



Condition Monitoring

www.turnerm-has.com



Condition Monitoring

Bespoke Monitoring Solutions

Many of the sub-MW onshore wind turbines in the UK have now been operating for 10-20 years and will be experiencing increased failure rates.

These older machines came with little to no condition monitoring equipment pre-fitted and so it is therefore not possible to track deterioration or detect failures when they occur. Turner Icenis M-HAS has been developed as a cost effective solution to these older sub-MW machines.

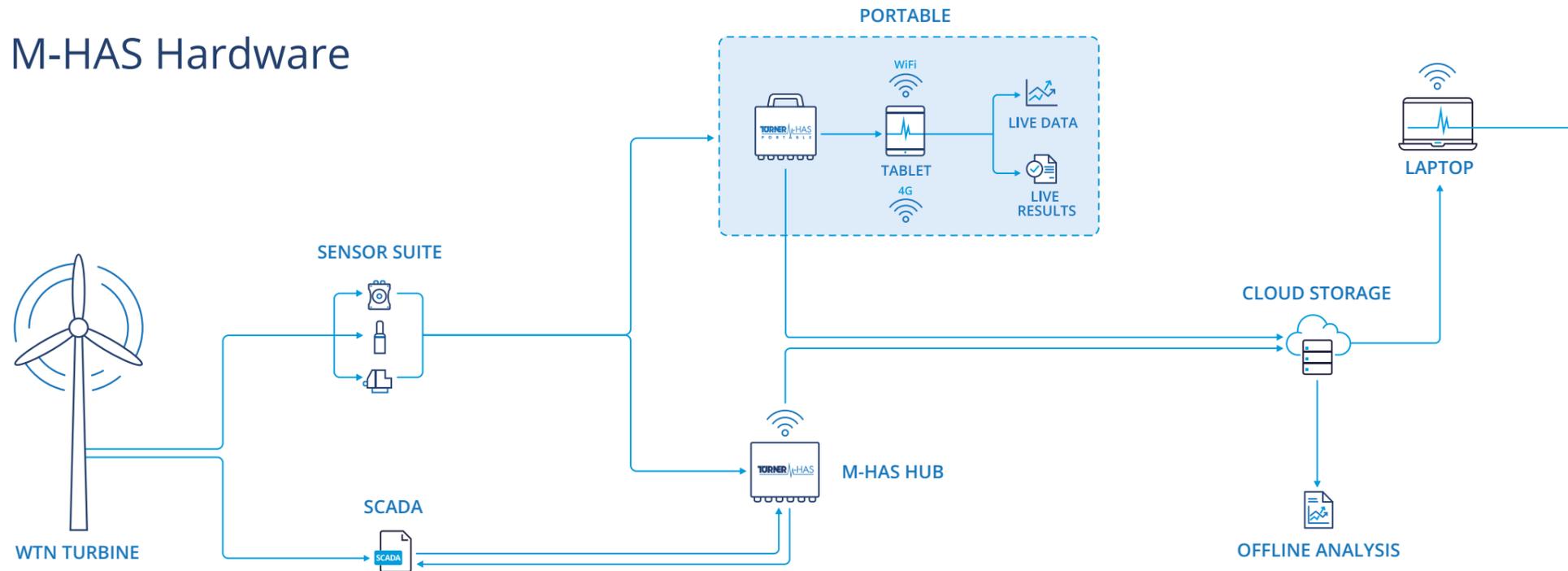


Turner Icenis is a UK-based company who design and build bespoke and cost-effective monitoring solutions for sub-MW wind turbines and hydro machines. They have installed their M-HAS (Machine Health Assessment System) solution on over 400 wind and hydro machines across the UK.

With a range of digital and analogue inputs it allows almost any sensor to be connected for monitoring key parameters. Using broadband cellular communications (3/4/5G) allows for rapid installation and connections to the M-HAS Cloud where all data is stored and available to view live through the M-HAS web interface.

From this interface, turbine owners/operators can view data trends and respond to alarms that have triggered because of a threshold breach. Through the early detection of impending faults, M-HAS has a proven record for mitigating catastrophic failures and allowing maintenance and repair activity to be carried out more efficiently, therefore reducing the costs of O&M.

M-HAS Hardware



Sensor Suite

M-HAS is a versatile system that can be adapted to any application, however a typical system may include:

- 1 One 500mV/G accelerometer on the main bearing.
- 2 2-4 100mV/G accelerometers on the gearbox.
- 3 2 100mV/G accelerometers on the generator.
- 4 Oil particulate sensor on the gearbox.

SCADA Integration

Turner Icenii can integrate existing SCADA data into M-HAS to utilize the data already captured by the wind turbine. Having SCADA data integrated with M-HAS is necessary to allow for the measured parameters to be assessed in relation to the turbines operational state.

Two-way integration between M-HAS and the SCADA system allows M-HAS alarms to show in the SCADA web-interface and vice versa.

MHAS Hub

The M-HAS hub is the main data acquisition unit that collects data from all the individual sensors and sends it to the cloud. It can be powered from a mains 240Vac supply or direct from a 24Vdc supply if available. The hub can be connected to the existing on-site communications network or to its own dedicated router. It can be accessed remotely for configuration and any software updates. The hub is typically installed within or next to the control cabinet within the nacelle or in a more suitable central location.

Data Collection

Data from each sensor will be acquired and sent to the cloud every 5 minutes. If the 5-minute data triggers an alarm, a sample of high frequency (25kHz) acceleration data can be acquired which will allow a "deep dive" into the cause of the alarm. High frequency data collection allows for accurate diagnosis, such as being able to differentiate between bearing or gear damage. Where a fault is detected, such as a broken gear tooth, the severity of this specific fault can be tracked over time. If the M-HAS hub loses communications at any time, the data will be stored locally and re-sent when communications are restored.

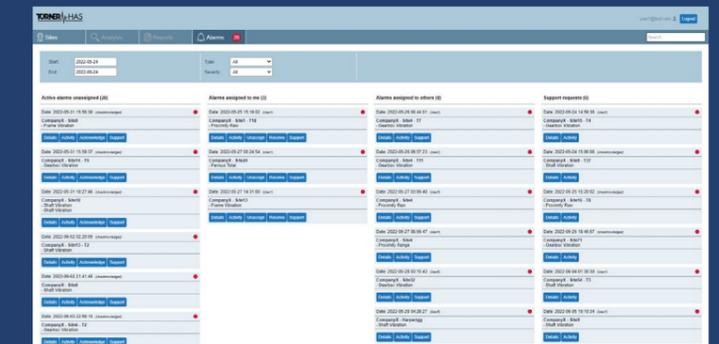
Web Interface

Live Data View



Live data can be viewed as it becomes available every 5 minutes. Multiple parameters can be viewed at any one time in addition to WindSync parameters such as power output or wind speed. Dynamic scaling of the y-axis allows for the relationship between the measured parameter and turbine operating state to be quickly visualised. The data displayed is defaulted to one month but any period of collected data can be viewed by altering the date range.

Alarm Management



The alarm management page is where the user can view all current alarms for their turbines as well as acknowledge that they have viewed an alarm. By acknowledging alarms, it allows a team to review multiple alarms and avoid the same alarm being reviewed by multiple people therefore minimising man hours. From this page the user can resolve alarms and request threshold adjustments or M-HAS technical support.

Alarm Rules and Thresholds

Alarm rules and their associated thresholds will be setup and continually monitored and adjusted by the M-HAS analytical team. Following the installation of M-HAS, a period is required to gain a baseline for normal operating levels. As more data is acquired the thresholds will be further tweaked to the optimal setting. Following any maintenance or repair activity on a turbine, the asset manager can request that the thresholds be reviewed.



Any Turbine, Anytime, Anywhere

Turner IcenI can provide a complete range of integrated renewable energy services and solutions.

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