



## Save Time And Costs

Optimize production process  
of rotor blades with laser  
projection systems

“Since commissioning, large time savings have already been generated.”

- Project Manager, Nordex Group

In 2017, one of the largest global wind power manufacturers, Hamburg-based Nordex Group, was facing a crossroads: The task was to produce an innovative rotor blade with a length of 74 metres instead of the usual fifty and sixty-five metres. So far, the determination of the exact position of the glass lay-up was very complex and no longer able to withstand the modern requirements for accuracy, sometimes in the millimetre range and was also very time-consuming. This required finding a new solution for the manufacturing process in order to produce the rotor blade cost-effectively with high quality standards.

Nordex Group discovered Z-LASER GmbH in its search for innovative and cost-reducing systems for this complex manufacturing process. The idea behind the process to use laser projection and positioning to achieve faster production and shorter cycle times and, at the same time, greater precision. We can already reveal that up to 3 hours were saved in the production process for a rotor blade related to laying over 200 glass fibre mats.

“The glass layers, patches and prefabricated parts are positioned exactly in the millimetre range using our Z-LASER projection system.”

- Project Manager, Nordex Group



## How did this happen so quickly?

The complete manufacturing process of a blank is very complex and therefore takes a lot of time. For this reason, the use of an optical guidance system represents a process optimization with great savings potential. In order to make the production process leaner and faster, Nordex Group installed a number of laser projectors called ZLP2 from Z-LASER GmbH at a distance of about 8 m above the negative mould on the roof of the production hall. The projectors were positioned to cover approximately 90% of the suction side mould and 40% of the pressure side mould. Workers may work in their working environment without restriction. Operation is controlled via the intuitive and easy-to-use ZLP-Suite software, which can be easily integrated into Nordex customer applications using the product's own programming interface, programmed by the user and may be extended on a modular basis.

The most time-consuming step in the production of a rotor blade is to cover it with glass fibre layers which, due to their size up to 20m, are divided into several patches. Most of the material is used in the so-called root area, since this is where the greatest forces are experienced once put into operations. Small tolerances must be observed when shafting this root area. In total, more than 200 individual glass fibre mats in 45 layers are laid layer by layer by hand. The ZLP2 projects the exact positions onto the workpiece so that this can be done optimally and accurately. Excess material can then be removed along the laser mark so that it does not remain in the component. In addition to the positioning of the fibre mats, many other applications where the laser projection system can be used in the production process of rotor blades were identified.



Intuitive software



Fan angle up to 80°



Optimized for 2D and 3D projection



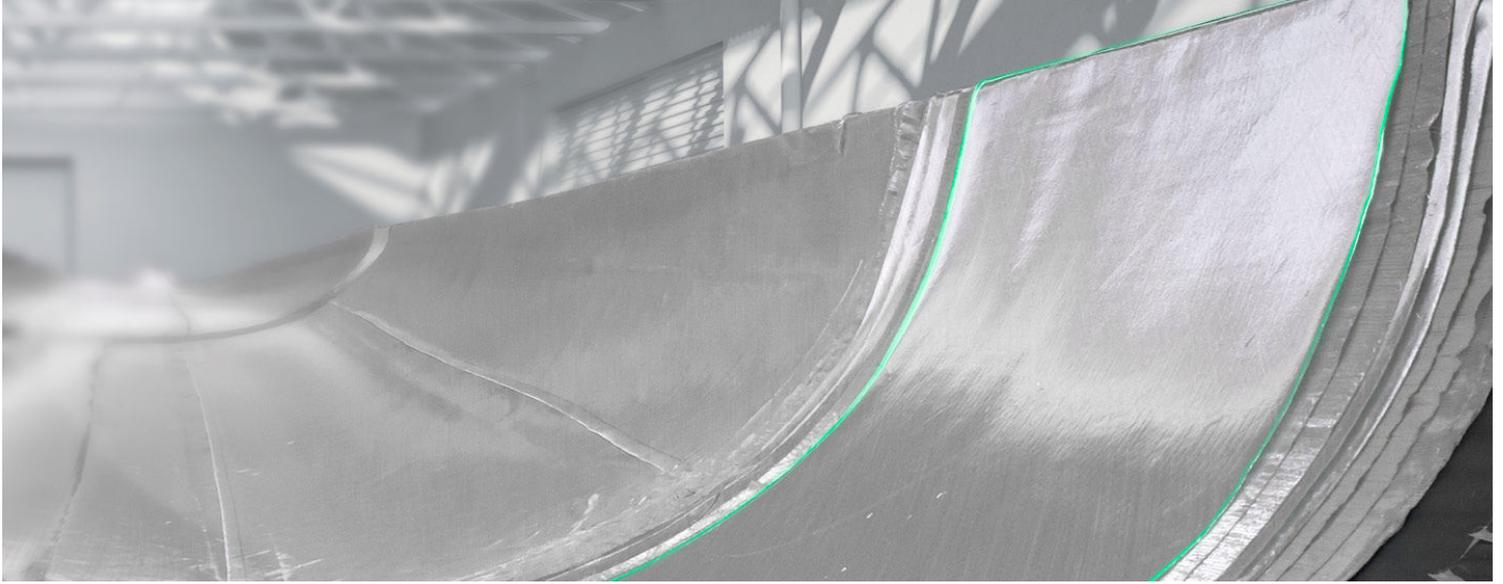
Integration into multiprojector systems



Active or passive cooling system



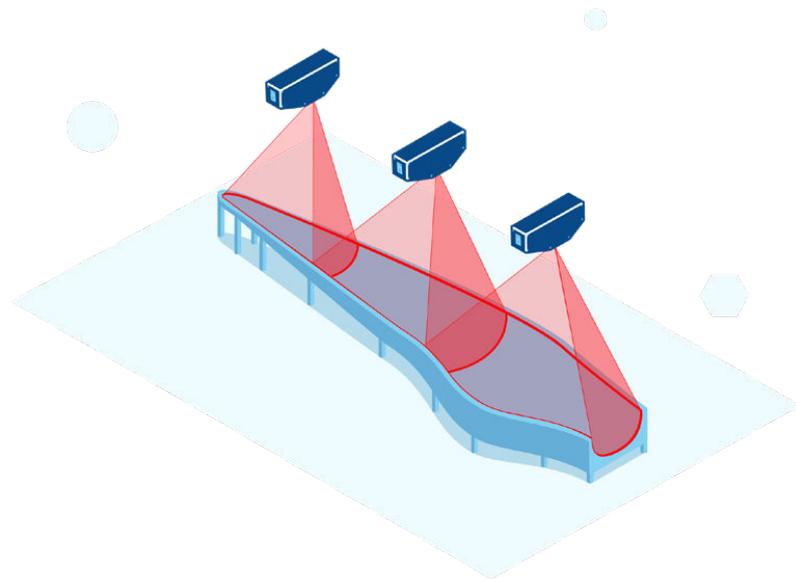
IP65



## A successful collaboration - Nordex Group and Z-LASER.

Since its founding in 1985, Z-LASER GmbH has been pushing the development of laser systems. Nordex Group's management had great confidence in the Z-LASER experts' experience and project planning, so that a decision was made in favour of the Freiburg-based company after a 3-month test phase.

Nordex Group, is clearly delighted with the successful use of positioning and projection laser systems in its own production: „The technical maturity of the products and the technical expertise of Z-LASER were the deciding factors for us. Even when timelines were tight, our collaboration with Z-LASER remained friendly and constructive. They delivered on what they promised 100 %. The use of Z-LASER's laser projection system has significantly reduced throughput times for rotor blades while at the same time improving lamination quality. This means that we have come much closer to our goal of reducing process time to a minimum.



## Conclusion

The manufacturing process can be significantly faster, more precise and more effective with the aid of lasers to position composite materials. Where previously the correct position of glass layers had to be determined in a complex way, today the use of laser systems sets new standards. In the manual lay-up process in particular, we can design with a relative degree of accuracy of 2 mm. Drastic cost reductions can be achieved by using lasers in production given time savings in the positioning process, ideal material consumption and minimisation of corrective work. Even the often time-consuming training of new employees becomes simple and quick because the laser system displays the work steps. Optimising manufacturing processes accompanied by increasing production quality represents forward-looking development on the path toward flexible and efficient Industry 4.0 and holds great potential for enterprises.



## The Nordex Group

The development, manufacture, project management and servicing of wind turbines in the onshore segment has been the core competence and passion of the Nordex Group and its more than 8,520 employees worldwide for more than 35 years. As one of the world's largest wind turbine manufacturers, the Nordex Group offers high-yield, cost-efficient wind turbines that enable long-term and economical power generation from wind energy in all geographical and climatic conditions.

„Quality is when customers return to us  
- not lasers.“

- Kurt-Michael Zimmermann,  
Founder Z-LASER GmbH

Our mission is to develop laser sources and laser projectors of the highest quality for our customers. Since founding Z-LASER in 1985 in Freiburg, we supply the industry with top functional and easy-to-use laser systems.

Z-LASER is a socially responsible company that cares about the well-being of people and its environment. A significant part of the energy requirement is gained through the in-house solar system. Furthermore, we only supply civil applications.

Laser technology  
from Freiburg  
made in Germany

Contact us.  
We would be happy  
to advise you!



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