

”

**We deliver blade services,
performed by specialists
and supported by technology**

Clobotics Wind Services
EMEA

Contents

- About Us
- Our Services
 - Inspections
 - Repairs
- Our Tools
- Why Choose Us

About Us



Clobotics develops and delivers market-leading software, robotics, and skilled specialists to help maintain wind turbine blades.

Our solutions help companies to automate time-intensive operational processes, which increases efficiency and improves business performance through data collection, analytics and intuitive access to data.

Choose Clobotics for wind turbine blade maintenance performed by specialists and supported by technology.

Clobotics Wind Services delivers the full scope of blade maintenance and optimization onshore and offshore, including vessel charter and logistics.



Our Services

EXTERNAL BLADE INSPECTION



01 Autonomous Blade Inspection

Clobotics IBIS™ is the most advanced drone system in the wind industry, optimized to keep turbine downtime to a minimum. IBIS™ performs a detailed inspection of your wind turbine blades in minutes, making it a cost-effective solution for both onshore and offshore WTGs.

High quality data is available online after 5 working days, with all defects labelled and categorized according to agreed specifications.

18-22

Minutes per WTG
inspected



99.9%

Accident free
record



75 000+

Wind turbines
successfully inspected



Our Services

EXTERNAL BLADE INSPECTION

02 Insource Your Inspections

Continuous development of Clobotics IBIS™ drone technology has led to a new milestone. We are now able to train your personnel to inspect wind turbine blades at the touch of a button, offering an unprecedented level of autonomy and flexibility for your blade inspection projects.

Clobotics has developed a training program that can be tailored specifically to technicians with different skillsets. Our comprehensive training course takes two days and covers everything that is needed to perform inspections confidently, safely, and efficiently.

03 Become a Partner

As a Clobotics IBIS™ partner your organization will have access to the most advanced technology, ensuring a competitive advantage. IBIS™ partners continuously receive the latest innovations, backed up by a regional Clobotics office in their time zone.

Your technicians will perform inspections and upload data. Within five days data is ready for your engineers to review or share directly with your client. Find out more at www.clobotics.com/wind



All partners are different, and therefore we tailor each partner agreement to fit the requirements of your business and your country of operation.



**YOUR TECHNICIANS
OUR TECHNOLOGY**

Our Services

STRUCTURAL INSPECTION



Clobotics offers inspections of towers, nacelles, foundations and TPs (transition pieces) using our drone or specially trained rope access technicians. We work both onshore and offshore and have a 10-year track record in offshore substructure inspections, including monopile and various jacket structures.

04 Tower Inspection

As part of wind turbine maintenance, the exterior of the tower structure can be periodically inspected using drones. We can combine tower and nacelle inspections with blade inspections to deliver a safe and efficient method of visualizing the health of the entire asset.

05 Offshore Foundations

Over the last decade Clobotics have inspected many monopile and jacket structures. As part of the inspection, we capture high quality images and perform detailed post-processing. The entire surface is analyzed, and observations are presented in our online portal IRIS™, where the entire asset can be monitored with ease.



Our Services

CLOSE-UP INSPECTION

06 Internal Blade Inspections

Clobotics performs internal blade inspections in a safe and effective manner using crawler robots. Our specialists are trained to work in confined spaces and are experienced in operating our advanced robot crawlers to optimize workflow and ensure high confidence in inspection findings.

08 In-house Blade Specialists

Clobotics is the safe choice for complex wind turbine blade cases. Our in-house specialists have experience in structural integrity and aerodynamic performance, as well the ability to develop and document unique repair cases. Clobotics inspects and repairs tens of thousand of blades every year – there is no other company in the world with the same track-record and knowledge.



KNOW YOUR ENTIRE ASSETS HEALTH

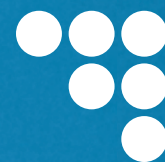
07 Uptower Inspections

Uptower inspections can be performed by rope access, cherry picker/boom crane or wire-suspended platforms. Clobotics has a range of cost-effective in-house solutions that enable us to react quickly to inspection requests.

09 LPS Testing

Clobotics performs LPS tests according to OEM requirements, on the full blade structure and other components of the Lightning Protection System. We often combine LPS testing with other blade inspections to improve efficiency and optimize weather downtime.

Learn more on www.clobotics.com/wind



REPAIRS

Clobotics Wind Services
EMEA

Our Services

BLADE REPAIRS



Clobotics' Blade Repair Service is led by our team of in-house blade specialists, complemented by our skilled technicians, and supported by state-of-the-art equipment. We customize work instructions and access methods for each project to ensure the highest quality of work. We have 27 years' experience in onshore and offshore blade repairs and are constantly focused on innovating the technology within our field. Our blade specialists have developed a range of methods to optimize the repair and curing process. Our methods are tested and approved by accredited institutes. Examples of our advanced repair tech include UV curing and LEP material development.

27

Years of experience
in blade repairs



ISO

We are ISO 9001
certified



94%

Achilles HSEQ
certification Score





Our Services

BLADE REPAIRS

01 Structural Repairs

Clobotics are a trusted partner for all types and categories of blade repairs. With a range of in-house blade technicians, we can perform the most advanced repairs according to client specifications, or by providing our own work instructions. Our blade specialists assess the specific defects and choose the relevant work instructions. If existing work instructions do not cover a specific case, our senior specialist can develop work instructions and handle the certification of new repair methods. All repairs are tracked using Clobotics Raven technology.

More about our repair methods and Raven technologies you can find at www.clobotics.com/wind

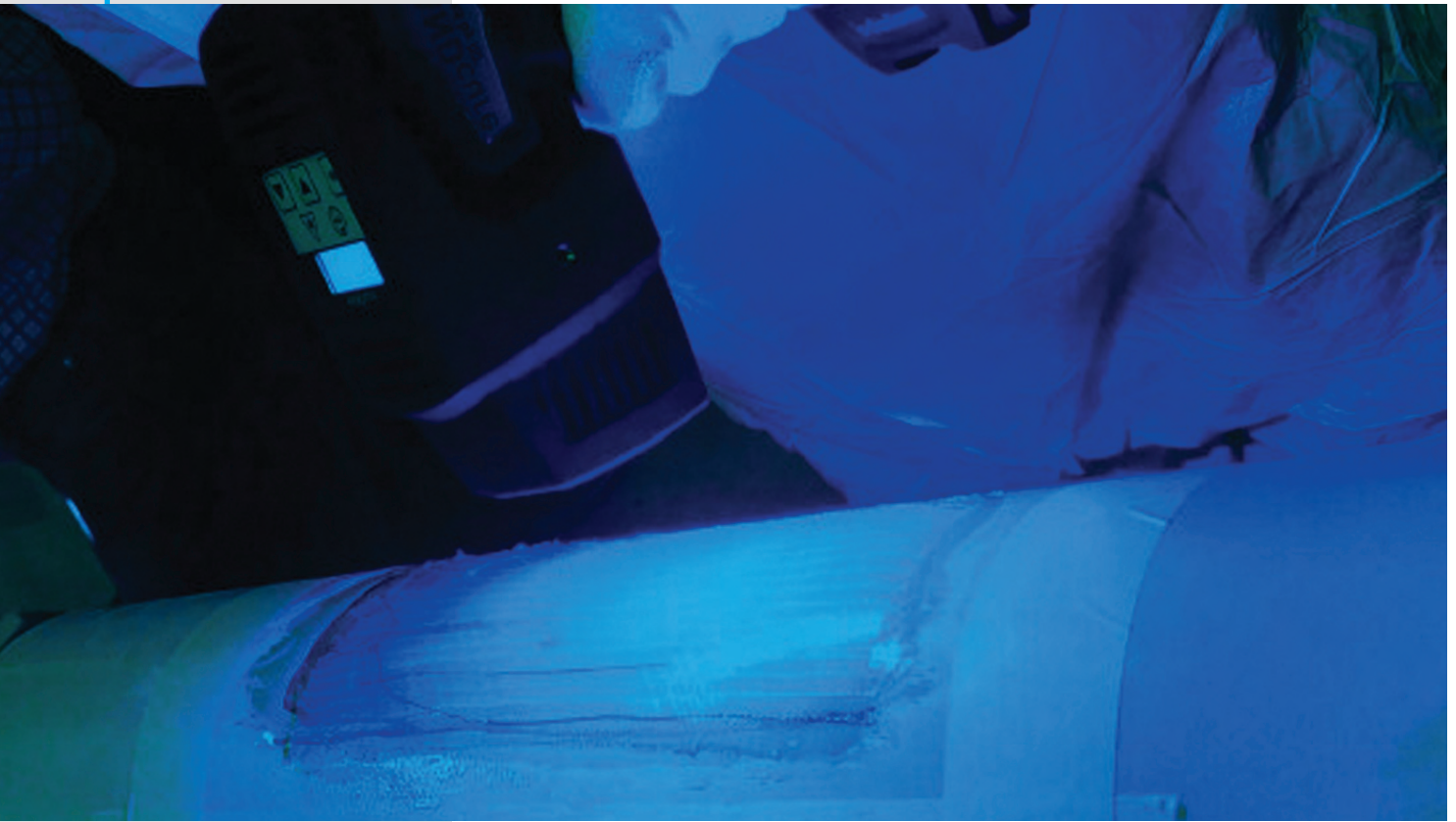
02 LEP Repairs

Clobotics performs repairs and application of Leading Edge Protection. We independently choose the right materials and tools for each project, depending on site-specific conditions, blade type and maintenance strategy.

Over the last decade, leading edge erosion has become a major concern. Clobotics works with leading suppliers of materials and can apply various systems according to our specialists' guidance. We perform extensive testing and develop special tools to perfect the application and to optimize wind turbine performance

Our Services

REPAIRS



03 Material Technology

Clobotics has developed repair methods for carbon fiber based de-icing systems. These enhanced de-icing repairs are considered more stable than the initial validation repair, and the entire laminate transfers the heat. The system is proven in laboratory testing and has been applied to turbines since 2020.

CLOBOTICS HAS DEVELOPED A GROUNDBREAKING UV-CURING RESIN

Conventional composite repairs have a long curing time and a strict weather window. By developing special resin and UV-curing, our technicians can reduce repair times significantly and increase the weather window of when composite repairs are feasible. The process can be performed at -5° Celsius and humidity of up to 90%. Clobotics' UV-curing has been successfully tested in collaboration with the Danish Technology University (DTU).



Our Services

REPAIRS

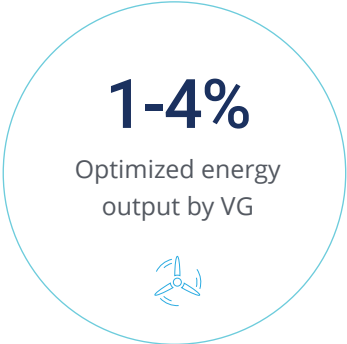
We are proud to be constantly innovating the technology within our industry, and we want to help you to optimize the energy output of your WTGs. Our portfolio of products and services covers all needs for maintaining and optimizing your turbine blades. Our projects are primarily initiated internally, and products are offered independently under Clobotics' brand names.

Find out more about our services on www.clobotics.com/wind

Our in-house experts continuously develop materials, tools, and work methods to optimize both performance and structural integrity.

04 Vortex Generators

Our unique VG (Vortex Generator) fins and mounting templates are developed by our in-house specialists who has repaired and performed optimization of blades up-tower for decades. The mounting technique has been developed to optimize the speed and accuracy of mounting, which is essential to ensure better performance. Clobotics delivers the entire scope of works. Blades are 3D modelled and analysis is performed based on individual blade size and construction.



Our Services

BLADE SERVICE CONTRACT



Clobotics combines an extensive track-record and in-house specialists to offer long-term service agreements for a range of wind turbine blade types. Our service agreements are customized for each individual wind park where a maintenance scope is agreed upon.

CLOBOTICS' BLADE SERVICE AGREEMENTS ENSURE A MORE STABLE OPEX AND IMPROVES PERFORMANCE OF THE WIND PARK.

Agreed maintenance plans include IBIS™ inspections at regular intervals. An optimal maintenance and repair plan is tailored in accordance with site logistics and weather. Wear and tear is continuously monitored and defects are repaired in a timely manner, according to site-specific requirements.



TOOLS

Clobotics Wind Services
EMEA

Our Tools

CLOBOTICS IBIS™



Clobotics IBIS™ platform is built on a DJI Matrice 300 RTK drone, with a customized data acquisition system including high-resolution cameras, intelligent sensors, and powerful onboard computing. It has been specifically developed for wind turbine inspections and designed to ensure cost-effective operations and economies of scale in the hardware system.

IBIS™ navigates autonomously around all three wind turbine blades, without any manual input or human intervention. While flying four paths on each blade, IBIS™ collects high-resolution images and precise metadata, to enable accurate post-processing and analysis of defects. The IBIS™ onboard computer automatically controls every aspect of the process to ensure high quality image data, regardless of lighting conditions or background landscape.

1

Flight per turbine
(12 paths)



18-22

Minutes per WTG
inspected



1

Person
for operating



Our Tools

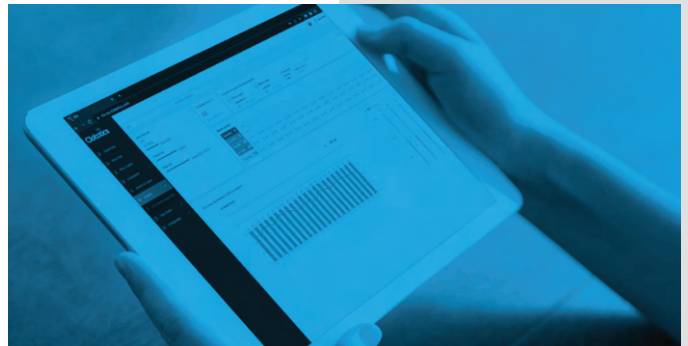
ONLINE PORTAL |

01 Data Management by IRIS™

Data is collected during the entire lifespan of a wind turbine. Inspections are a vital part of that process, both for planning maintenance and repairs, but also to document asset status ahead of change of ownership or service responsibility situations. The IRIS™ data portal enables the user to generate fast overview reports, as well as giving them the ability to drill down to individual defect level. Users can annotate defects and add comments and recommendations to vendors and other stakeholders.

02 Change to IRIS™ with Ease

Clients are assured a seamless transition to IRIS™, with training and support available in their local region. IRIS™ is an intuitive online portal, with no requirement to download apps or third-party software. Users are granted a username and password and have instant access to all data. Clobotics IRIS™ has been tailored to support the upload of various formats of drone and camera inspections. If data is consistent and in a common format, Clobotics can upload legacy data and generate statistical overviews to assist in the review and planning process.



Our software engineers are continually working on integration and optimization of our portal, enabling clients to use IRIS™ as their preferred tool for managing blade, tower, nacelle, and foundation inspections.

Our Tools

REPAIR TRACKING BY RAVEN



Clobotics' Raven system comprises both hardware for data collection, and a software package for finalizing and generating inspection reports. At the end of each working day, the data captured is uploaded to the Raven online portal, where blade specialists can oversee the quality of repairs and documentation. Data can also be accessed online by our clients, enabling them to closely follow the progress of our fieldwork.

Raven optimizes the workflow of repair technicians, while also ensuring that all repair steps are automatically documented to produce accurate reporting data in our online platform.



**REPAIR REPORTS ARE
GENERATED IN MINUTES**

Our Tools

SPARROW™ REPAIR ROBOT



In recent years, Clobotics have developed a repair robot to consolidate our position as a marketleader in the field of repairs. We combine the accumulated knowledge from thousands of onshore and offshore drone operations, with our market-leading repair experience and superior software development competencies.

With a hands-on approach, Clobotics have developed a concept that is revolutionizing the way that blade service works. Sparrow™ offers a decisive advantage on all turbine types and is suitable for both onshore and offshore use.

Sparrow™ is the first repair robot in the world developed to launch directly from the deck of an offshore vessel.

Sparrow™ is modularized and can carry a variety of tools and materials. Several toolsets have been developed to automate repairs of the leading edge and for the application of LEP (Leading Edge Protection).

Why Choose Us

6 Reasons why we are different from others

01 **27 Years' Track Record**
Clobotics have merged with leading industry players around the world, giving us a unique knowledge base within inspections, repair and maintenance of onshore and offshore wind turbines.

02 **Technology-Driven Services**
Clobotics leads the way, combining advanced technology with wind turbine blade service and maintenance.

03 **200+ Years' Experience**
With subject matter experts located around the globe, you can trust us to find the right solution for your requirements for blade maintenance and optimization.

04 **Blade Service Made Easy**
Our dedicated project managers tailor each project - organizing logistics, preparing documentation, selecting vessels and equipment, and handling the entire flow of data and documentation.

05 **We Focus on Blades**
We develop drones, robots and IoT devices specifically for wind turbine maintenance. Our systems are developed without compromise and optimized for safety, quality, cost, and speed.

06 **Future-Proofed Blade Service**
Clobotics are continuously developing and optimizing materials, tools and methods to ensure blade maintenance costs are minimized.



www.clobotics.com/wind

Get Started

Denmark Office
Fiskerihavns­gade 9
6700 Esbjerg

info.europe@clobotics.com

Follow Us

