Driven by data

As one of the innovators within the energy service sector, Sulzer Schmid's rotor blade inspection process employs autonomous drones to capture high-quality and consistent images. PES was keen to spend time talking to Tom Sulzer, CEO and co-founder of Sulzer Schmid, about its cloud-based 3DX™ Blade Platform and how it provides customers with actionable insights, to optimise performance of their renewable energy assets.

PES: Switzerland is known for being high-tech and innovative, but there are few wind turbines out there. How did it all start for Sulzer Schmid?

Tom Sulzer: Christof Schmid and myself have always been entrepreneurs at heart. We love addressing complex problems and by combining my passion for robotics and software development and Christof's passion for drones, we came up with the idea of creating a smart solution that brought drones and software together.

The idea to inspect wind turbines by way of drones came early on. We founded Sulzer Schmid together and started to develop and test an innovative drone-based rotor blade inspection software in our lab in Switzerland. It was successful and we were hired to conduct our first blade inspection campaign for Vestas back in 2018. A total of 200 turbines were inspected in Germany, with great success. We went on to expand our operations and customer base very rapidly.

Today, we are inspecting rotor blades in 35 countries across four continents, with the support of highly experienced field operation partners as well as our own specialized inspection teams, who use our 3DX™ technology and platform for visual rotor blade inspections.

PES: You were one of the first companies to design an open software platform to collect and process rotor blade inspection data. Can you elaborate on that?

TS: In the early days, we started by building our own drones, but we soon realised that the real power lies in the data. We shifted our focus and created a sophisticated software platform that can manage data more effectively than ever before. Our aim was to provide a platform which allows for high-quality images to be reviewed, annotated and analysed in a fast and structured way. It allows you to learn from your findings and plan future repair campaigns more efficiently and with better results. This was the true game changer.

Flexibility is important to us, which is why the platform was designed to be open. It provides greater freedom to the customer and is both adaptable and scalable to meet their ever-evolving needs. Other competing solutions on the market tend to lock customers in. They offer little transparency on inspection methods, data format and platform functionalities. We don't believe it fits the needs of the industry. Instead, we allow customers to inspect assets on their own terms.

Our open browser- based 3DX™ platform can manage many kinds of inspection data and even uses any given customer's unique taxonomy to link it seamlessly with their processes and systems. With easy access to both historical and current data, a smooth review/annotation workflow and a large range of filters and analytics functionalities, our platform is a powerful asset management tool that enables the wind industry to make informed decisions about their assets in a way that fits with their processes, strategy and ambitions. What's more, the platform has a modular build, which means that you can access one, several or all parts of the platform depending on your needs.

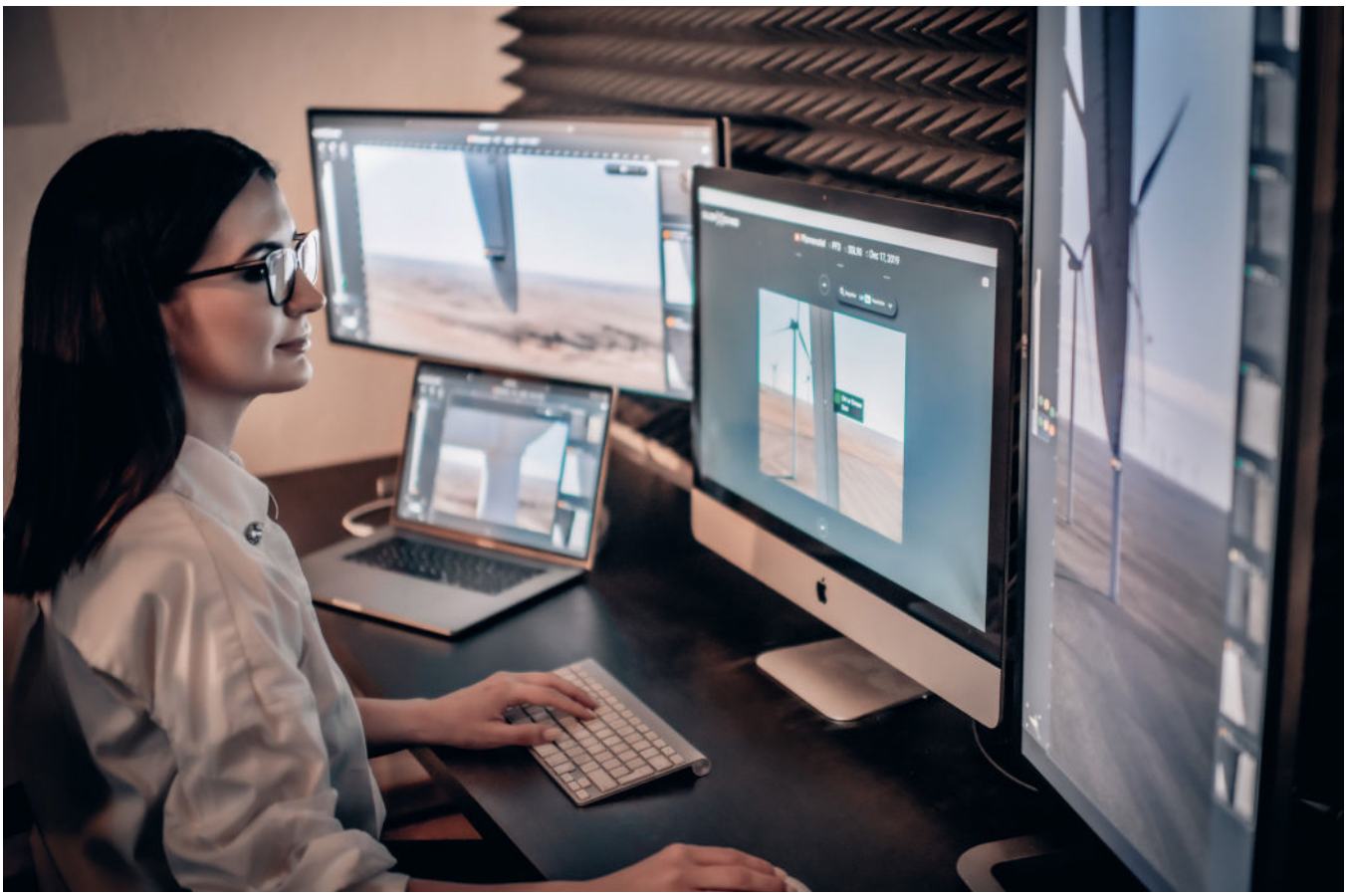
PES: Can you give an example of how the platform can address the needs of different customers?

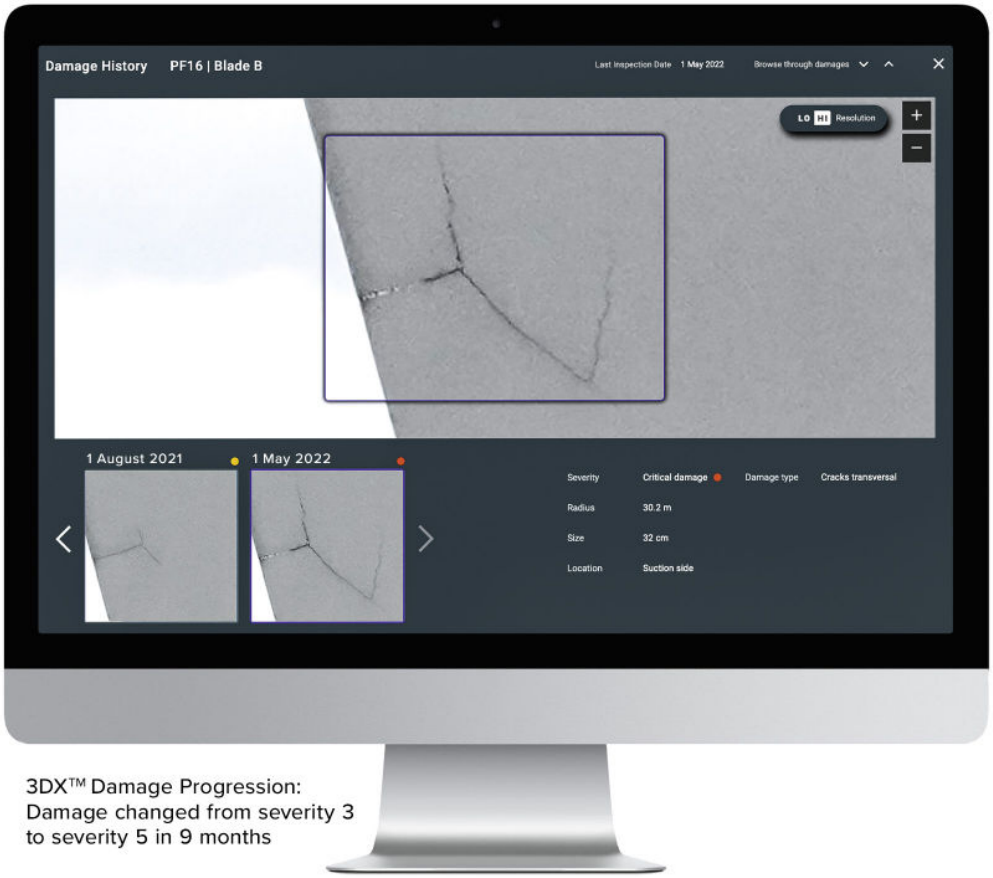
TS: On one hand, you have got customers who only want to inspect their assets to get a snapshot of their current condition and identify necessary repairs. These customers can inspect and upload inspection data into our platform regardless of where the data came from, and it is then pre-annotated using our AI-engine.

With more than 50 years of combined hands-on blade repair experience, our team of blade experts can classify and categorize damages using the customer's specific taxonomy. The customer can then review images and approve the inspections within the platform. With the deep link function, they can then share links to specific damages or turbines within the platform, enabling repair companies to provide reliable quotes but also serving as a solid foundation for discussions with end-customers, insurance companies or any other parties.

Tom Sulzer

On the other hand, we have customers who use our platform as a complete asset management tool. This is the approach that offers the greatest benefits for OEMs, owners and operators alike. With an intuitive interface, a large range of filtering tools, detailed reporting on fleet and site level as well as intuitive dashboards, they are able to analyse the information at hand and use inspection data to make informed decisions that support their O&M strategy.





3DX™ Damage Progression: Damage changed from severity 3 to severity 5 in 9 months

Let us consider for example a large OEM, which has been collecting inspection data for a few years. Thanks to our Data Analytics module, they can monitor how their turbines are performing and create filters by regions, turbine types or damage types. Having this information at their fingertips gives very valuable insights, which can be considered during the design and manufacturing process or when commissioning new wind farms. It is also true for owners and operators, who benefit from a detailed overview of their assets and can make informed decisions to reduce costs and optimize performance.

PES: Can you share your views on the latest innovations in the field of predictive maintenance?

TS: The strive towards predictive maintenance is a well-known focus area for the industry, and a key objective for Sulzer Schmid as well. With this in mind, you have to look at the 3DX™ Blade Platform as marking the start of a digital journey. Successive inspections generate a genuine data treasure that can be exploited to monitor trends and make informed decisions.

We also need to be able to monitor damage progression in an intuitive way, compare data acquired over the years and most importantly draw valuable insights from the observations. In a recent platform update, we have added a new damage progression module with a single damage ID which enables us to do just that. The development of a given damage is displayed in a time series of recorded inspections.

With this feature, damages like leading-edge erosion can be closely monitored over time and its evolution can be tracked in a so-called 'damage chain'. Knowing how damages develop allows blade experts to determine which damages need to be repaired now, in six months or can be monitored. It significantly improves the planning of repair campaigns, enabling us to find that sweet spot between repair costs and aerodynamic performance.

By applying the single ID for all damages, we can follow them and build up a lifetime record of each turbine. In addition, it gives us the opportunity to check the quality of repairs and see if damages re-appear over time. We have built this new damage progression module to provide a solid foundation for predictive maintenance.

PES: Can any company use digital inspections?

TS: In principle, yes. But conditions and requirements differ, so we have created two options to meet different customer needs. On one hand, our 3DX™ Autopilot is perfect for large inspection campaigns where you need to inspect a large number of turbines within a set timeframe. We can orchestrate these campaigns in advance, arrange for dedicated inspection teams and equipment to be used throughout the campaign. The work can be planned well in advance and cover many different countries in a single campaign.

To give you an example, we inspected 4,000 turbines with 19 teams across 14 countries in a single campaign last year, and this year we are looking at inspecting more than 6,000 turbines in the same campaign. Besides this highly efficient inspection solution dedicated to large inspection campaigns, we have also developed a new ground-breaking inspection solution which allows for ultra-flexible and self-performed inspections using an affordable, off-the-shelf drone. Bundled with a proprietary flight-app, this drone can be flown by inhouse teams after as little as one day of training.

The compact design of these drones makes them particularly well-suited for the inspections of wind farms in very remote locations but also for ad-hoc inspections and smaller wind farms. It's like carrying out inspections from a backpack and this new plug-and-play solution can overcome most logistical and customs restrictions. Another benefit is that inspection teams can conduct inspections anywhere and anytime they want depending on the conditions. They can also bundle inspections with repair work for greater efficiency.

With our 3DX™ SmartPilot solution, our aim is to lower the entry barrier to digital rotor blade inspection, to extend its many benefits to more customers in more markets. With our AutoPilot and SmartPilot solutions, we ensure there is a suitable solution for all use cases.

PES: How do you see Sulzer Schmid's future?

TS: Building up data over time will give the wind industry the insights needed to make smarter, more informed decisions. By providing a global, open and scalable platform bundled with a selection of inspection models to suit all needs and budgets, we aim to contribute to this effort in a unique way.

As a Swiss company, quality and precision is in our DNA, and that applies to our inspection teams as well as our software solutions. Our platform provides transparency and allows customers to work more efficiently within their own organisation and with partners. They can share information through secure links not only with their teams but also with repair providers, investors, insurance companies, in short with all the parties concerned with wind farm health.

We see ourselves first and foremost as a technology partner for our customers. Understanding their needs and adapting our solution package to meet these needs is guiding everything we do. Together with our customers, we have developed a number of solutions over the years, and we will continue to do so. Recently, we added a new feature which combines LPS and rotor blade inspections in one flight and incorporates the data into our platform. Now we are developing modules for thermal inspections, blade inside inspections and tower inspections to name but a few.

We truly believe that thanks to our 3DX™ Blade Platform, monitoring wind turbine blades has become easier and more efficient than ever, ultimately lowering the cost of energy. This is still the beginning of our journey, and we know that there is considerable room for further innovation in our space.

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