Bringing data ubiquity to the wind turbine inspection market

Tom Sulzer is CEO and Co-founder of Sulzer Schmid. Under his leadership, the company has taken a leading role in solving some of the most complex maintenance issues that wind turbine manufacturers, operators and asset owners are faced with. The Swiss-born CEO is poised to transform the turbine inspection business into a player to reckon with in the Artificial Intelligence age. In this interview, he explains how his company leverages data and technology to bring down O&M barriers and make wind energy assets safer and more profitable.

PES: Welcome to PES Tom. It seems like the business of turbine inspections has been particularly innovative this past decade. How hot is the market right now?

Tom Sulzer: That is very true. More than ever in the wind energy industry, the effective inspection and maintenance of turbine components is expected to fulfill

its vital role in ensuring operating assets' optimal performance and longevity. Investors are demanding steady returns, and this creates a powerful incentive to O&M innovation.

Today, the most advanced drone-based inspection solutions on the market offer possibilities that we wouldn't have dreamed

of 20 years ago. Over the past decade alone, we have been able to leverage successive technological progress in the fields of Unmanned Aerial Vehicles (UAV), digitalisation, and artificial intelligence to develop increasingly efficient rotor blade inspection methodologies. And that's not all. We have also been able to bring the benefits
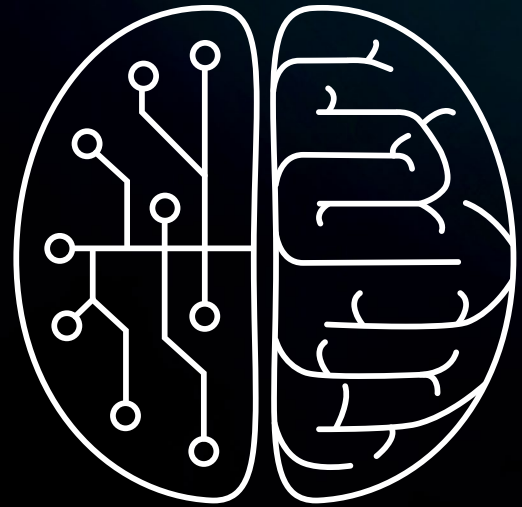
of drone-based inspections to other areas than just the blades' outer layer.

We can now also use drones to inspect other important pieces of turbine equipment like the Lightning Protection System or the Anti-Icing System, and with rovers, we can get digital inspection data from the blade inside as well.

PES: That is a lot of data to analyse! How do you deal with this challenge?

TS: As it turns out, collecting data isn't the hardest part of the whole process. The big challenge is to find the optimal way to exploit very diverse datasets so that we can extract their deepest, most accurate insights. Let me unpack this issue for our readers.

Firstly, you must consider that OEMs, asset owners, and operators are not generally attached to any one exclusive inspection provider. They engage multiple providers depending on inspection campaign specifications and locations. And as you may know, there is no shortage of inspection

service providers. This is a very busy marketplace. As a result, the data acquired over time is often spread across a great many systems and available in different formats, sometimes even as PDFs! You can imagine how this complexifies data access and utilisation. This already bad situation gets of course even worse as years go by and inspection campaigns pile up, making the job of forming an accurate history of the health of assets nearly impossible.

This means that data heterogeneity is, in a nutshell, the key problem that faces our clients.

That's why we have re-designed the 3DX™ Blade Platform to be open, ubiquitous, and extremely versatile. Not only can our platform integrate most types of inspection datasets, regardless of where they are coming from, but it also offers the most advanced analytical capabilities on the market right now. We don't just centralise data in one place, we consolidate them so that all of it can be analysed together. The

3DX™ Blade Platform can crunch these very diverse datasets to unlock powerful insights. In short, our platform builds the bridges needed to unify what has been until now a rather atomised data environment, and we can now start to unleash the power of big data to gain superior insights.

PES: Consolidating all data in one place seems very useful. Can you elaborate on the practical advantages it offers users?

TS: One of the primary advantages of having a single platform to store many types of inspection data is the improved accessibility within an organisation. Our open platform provides a virtual data room that leaves no data set out and streamlines the process of accessing and managing this data over time.

Another important aspect is the ability to incorporate various inspection methods into one platform. Asset owners and OEMs are sometimes responsible for wind turbine fleets spread across entire continents,

or even the entire world. They face the challenge of coordinating various types of blade inspections and then using the data to plan repairs and maintenance work in multiple locations. That task becomes way easier to accomplish when all data is consolidated on a single platform.

Another obvious benefit is the increase in the efficiency of repair planning. With our platform, repairs are planned, budgeted for, and executed based on very accurate information about damages and their location, whilst relying on detailed information on how damages progress over time, in different regions, and under different conditions.

By accurately identifying damage and monitoring how they evolve over time, blade experts can assess the severity of damages and predict their future development. This facilitates informed decision-making regarding repair priorities: fast-progressing damages can be given higher priority for immediate repairs, while repairs for slowly progressing damages can be deferred based on their lower impact and urgency. This strategic approach optimises repair schedules, minimises unscheduled maintenance and downtime while maximising the performance of the wind turbine fleet.

What's more, planners can share accurate inspection data with repair teams who can prepare themselves better, bring the right equipment and material, as well as better estimate the time it will take. This ensures that blade technicians are used in an efficient

manner and minimises the need to redeploy teams, saving both cost and downtime.

PES: Can the platform also integrate data from past inspections?

TS: Of course, the 3DX™ Blade Platform has the versatility needed to import historical data from previous inspections and inspection providers even if they all used different technologies and methods. This is a very important capability since it enables users to build a lifetime record of turbine blade health.

And that's not all; our unified platform also allows comprehensive trend analysis of inspection data not only at the turbine level but at the wind farm level and even fleet level. Thanks to extended search and filtering functionalities, we can identify patterns and correlations over time and across regions. Users can identify serial damages earlier, implement targeted improvements and optimise overall fleet performance. That's the beauty of historical data: OEMs, owners, and operators genuinely gain a holistic view of the health status of their wind turbine fleet. It increases the ability to make informed decisions about turbine design enhancements, maintenance strategies, and operational adjustments.

This data-driven approach leads to continuous performance optimisation and increased efficiency. By having all the data in one place, we bring all expertise into a virtual workplace, a common data and analytics control room, that makes the whole O&M process more efficient and provides vast productivity gains.

Tom Sulzer

PES: I suppose it really helps with collaboration and knowledge sharing too?

TS: Blade inspections and repairs inevitably involve multiple stakeholders who require efficient access to all relevant data and proposed actions. It is true within an organisation but also between different organisations, for instance, OEMs and their customers.

With all relevant data available at a push of a button in the platform, it's easier to agree on actions in an efficient and transparent manner. Data can also easily be shared among teams, allowing for the involvement of various experts, and providing efficient
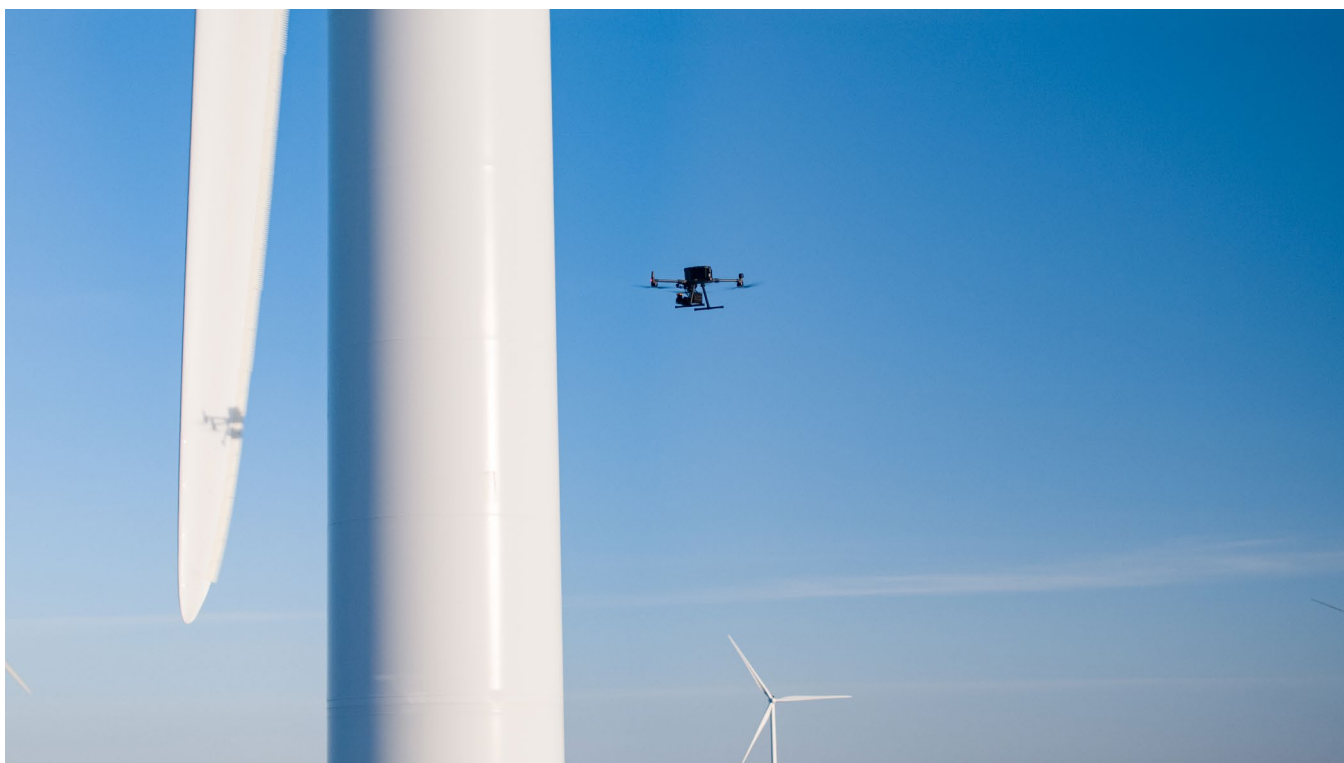
The 3DX™ Blade Platform can perform and process different types of blade inspections including Lightning Protection and Anti-Icing Systems as well as tower inspections

The platform's analytics capabilities are accessible to a wide range of users and stakeholders, allowing insights to be leveraged to make informed decisions

decision-making. Mutually agreed follow-up actions and conversations are documented in real-time, improving transparency and eliminating the risk of information loss.

PES: How will your unified data platform impact future trends?

TS: Consolidating all data in one platform is the key enabler of next-generation innovations in big data and Artificial Intelligence. This is why it's so important. As the wind industry charts its course into the future, embracing AI-driven maintenance is just crucial.

You need the kind of unified data environment 3DX™ provides to really enable fleet-wide AI-driven analytics and decision-making. Big data pattern recognition will play an important role, and customers will be able to identify serial damages and incorporate repair recommendations based on big data analysis. The ability to compare successive inspections before and after repairs provides an additional layer of validation and opportunities for AI training, whilst supporting repair warranty claims.

These are exciting times. The transition from data-driven to AI-driven blade maintenance is just around the corner and will revolutionise O&M strategies across the industry.

For more information about data- and AI-driven blade maintenance and the potential of using a consolidated blade asset management platform, contact Marc.Hoffmann@sulzerschmid.com.

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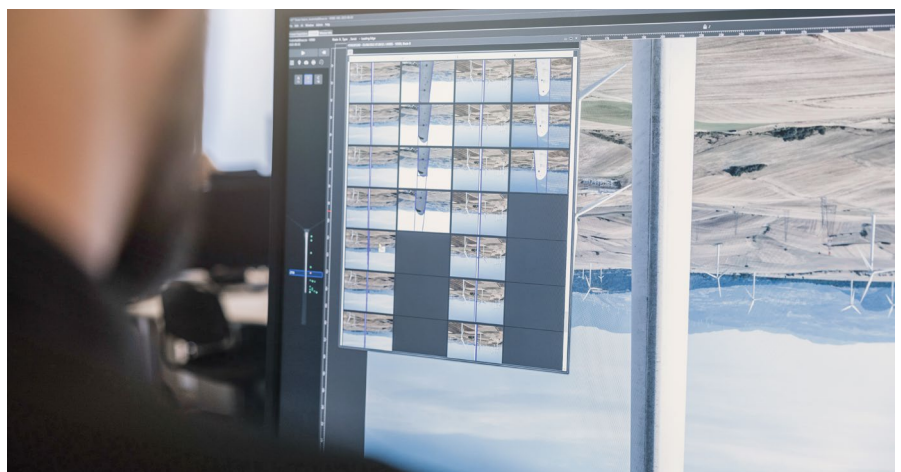
Blade experts reviewing inspection results as part of the annotation process in the 3DX™ Blade Platform
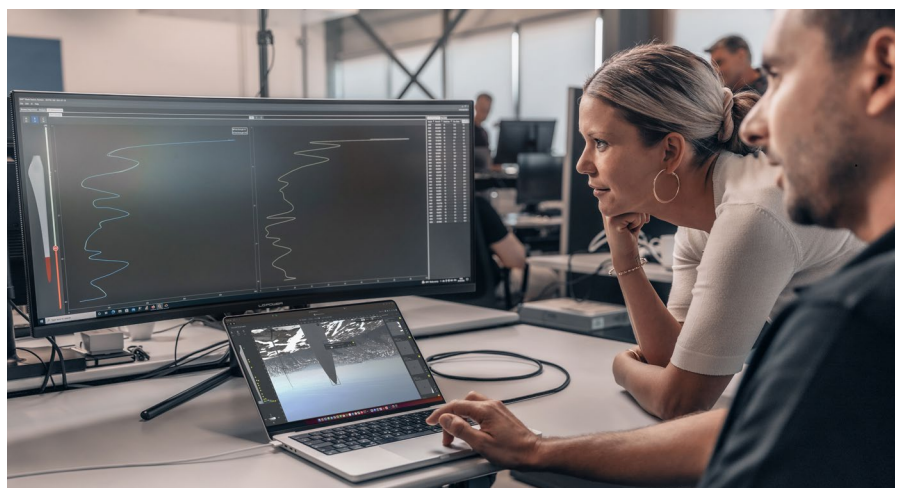
A user-friendly interface where different types of inspection data is reviewed simultaneously