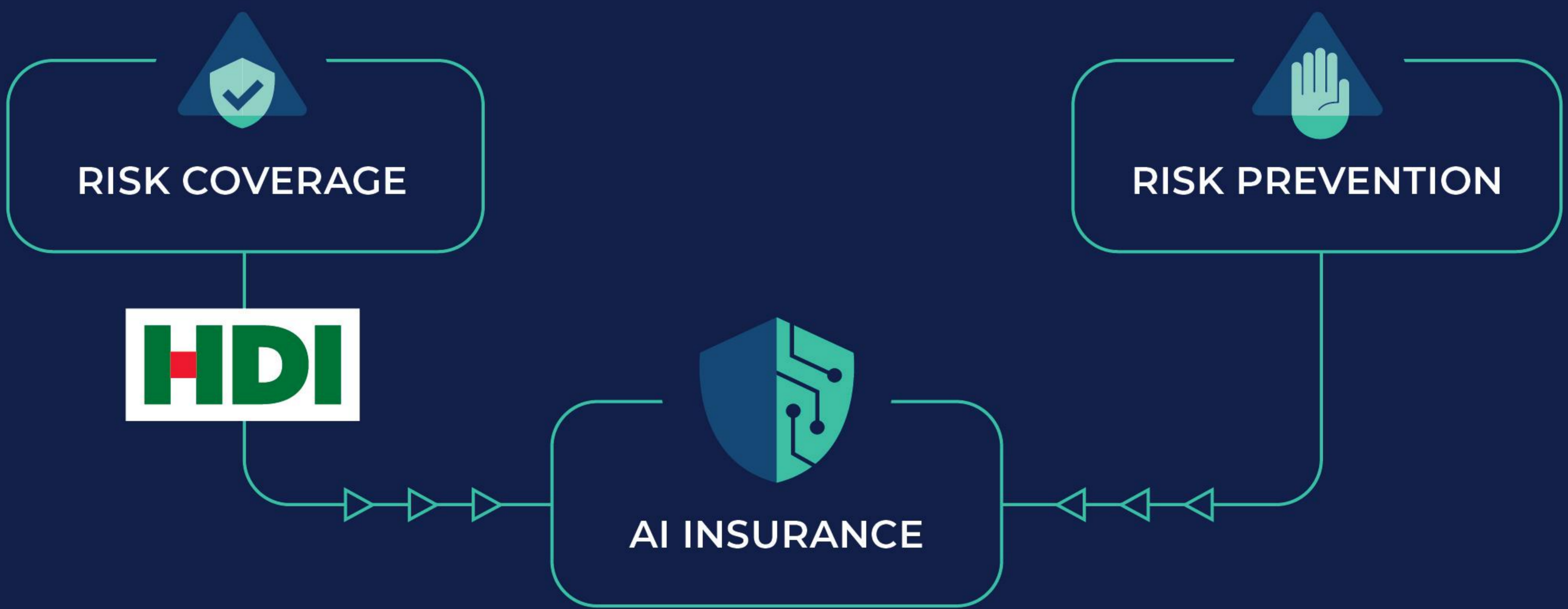


EFFICIENT RISK TRANSFER

Increases transparency and aligns interests between insurer and owner.

HOW DOES THE SMARTER RISK TRANSFER WORK?

RISK COVERAGE FROM HDI AND RISK PREVENTION FROM TURBIT - EMBEDDED IN POLICY TERMS.



TURBIT BLUE PRODUCTS.



VOICES OF OUR CLIENTS.



“ Oliver Kayser, SAB WindTeam

With Turbit's solutions and the straightforward collaboration, we get a much better view of our asset base. A real added value for technical operations and asset management.



“ Dimitry Nilov, Windpunx

Since 2019, Windpunx has been collaborating trustfully with Turbit. We place great emphasis on integrating innovations into the daily tasks of technical operations and work closely with Turbit in this regard.



“ Alexander Hentschel, Qualitas Energy

With Turbit Blue, we can reliably meet our high standards for performance and safety for both older and newer wind turbines. We regard the cooperation between Turbit and HDI Global as pioneering for modern, efficient, and risk-conscious operations of wind farms.

TURBIT BY THE NUMBERS.

3500+

TURBINES UNDER
MONITORING

30k+

ASSET YEARS
OF DATA

12k+

NEURAL NETWORKS IN
PRODUCTION

40+

CUSTOMERS
WORLDWIDE

30+

TEAM
MEMBERS

9+

YEARS IN THE
INDUSTRY

TALK TO OUR EXPERTS.

Explore how Turbit can enhance your asset management and operations.



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