TTTech industrial

Case Study: Vestas

Delivering safety control systems for wind turbines

Vestas is a leading name in sustainable energy solutions. The company designs, manufactures, installs, and services wind turbines across the globe.

Challenge

Vestas faced a situation where the internal control systems for different turbines varied widely, often requiring a significant architecture redesign for each new turbine model.

Previous generations of turbines had been based on control systems where safety and non-safety functions were physically separated. This ensured safe operation but restricted the way that data could be gathered from the control system. Physical separation of systems meant that there was a lot of external wiring between the actuators and the controllers which made servicing and maintenance challenging. Vestas wanted to migrate from restrictive safety systems based on dedicated safety PLCs to a more flexible system with a consolidated design. TTTech Industrial offered great experience in functional safety and deep technical knowledge that stood out from other suppliers.

Solution

TTTech Industrial built a scalable Distributed Control System (DCS) for Vestas that fulfils safety requirements and can be reused in multiple turbine models. At the heart of the DCS is the Safety Control Board, designed by TTTech Industrial to converge safety and non-safety functions on one piece of hardware. The entire DCS allows safety and non-safety systems to operate seamlessly together. It was developed with safety standards in mind so that it meets the requirements of safety certification bodies like TÜV. Additional Safety Control Boards can be easily

> " We chose to work with TTTech Industrial due to their outstanding experience in functional safety. The scalable DCS allows us to the focus on extending functionality and offering customers new services, confident in the knowledge that Vestas turbines meet the highest safety standards. "
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> David Steele,
> Vestas

added to the DCS in order to scale it for use in larger turbines or models with special features, such as ice removal for use in cold climates.

Using Deterministic Ethernet within the DCS allows more data to be shared on the network whilst ensuring optimal bandwidth usage.

Benefits

Vestas is integrating the scalable DCS from TTTech Industrial into thousands of wind turbines every year. The company is benefitting from increased flexibility and reduced complexity which brings down the cost of setting up new turbine control systems substantially. The scalability of the DCS has also streamlined development, with more than 70% of the turbine control architecture now being reused when building new turbines.

The reduction in external wiring enabled by the converged safety control and networking equipment has led to lower maintenance and servicing efforts. The system not only requires fewer spare parts in total, the spare parts required are also easier to change. Network switches can now be replaced or added without affecting the safety control board which remains in place. Vestas has enjoyed significant improvements in turbine uptime which ensures that customer contracts are fulfilled and the overall cost of energy for consumers is reduced.