

Simplifying data for future growth

Everyone has now woken up to the benefits of automation, integration and digitization in the wind industry, but what's the next phase and how can we continue to support the global market consolidation with technology? We asked Onyx Insight's Product Owner Jon Hodson and Joshua Greenslade, Machine Learning Engineer to share their thoughts.

PES: Welcome to PES Jon and Joshua. Shall we begin with an overview of Onyx Insight?

Jon Hodson: Onyx Insight is a global company that provides software, monitoring, advanced data analytics and other services primarily to the wind industry, although we do monitor other rotating machinery too.

We help engineering and operations teams around the world deliver increased production and reduce operations and maintenance costs through smart, and importantly, unbiased analytics that is backed by real-world engineering expertise.

PES: So how can digitization make a difference with the challenges the wind industry faces?

JH: I think the key challenge that the wind industry faces is fragmentation, or decentralisation of data. You've got SCADA data over here, vibration over there, inspection images and data in another five different pieces of software, each one covering a different area of the turbine.

Customers tell us daily that it is a challenge to get a holistic view of your fleet because you can't combine those results easily in a way that scales, at least not with existing tools.

Joshua Greenslade: You've also got the related problem of standardisation. Each different piece of software will use different formats and names, and each turbine make and model will have its own unique set of sensors. Matching these up can be tricky. We frequently deal with turbines with either



Jon Hodson

missing or multiple sensors that map to a single sensor in another turbine.

Then you have to actually match up your vibration, SCADA, event and oil data in a sensible way. Standardising the data allows you to start automating parts of the process, tracking things like rate of failures, false positives/true positives of your detection systems, causes and amounts of lost energy. This is something that is difficult to do when your data and communication are spread all over the place.

JH: And then we get to the actual process of communicating between teams to fix issues on your sites, and the same sort of

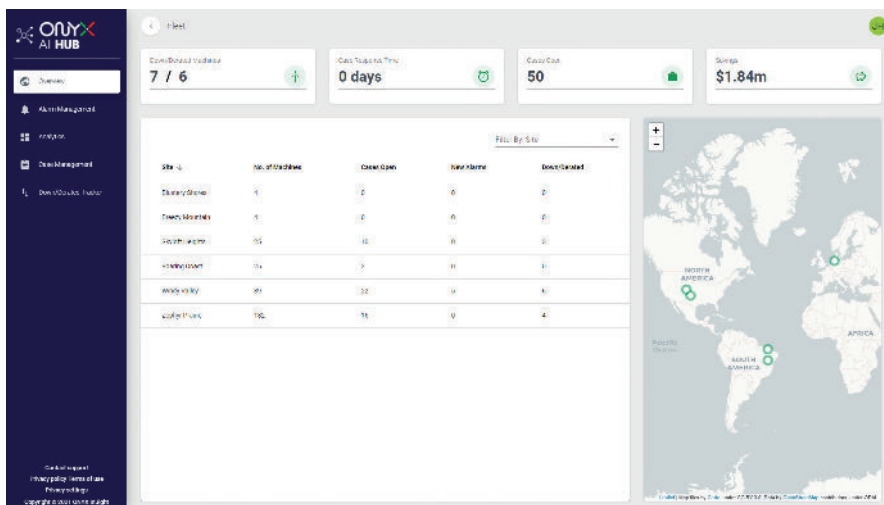


Joshua Greenslade

problem applies. Communication can often be slow or difficult to follow, with little transparency between teams. It is frequently spread out over different emails and messaging systems, or some poorly maintained shared tracking sheet. It gets quite difficult to follow, so issues are taking more time to resolve.

Worse, because once an issue is dealt with it is swiftly forgotten about, critical institutional knowledge about how best to maintain your turbines is being lost as members of staff move jobs or roles.

Digitalization can alleviate these issues by providing a single space for this data. By



The AI HUB aggregates data across your whole fleet, enabling fleet-level analysis and reporting

centralising the data, you can reduce these analysis and communication overheads, and provide a single location for everyone to access the information they need.

PES: You have launched a new product, the AI HUB, which looks to revolutionise the way operations and maintenance are managed. Could you tell us about it?

JH: The AI HUB helps to streamline and simplify the challenges we've mentioned that our customers face. The name encapsulates what we're trying to do; AI because we want to provide you with our industry-leading intelligent analytics and HUB because we want to provide a single place for you and your team to manage your O&M process.

JG: AI HUB is our market solution to globally simplifying the way you do your predictive maintenance by looking at the whole turbine. By taking advanced analytics across this, it brings in standardised data on all aspects of a turbine's health and brings them together centrally with a Case Management module, which is our issue management system.

From here, asset managers and other roles within O&M can view the simplified data to get greater clarity of your turbines. Then you can compare across fleets, schedule in more cost-effective maintenance and make better decisions that enable streamlined management of your fleet.

PES: Many software service providers have AI in their title, so what makes AI HUB different from the rest?

JG: Yes, it is true that digitalisation and AI have been very popular topics in renewables in the past few years and yet we are still to see wider adoption and tangible benefits. The problem is lack of operational knowledge of renewable assets from many software providers.

This is very different at Onyx Insight, where our data science team sits right next to engineers who travel to sites all over the world every week. Not only does this allow us

to build our products in such a way that they solve real problems, we also understand the importance of simplicity.

The output of our analysis is not just beautiful graphs; we understand the challenges faced by our customers and help them to make real-world decisions that deliver value from their assets.

JH: Our engineers are also first to find out about emerging reliability issues. Then we can cross check it across over 70GW of assets that we have in our operational database to make sure the models we develop can be scaled across multiple turbine platforms. 10 out of 20 top wind asset owners are among Onyx Insight customers and it is this deep understanding of wind assets that sets us apart from pure software providers.

PES: Can you share some real-life examples of how you have helped operators to digitalize O&M?

JH: We managed blade inspections and repairs for a large North American operator,

which involved bringing blade inspection data spanning multiple years and sources into a single database and allowing it to interface with the AI HUB's Case Management module.

The operator can also manage their down and derated turbines and quickly and cost effectively get back to productivity.

Another operator is using AI HUB Case Management in tandem with fleet MONITOR to manage their major component and drivetrain issues across their large fleet.

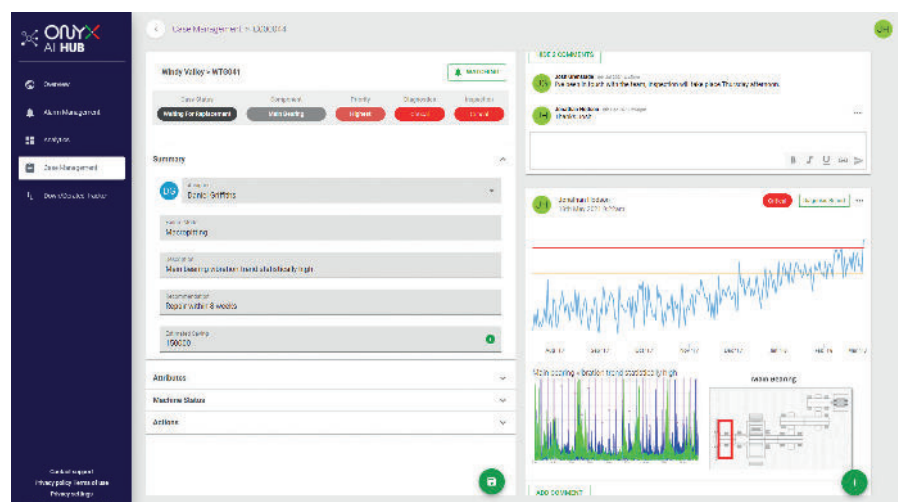
Our monitoring engineers now deliver their monitoring reports via AI HUB case management and all collaboration between our engineers and the operator's engineering and ops teams takes place on the AI HUB. This means they have all the information related to each issue at their fingertips.

PES: You talk a lot about enabling collaboration between teams, is this a real issue?

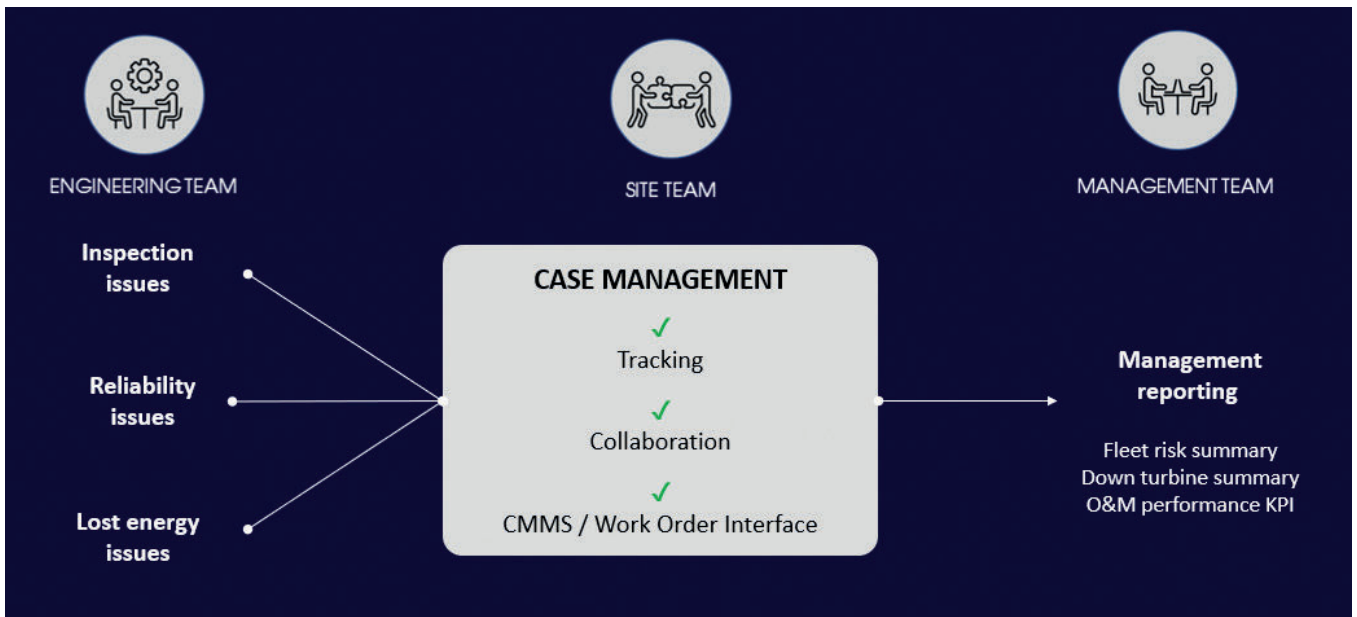
JH: The whole renewable industry is going through a phase of tremendous growth. Our customers' portfolios are growing on average by 15% every year. This puts additional pressure on operating teams who have to onboard these assets while dealing with new turbine technologies at the same time.

Existing siloes within organisations, where performance engineers often sit in a separate department from maintenance and asset integrity teams with each of them using their own tools, are very inefficient.

JG: Automation can be key in removing many potential inefficiencies that can happen with manual data administration too, which undermine the accuracy of the data. We often see some of the best and brightest people in companies having to spend most of their time fighting known and easily trackable issues, because it hasn't been automated. Once you automate that, you free up time for those people, who often know your site



The AI HUB Case Management module can track data from multiple sources. Vibration, SCADA and inspection data can all be centralised in a single case page, alongside the collaboration and messaging between teams. All of the relevant data is now available in a single location, enabling faster and smarter decision making



The AI HUB can ingest a wide range of data types and collate them in a single location to streamline workflows for all users, from engineering, to site, to management

inside-out and can tell you exactly where you can make micro-gains in annual energy production, to work on the important tasks.

If you can free up the time to innovate, by taking away some of the problems, owners and operators can get away from reactively fire-fighting to a higher percentage of predictive maintenance that looks at all in-efficiencies, for example, lost energy.

PES: As a machine learning engineer, how do you think this can change the way things are now in the renewable industry?

JG: Around 80% of the issues we detect on sites are small issues. But they're issues that are causing our customers lost energy and losing them tens of thousands of dollars. I call these issues boring, because we've got systems that can automatically detect them, and automatically make recommendations for what to do to fix them.

That's where I see the big change coming; identifying and automating away those issues, so that engineers and site managers can focus on the bigger issues. With a library built up over our whole portfolio of turbines we monitor, we've been able to build component specific models that link up to our lost energy estimates, enabling our customers to prioritise the issues that are most likely to cause them the most amount of lost energy.

JH: What we're hoping to do in the future is apply machine learning to your case management data. If we're storing all of this data in one place, so site, machine, component, failure mode, when it was opened, closed, did it bring the machine offline, what actions were taken and when, we can start doing interesting things with this data.

A simple example might be to start suggesting similar issues when a new issue is opened. Then you can start getting more technical. We can start giving you estimates of how long cases take to resolve based on previous data, or how long a machine might be offline.

Then we can get even more complex. We can start suggesting the next actions to take. This could be useful to reduce the burden on reliability engineers, since it leaves them free to focus on the more complex or rare problems, like Josh mentioned earlier.

Our goal is to enable the industry to think beyond separate components. Consolidating data into a single, whole-turbine view to support predictive maintenance and deliver smarter O&M decisions for their whole fleet.

Further evidence is in the growth of the AI HUB. Going from zero users in 2020, to now serving over 7.5GW of wind assets worldwide, shows that the idea is very popular.

For more information go to: <https://onyxinsight.com/software-analytics/ai-hub/>

