



ARTIFICIAL INTELLIGENCE FOR THE WIND INDUSTRY.



WIND ENERGY IS RAPIDLY EXPANDING, DRIVING INNOVATION AND GROWTH.

However, with this growth comes evolving risks. As operational complexity and risk profiles shift, the need for advanced solutions becomes increasingly critical.

- | Growing conflict of interest between OEM service provider, insurance and owner.
- | Modern FSA have limited liabilities for new and bigger wind turbines.
- | Skilled labor shortage and intensifying workloads increase downtime risk.
- | Longer lead and production time for spare parts increase downtime risk.

MINIMIZE INDUSTRY RISKS THROUGH AI INNOVATION.

Work less, achieve more. Turbit's scalable AI solutions save time, reduce risks, and set new standards in wind asset management and operations, accelerating the transition to renewable energy.



REDUCE RISKS

Proactively detect issues to safeguard asset health and minimize downtime, leveraging AI for a smarter approach to risk management that improves financial performance.



SAVE TIME

Streamline fault detection, reduce monitoring efforts, centralize data management, and automate administrative tasks with AI solutions, enabling you to optimize operations and focus on strategic growth.



USE FUTURE PROOF TECHNOLOGY

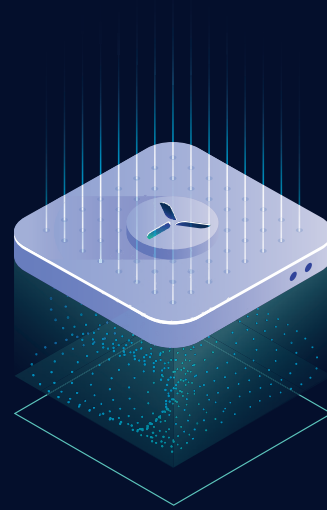
Implement AI-powered systems for wind energy that improve at the rate of global AI innovation.

PRODUCT OVERVIEW.



TURBIT MONITORING

Reduce monitoring efforts with a self-improving AI system that detects emerging faults early and assesses anomalies like a seasoned engineer.



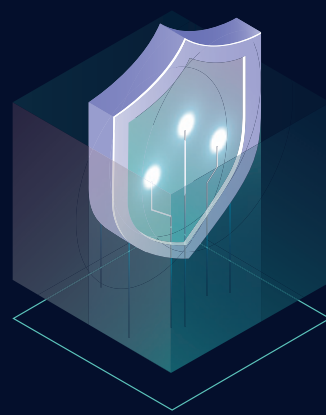
TURBIT DATAHUB

Unlock the potential of your data with a centralized data infrastructure that empowers cutting-edge AI applications.



TURBIT ASSISTANT

The AI Assistant designed for you, tailored to meet the specific needs of your wind operations. It enhances efficiency for daily operational tasks, and delivers expert insights and industry knowledge at your fingertips.



TURBIT BLUE

Turbit Blue combines AI-driven risk prevention with traditional insurances, offering owners a more intelligent risk management solution.



TURBIT MONITORING

Maximize Asset Health and
Performance with AI.

Reduce monitoring efforts with a self-improving AI system that detects emerging faults early and assesses anomalies like a seasoned engineer. Get notified when it matters, offering comprehensive insights into turbine health to minimize downtime and optimize performance.

1. GAIN CLARITY WITH LESS DISTRACTION

Engineer-level AI assessments and automatic root cause analysis help you focus on critical issues, cutting through the noise of today's information overload in technical operations and asset management.

2. GET FULL CONTEXT IN ONE ALERT

Each alert comes with comprehensive AI reports, including plots, benchmarks, and status codes, providing everything you need for accurate and effective issue prioritization and resolution.

3. ACT EARLY, MINIMIZE DOWNTIME

By detecting anomalies as they occur, you gain the speed and insights necessary to safeguard asset health and minimize downtime.

THE POWER OF AI ASSESSMENT.

KEY FEATURES OF TURBIT MONITORING:



ENGINEER-LEVEL ALARM ASSESSMENT

Turbit AI assesses anomaly relevance with the expertise of a seasoned technical operator, providing clear insights to help you focus on what matters most.



AUTOMATIC ROOT CAUSE CLASSIFICATION & ANALYSIS

Provides in-depth insights into the cause of anomalies, enabling precise and effective troubleshooting.



AI REPORTS

Get comprehensive reports with each alert, including relevant plots, benchmarks, and status codes for quick interpretation.

TURBIT AI INFRASTRUCTURE.

The four steps of Turbit's fully automated and self-improving AI infrastructure.

1. DATA ENGINEERING

Raw Data Collection

Data Lake and Warehouse

Data Streaming

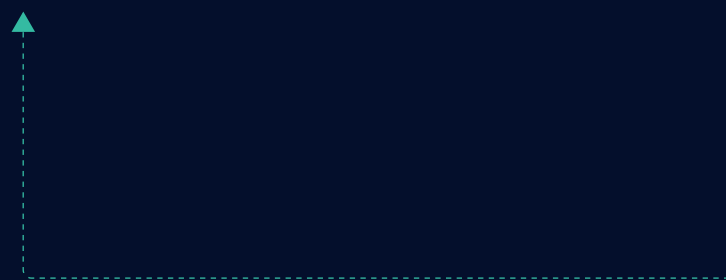
2. AI ANOMALY DETECTION

NN* Training Automation

NN* Predict Normal Behaviour

Outlier Detection

*NN: Neural Network



3. AI CLASSIFICATION

Anomaly Classification

Failure Mode Prediction

Relevance Prediction

4. FEEDBACK

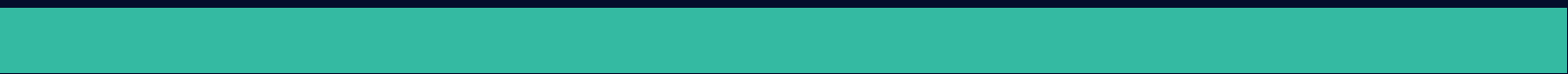
Customer Feedback
Functionalities

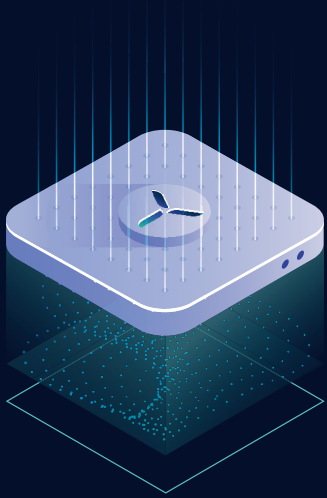
Communication with Service

Reporting & Analytics Tools

Failure Database

Retraining NN





TURBIT DATAHUB

Leverage the power of data for AI.

Unlock the potential of your data with a centralized data infrastructure that empowers cutting-edge AI applications.

1. REAL-TIME DATA STREAMING

Stream massive amounts of raw and third party data to enhance AI applications in real-time.

2. COST EFFICIENT DATA STORAGE AND STREAMING

Securely store all technical available data in a unified data lake, ensuring seamless and flexible access to your critical data needs. Connect effortlessly to different applications without additional costs.

3. UNIFIED DATA MAPPING

Achieve clear and actionable data mapping that aligns with your analytical needs.

4. DATA MONITORING

Monitor data access, quality, and integrity, with automatic notifications for any issues that arise.

EFFORTLESSLY MANAGE AND SECURE WIND DATA.

KEY FEATURES OF TURBIT DATAHUB:



API AND MQTT CONNECTIONS

Effortlessly integrate and transfer data with robust API and MQTT connections, ensuring real-time access and seamless communication between systems.



HORIZONTAL SCALABLE DATA CLUSTERS WITH UNLIMITED STORAGE

Scale your data infrastructure horizontally to accommodate growing volumes, with virtually unlimited storage capacity to meet your expanding needs.



DATA MAPPING ACCORDING TO IEC 61400-25-2

Align data management with IEC 61400-25-2 standards, providing precise and standardised data mapping for consistent and reliable wind industry data integration.



DATA STORAGE OF ALL DATA TYPES

Store and manage all data types, including historical, live, SCADA, status, high-frequency (1s), condition monitoring data, documents, pictures, videos, and more.



TURBIT ASSISTANT

Supercharge operations with a powerful, tailored AI Assistant.

The AI Assistant designed for you, tailored to meet the specific needs of your wind operations. It enhances efficiency for daily operational tasks, and delivers expert insights and industry knowledge at your fingertips.

1. ENHANCED EFFICIENCY AND TIME SAVINGS

Save up to 40% of your time with intelligent assistance for daily operational tasks, allowing you to focus on higher-priority activities.

2. PROACTIVE DOCUMENT MANAGEMENT

Stay organized and on track with automatic alarms that notify you of document deadlines, missing items, and required actions, ensuring nothing is overlooked.

3. AI SUPPORT AT YOUR FINGERTIPS

Access comprehensive wind industry expertise and interact with your documents seamlessly, providing you with valuable insights and efficient information retrieval.

UNPARALLELED SUPPORT AND INSIGHT GENERATION.

KEY FEATURES OF TURBIT ASSISTANT:



AUTOMATIC ALARMS

Receive timely notifications for important document deadlines, missing items, and required actions, ensuring you stay on top of essential tasks and updates.



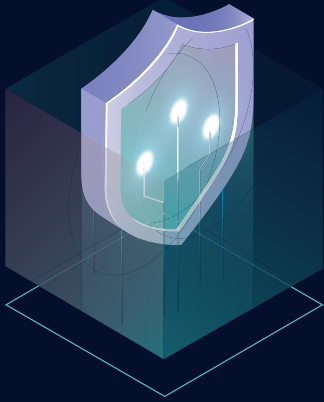
CHAT WITH YOUR DOCUMENTS

Interact with your documents through intuitive chat-based queries, allowing for easy access to information and insights without manual searching.



OPERATIONAL TASK ASSISTANCE

Streamline your daily operational tasks with intelligent assistance, reducing time spent by up to 40% and enhancing overall efficiency.



TURBIT BLUE

Transform risk management with AI.

Turbit Blue combines AI-driven risk prevention with traditional insurances, offering owners a more intelligent risk management solution.

1. ADVANCED AI INTEGRATION

Leverage Turbit Monitoring to proactively identify and address potential issues before they arise, preventing costly downtime and damages.

2. COMPREHENSIVE COVERAGE

Access extensive coverage for uncapped risks in the modern Full Service Agreements, addressing contemporary needs and evolving challenges.

3. POTENTIAL TO REDUCE COSTS

This proactive approach not only protects your equipment but also offers you the potential to reduce operational expenses.



FULL COVERAGE WITH TURBIT BLUE.

AI Insurances from HDI Global SE are available with Turbit Monitoring. It provides comprehensive coverage tailored to the unique challenges of the wind energy sector, offering up to 30% savings of your total costs compared to your current solution.

1. AI SUBSIDIARY INSURANCE

Cover the gaps that arise due to limited liabilities in Full Service Agreement

+

Turbit Monitoring

+

AI Subsidiary Insurance

+

Full Service Agreement

OR

2. AI FULL COVERAGE INSURANCE

Alternative Service Agreement with full coverage of predictable damages

+

Turbit Monitoring

+

A Full Coverage Insurance

+

Basic Service Agreement

CHAT WITH YOUR DOCUMENTS.

When was the last oil analysis for VES12345 and what was the result?

The last oil analysis for wind turbine VES12345 was carried out on 05/12/2023, based on a sample taken on 01/12/2023. No noticeable abnormalities were found in the analysis results, as the overall evaluation showed no significant wear or contamination issues.

Tell me the detailed results of the last safety inspection on turbine VES12345 as a list.

The last service event for turbine VES12345 included several inspection metrics and checks. The overall result had no critical issues. Here are the detailed results listed:

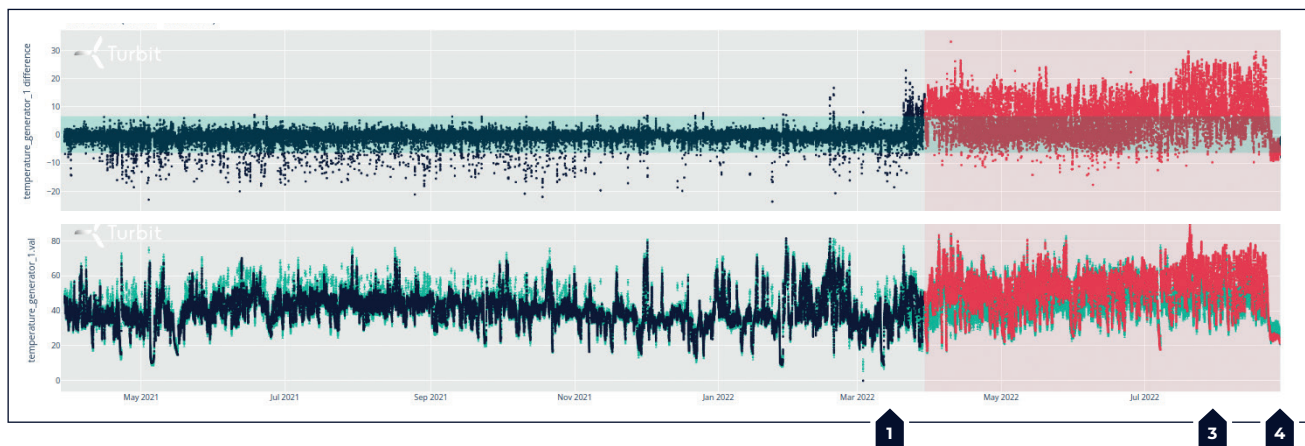
1. Service Order Number: 54321
2. Inspection Date: 16.04.2024
3. Serial Number Inspected: 12312312/34
4. Manuals Check: OK
5. Type Plate Check: OK
6. Safety System (Climbing Protection System):
 - Upper Cord Attachment: Checked
 - Screws: Checked
 - Shackles/Cable Eyelets: Checked
 - Condition/Dirtiness of Cords: Checked
 - Lower Cord Attachment: Checked
 - Cord Holder: Checked
7. Result for Various Components:
 - Upper Cord Attachment: Not Applicable
 - Screws: Not Applicable
 - Shackles/Cable Eyelets: Not Applicable

CUSTOMER SUCCESS STORIES.

1. GENERATOR BEARING.

Root Cause: Meltdown of generator windings due to increased reactive power

Precision: $\pm 0.5^{\circ}\text{C}$



1. MARCH 2022

Turbit first detected an abnormal generator temperature on the 4 WTGs of the park.

2. APRIL 2022

The client informed the maintenance team about those anomalies, but even after a second anomaly report in July, the service replied that they don't see an issue.

3. AUGUST 2022

A total generator breakdown occurred.

4. SEPTEMBER 2022

The client reported a claim to the service and now saves the 3 other generators and gets a better service quality.

● Simulation ● SCADA ● Outlier ● Escalated Alarm

VOICES OF OUR VALUED 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.



TURBIT BY THE NUMBERS.

2500+

TURBINES UNDER
MONITORING

20k+

ASSET YEARS
OF DATA

12k+

NEURAL NETWORKS
IN PRODUCTION

40+

CUSTOMERS
WORLDWIDE

25+

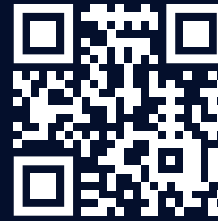
TEAM
MEMBERS

7+

YEARS IN THE
INDUSTRY

TALK TO OUR EXPERTS.

Explore how Turbit can enhance your asset management and operations.



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