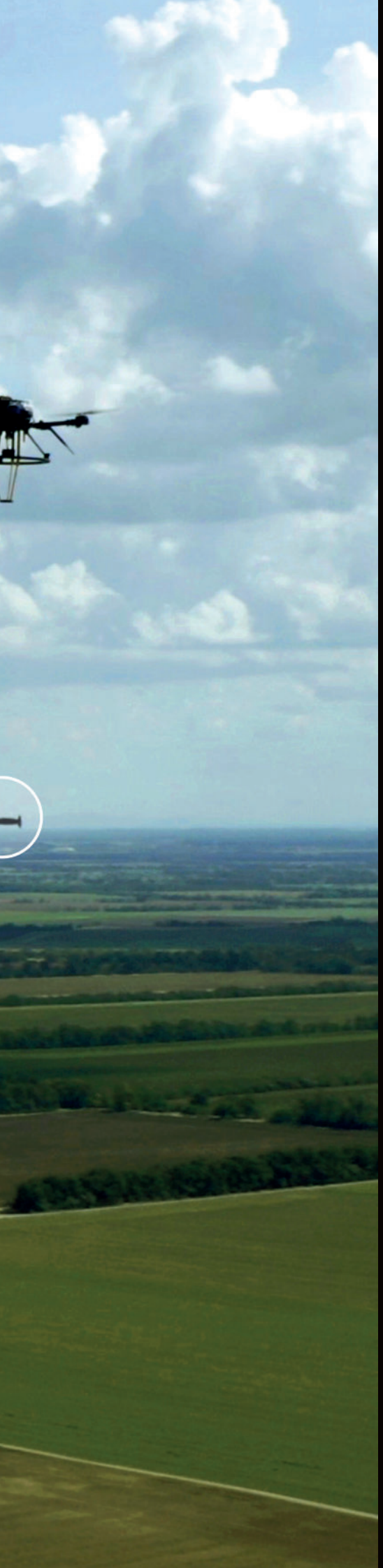

Resident robotics for continuous data collection

As large, unmanned, remote structures that are open to the elements, wind farms both on and offshore are often subject to performance related issues that need to be addressed to remain cost effective and maximise efficiency. With the market growing faster than it is possible for personnel recruitment to keep pace with, overcoming these challenges may just mean a greater reliance on remote technology. PES was eager to speak to Boaz Peled, Founder & CEO of First Airborne, to get his thoughts on the subject.

PES: Welcome to PES, I'm looking forward to our conversation today. To get us started would you mind giving a brief introduction to First Airborne for readers who might not know?

Boaz Peled: Certainly, First Airborne provides resident, robotics-based performance and inspection services, unmanned and tailored to wind farms on and offshore. Our Resident Airborne Services (RAS) platform, features marine worthy docking stations, high wind resistant aircraft, proprietary wind measurement instrumentation, and importantly a SaaS tool. Combined, these enable operators to recover significant income, reduce maintenance costs, increase availability, and eliminate longstanding logistic and economic inefficiencies.

PES: The wind industry is growing at a very fast pace of course, and wind farms are growing with it, but does this present challenges in tracking their performance, particularly related to challenges of personnel on site?

BP: Everything is complex when it comes to data collection and analysis of wind farm operations, as these assets are very tall, almost always remote and generally unmanned.

Performance related issues are certainly one aspect where wind farms are losing significant income, and we have some very disruptive technology to address this, but so is asset integrity. The fact that inspections today are performed on schedule or on some statistical basis is in itself proof of how much upside exists in this vertical for all parties involved.

Turbine installations outweigh the growth in trained personnel by a factor of over 10 per year and this trend will grow exponentially. Therefore, the introduction of technology to make up for the difference is a given.

PES: How do airborne services help with this, in ways that perhaps stationary technologies are unable to?

BP: As a straight forward example, a blade inspection currently involves tenders, qualifications, travel, fuel, accommodation, contractors, climbers or manned drone

operators, safety hazards, employee overheads and turbine downtime. With RAS, all that is required is to click on 'Launch Blade Inspection WTG #25' from your workstation, and sit back until a report is automatically generated post mission.

This can be repeated and tailored as needed, for example post storm, on schedule, trigger based, and pre and post maintenance.

PES: And in the unique and currently logistically challenging case of Performance Monitoring?

BP: With respect to performance monitoring, current methods such as LiDARs are expensive, stationary, and complicated to install and calibrate. They need to be moved from one turbine to the next and craned if they are nacelle based.

Windborne is a proprietary, on board wind measurement instrument, now validated and patented globally. And by 'hopping' from one turbine to the next it enables farm-wide direct performance monitoring, ensuring that all turbines are monitored continuously throughout the year at no additional cost. This inevitably leads to significant income recovery.

The more data we gather on the nacelle alignment, pitch alignment and power curve integrity at large, the more optimization possibilities become available.

PES: Can such constant data collection and analysis help to make predictions about maintenance issues as well?

BP: Of course. As the saying goes: 'If you don't schedule your maintenance, it will be scheduled for you.' And I might add that it will then cost you five times as much.

The more data we have, and the higher the availability of data collection, the better we know how and when to apply maintenance and optimization activities.

Interestingly, about 1% of blades come down every year in some areas, that's 3% of turbines. Imagine the benefit once your assets are tracked consistently. And of course, resident robots don't require hotels and transportation, their cost per additional task is virtually zero.

PES: Presumably there are advantages in terms of cost and time too, not to mention the potential for improved income recovery?

BP: In terms of cost per turbine this is a whole new universe. Let's just say that the cost of a performance test for three turbines in a 60 turbine wind farm using a LiDAR device, is about equivalent to the cost of performance testing the entire wind farm twice over using the RAS platform. And that's before considering all internal related costs, coordination with the OEMs and so forth.

PES: How reliable are such unmanned or remote monitoring systems?

BP: Unmanned robotics is advancing at an incredible pace. The off the shelf sensors we use on board our aircraft today would have cost millions to develop just a few years back. Due to the dimensions and distances at hand you can't expect a person to orientate, accurately fly, or ensure safety when controlling a robot that cannot be seen at such heights and angles.

Boaz Peled

If the automation and autonomy are designed and implemented correctly, safety, predictability and reliability are very impressive.

PES: Is it easy enough to retrieve the data and share it?

BP: As easy as it is to share via WhatsApp, email, or commonplace cloud services. We are about to introduce a live sharing feature, which would enable operators to share live streams during, for example, BoP inspections. This will enable several interested parties to interact during or post missions.

PES: Can you give us any real-world examples of how robotics is being used in wind farm performance and inspection?

BP: Of course. Having launched our commercial activity at the end of last year, our system is now being used by major players. For example, our system is currently running nacelle misalignment analysis services at wind farms in France and Austria.

The rate at which we turn around data and the ability to then easily adjust turbine parameters to enhance production is unprecedented in our industry.

PES: Do you think this technology will develop further and become more commonplace as the industry grows?

BP: We often contend that there is no question that all significant wind farms on and offshore will have resident robots on site for different purposes. We will spare no effort to ensure that many of those robots are ours.

PES: And for First Airborne, what comes next in 2022 and beyond?

BP: In 2022, First Airborne will deploy its platform on several European wind farms owned by some of the world's largest operators, these agreements are already signed and the platforms have now been shipped. Beyond that, we will then be headed for deployment in the USA, and after that the ultimate challenge: offshore wind farms in the North Sea.

PES: That's intriguing Boaz and we look forward to learning more about it in a future conversation.

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