Ingeteam is fully committed to meeting the challenges of the rapidly expanding global wind power market. (Courtesy: Ingeteam)

INNOVATION

## Ingeteam strengthens tech platforms to meet future challenges

Ingeteam Wind Energy, a global specialist in wind-energy drivetrain technology, announced that it has successfully secured framework contracts with key clients for the serial supply of its latest technology developments, including its new high power DFIG converters, as well as low- and medium-voltage full power converters. These agreements will secure the manufacture and supply of new generation and conversion equipment across its manufacturing plants in 2021 and beyond.

Ingeteam is fully committed to meeting the challenges of the rapidly expanding global wind power market, to promote the implementation of international quality standards as defined by the APQP4Wind manual for the development of wind products, and to optimize the LCOE. This is an evolutionary process, based on continuous improvement, to increase competitiveness, and reduce costs to facilitate the transition to renewable energies around the world.

Since first launching its DFIG converters 25 years ago, this technology has become the standard for the onshore wind turbines. 2020 saw the launch of Ingeteam's latest generation of wind-energy converters developed for high-power DFIG converters, expanding the range from 5 MW to between 6 and 8 MW. These doubly fed converters with high-speed drivetrain technology have been rigorously tested and labeled to comply with the strictest international grid codes and facilitate the full wind-turbine certification process.

For offshore markets, LCOE optimization has typically been achieved through the development of ever larger wind turbines.

"Offshore wind turbines, with capacities of 10 MW and above, will move from prototype stage to commercial availability in the short-term," said Alberto Barcia, commercial director of Ingeteam's Wind Business. "We are working closely with manufacturers to bring these huge machines to mar-

ket, by developing a third-generation suite of medium-voltage (MV) full converters, which offers a range of benefits to OEMs. Their compact and modular design provides flexibility to adapt to power upgrades, and they are more easily installed within nacelles. MV converters are able to achieve optimized availability and reduce maintenance, both critical conditions for offshore wind farms."

Power plant control and monitoring is also at the heart of Ingeteam's business to optimize LCOE. The development and implementation of a Renewable Energy Control Center offered in the Smart SCADA suite of solutions integrates big data analytics and cybersecurity ensuring safe and comprehensive control of renewable assets. By offering flexibility in design, backed by R&D, the company provides clients with tailored and competitive solutions to minimize LCOE and optimize their equipment. In 2020, an increasing number of clients entrusted Ingeteam to develop their own control centers, demonstrating the success of the technology and Ingeteam's client focused approach.

During a year in which the global COVID-19 pandemic has created unprecedented disruption, affecting many lives and businesses, Ingeteam is proud of the accomplishments of all its employees, providing high-quality service to clients around the world. A constant rhythm of activity has been maintained at all manufacturing plants. In total, the company delivered 3 GW of electrical equipment to wind OEMs, confirming its market leadership position.

"Our agile and localized manufacturing strategy allows for the flexible supply of products and solutions, including the new generation of equipment in all technologies, from our cutting-edge manufacturing facilities in Europe, Asia, and North and South America, to the highest quality standards in the market," Barcia said.

**MORE INFO** www.ingeteam.com

INNOVATION

## B&K Vibro introduces machine health monitoring tech

Brüel & Kjær Vibro (B&K Vibro), one of the leading worldwide independent suppliers of condition monitoring solutions for rotating machinery, has launched VIBROSTORE 100, a palm-sized device that provides vibration level and bearing wear monitoring for balance-of-plant machines at the push of a button.

The lightweight device can be used single-handedly and enables even un-

trained personnel to take vibration measurements and assess a semi-critical machine's overall vibration condition. The instrument is equipped with a pre-set cable-connected high-quality B&K Vibro acceleration sensor. Once the type and size of the machine based on ISO 10816 and its running speed are entered, a one-button push can perform the measurement. A traffic-light display immediately indicates the severity of the vibration based on the built-in ISO 10816 alarm limits (velocity in mm/s or in/s). The main screen also shows the rolling-element bearing condition in bearing damage units measurement (BDU) and total g (RMS acceleration). The display of the vibration level in frequency ranges indicates the most common machine faults, such as imbalance, misalignment, or looseness.

"Whereas critical and semi-critical machinery is usually equipped with an online protection system to avoid catastrophic damages, it is often too difficult and costly to install an online condition monitoring system on every semi-critical machine," said Florian Endres, commercial platform leader, B&K Vibro. "With a combination of B&K Vibro quality and extremely competitive pricing, the VIBROSTORE 100 fills the gap in detecting the most common machine faults and delivers quick, reliable and cost-efficient machine health monitoring for semi-critical and balance-of-plant machines."

VIBROSTORE 100 is available either as stand-alone or packaged with the B&K Vibro Report & Route Manager software, a powerful and highly functional route editor and analysis software.

**MORE INFO** www.bkvibro.com/vibrostore-100


The VIBROSTORE 100 can be used single-handedly and enables even untrained personnel to take vibration measurements. (Courtesy: B&K Vibro)

INNOVATION

## New lifting system, tower to enhance turbine assembly

Mammoet has started a joint effort with Sumitomo Mitsui Construction Co., Ltd and FHECOR Ingenieros Consultores for the development of an innovative onshore wind-turbine generator erection system and tower structure. Its self-climbing installation technology erects each wind turbine tower in sections, allowing them to reach to greater heights and more reliable winds.

A new lifting system allows the nacelle to be affixed to each turbine tower at a much lower height. (Courtesy: Mammoet)

As nations strive toward 2050 carbon neutrality targets set by the Paris Agreement, onshore wind is seen as a reliable and plentiful source of renewable energy. Installation onshore brings access to stronger and more constant air flows; at higher hub heights this effect is multiplied.

However, as towers stretch toward 200 meters, fewer cranes have the reach necessary to perform turbine assembly on land. Developers then looked at alternative assembly methodologies such as climbing cranes or huge tower cranes, but these are not available in the market. In addition, other massive crawler cranes used are not specifically designed for onshore wind-farm constructions.

Furthermore, when towers approach 200 meters in height, there is an additional requirement for them to be constructed using a concrete or hybrid steel-concrete structure because steel alone lacks the rigidity required to support the weight of the tower, nacelle, and blades.

To address the above challenges, Mammoet, Sumitomo Mitsui Construction, and FHECOR have agreed to start the joint development of a 200-meter tower. The design was by both Sumitomo Mitsui Construction

and FHECOR whereas the self-climbing lifting system's conceptual design was by Sumitomo Mitsui Construction. Mammoet contributed in terms of experience and engineering. Each tower is to be constructed in sections and raised in stages to its full operational height.

This system allows the nacelle to be affixed to each turbine tower at a much lower height than is the case, improving the safety of each lift and allowing customers to choose from a larger pool of cranes that is capable of undertaking this work. In turn, this has a positive impact on both project scheduling and cost.

It will also allow turbine blades to be connected to the nacelle at a lower height and ensure that equipment in use for onshore wind projects does not need to be replaced as hub heights grow.

"With Mammoet, this project moves from concept to reality," said a representative of Sumitomo Mitsui Construction. "We provided technical development for design and ideation, whereas Mammoet then supporting us with their experience and expertise in heavy lifting and engineering for wind-power and renewables sector. We believe this technology developed will meet gradually also meet the needs of onshore and offshore wind markets not just in Japan, but around the world."

The technology can be used for both greenfield onshore, offshore wind developments, or for the renewal of existing onshore wind towers. Development of the technology continues.

**MORE INFO** www.mammoet.com

INNOVATION

## WindCube advances wind energy with enhancements

Leosphere, a Vaisala company that specializes in developing, manufacturing, and servicing turnkey wind Lidar instruments for wind energy, recently announced increased measurement capabilities, premium services, and turnkey options for WindCube® — the industry-standard vertical profiling Lidar for wind energy applications — to further deliver an unprecedented customer experience.

"With renewable energy technologies continuing to advance and proliferate, wind-power generation is set to take off in an increasing number of geographies around the globe," said David Pepy, head of Renewable Energy Business, Leosphere. "To maximize efficiency and production, a complete, accurate view of the wind profile is essential — particularly as wind turbines become increasingly larger, especially offshore. These lat-


WindCube's new set of enhancements provide increased performance. (Courtesy: Leosphere)

est WindCube enhancements provide that. Just as critical, our new services, including a suite of validation options through our partnership with DNV GL, will increase Lidar operational continuity and maximize uptime. Combined, these new improvements empower wind-farm developers and operators to harness the power of wind energy more quickly, efficiently, and affordably."

WindCube's new set of enhancements provide increased performance. The benefits of these enhancements include:

Innovative new algorithm: The system embeds a unique hybrid wind reconstruction algorithm to reach an unrivaled IEC classification while reducing uncertainty and increasing reliability.

Increased wind-measurement range and more simultaneous measurement heights: By measuring up to 300 meters at 20 simultaneous heights, WindCube comfortably covers the wind profile of even the largest onshore and offshore wind turbines, providing increasingly accurate and reliable data for wind-resource campaigns.

Industry-standard compliance: Validated by Deutsche Windguard, WindCube is IEC-classified and compliant with the highest-available industry standards.

Improved service levels: Accelerated workshop service and a premium service level with on-site repair and guaranteed intervention delays maximizes uptime and service continuity.

Turnkey options: Affordable new options simplify deployment and operation, with additional options to come soon.

A suite of new validation services, through a partnership with DNV GL, a global quality assurance and risk management company that delivers advisory, certification, and testing services to stakeholders in the energy value chain — maximizes uptime and simplifies third-party validations, saving organizations time and money. These services include:

WindCube Golden Validation by DNV GL: Each WindCube is validated by DNV GL against a Golden Lidar before it leaves the factory.

IEC-Compliant Validation by DNV GL: With this option, fully IEC-compliant WindCube Lidars can be ordered and delivered, shaving approximately two months from the third-party, on-site validation process. This enables the Lidar to enter service quickly while fulfilling standards' requirements for bankable wind resource measurement and power-performance validation.

Validation Continuity to Maintain IEC Compliance: By providing a unique DNV GL-validated Laser Chain swap process in case of maintenance, this optional warranty service—which is estimated to be available by end of the first quarter of 2021 — ensures the system automatically maintains IEC-compliant validation by DNV GL during maintenance and can be immediately put back into service.

"Our partnership with Leosphere will provide the industry with unique services that will save their customers time and money," said Fabio Wagner, head of Section Loads & Power Performance & Wind Resource at DNV GL.

"We've reviewed already more than 45 of the enhanced WindCube Lidars and can conclude that WindCube meets the highest standards for accuracy," said Bastian Schmidt, Remote Sensing Team Leader at DNV GL. "The improvement of the wind-reconstruction algorithm surely has the potential to help with bankability and measurement accuracy."

With more than 15 years of scientific Lidar innovation, WindCube has earned the trust of customers and other industry leaders through thousands of deployments around the globe.

**MORE INFO** www.windcubelidar.com

CONSTRUCTION

## Swedish take-up of the Siemens Gamesa 5.X platform continues

The strength of the onshore powerhouse Siemens Gamesa 5.X platform has gathered momentum in Sweden heading into 2021 following the signing of a 62 MW deal to supply two adjacent sites in the Sunne region.

The deal with local utility firm Tekniska verken will cover the supply of 7 SG 5.8-170 turbines at Fryksdalshöjden and three of the same turbines at the nearby site of Norra Länsmansberget. These turbines will use a flexible power rating to adjust their nominal power to 6.2 MW, among the most competitive in the industry. They are

The deal with local utility firm Tekniska verken will cover the supply of 7 SG 5.8-170 turbines at Fryksdalshöjden and three of the same turbines at the nearby site of Norra Länsmansberget. (Courtesy: Siemens Gamesa)

expected to be installed by late 2022 and will have a 115-meter hub height. The deal also includes a up to 30-year service agreement.

Siemens Gamesa has now sold more than 2 GW of this market leading onshore platform with one of the largest rotors at 170 meters in the industry, enabling it to provide an unrivaled levelized cost of energy (LCOE). Of that 2 GW, about half has come from various sites and customers in Sweden, showing the pioneering nature of the country and its enterprises in their adoption of renewable technology.

"Sweden has proven a major driver to the success of the Siemens Gamesa 5.X platform, and we are encouraged to see its rapid roll-out continue in 2021," said Clark MacFarlane, Siemens Gamesa Onshore CEO for Northern Europe. "We also welcome another contract with a key customer in Tekniska verken, with which we will work closely going forward to help develop the region's renewable capabilities."

"Our choice of turbines is based on sustainability in the long term with the least possible impact on the environment," said Tekniska verken i Linköping Vind AB CEO Henrik Valent. "We always strive to create solutions that are beneficial to society, the environment, and the economy. Today we are glad to say that the SG 5.8-170 turbine fits our two projects perfectly."

Siemens Gamesa's contracts in Sweden for this latest platform also included a huge 372 MW deal in Björnberget, the largest it has signed in the country for the 5.X turbine.

**MORE INFO** www.siemensgamesa.com

CONSTRUCTION

## Offshore leader Mark Rogers joins Burns & McDonnell

Burns & McDonnell has hired industry veteran Mark Rogers to lead the firm's development of offshore substations for offshore wind-farm projects in

Mark Rogers (Courtesy: Burns & McDonnell)

the U.S. With the addition of Rogers, Burns & McDonnell is now capable of providing the complete electrical system design for offshore wind farm projects.

"We believe the offshore wind industry in the U.S. has potential to help create thousands of high-paying jobs, support a growing economy, and help us to create efficient, sustainable energy for years to come," said Ray Kowalik, chairman and CEO of Burns & McDonnell. "To support the development of offshore wind farms in the Northeast, our firm plans to grow 15 percent to 20 percent each year in the region throughout the next five years. Mark is a big part of that as he brings his European experience to the emerging U.S. market."

An engineering manager with more than 35 years of experience in offshore and onshore electric transmission and power generation, Rogers will serve as the offshore substation engineering manager for the firm. Most recently, Rogers led the offshore platform engineering team at one of the largest global technology firms, developing a portfolio of offshore substation platforms for more than 3 GW of offshore wind in Europe.

Rogers will work to train and mentor Burns & McDonnell engineers in

the U.S. and hire additional electrical engineers to expand knowledge of offshore substations and share his experience from the European market.

"Mark has created innovative market-leading solutions that have shaped the offshore wind industry," said Jason Cabral, Northeast U.S. regional vice president for Burns & McDonnell. "With Mark's industry knowledge, our firm will be able to execute the electrical components of offshore wind projects in the U.S. from the turbine to the interconnecting utility, using the services and skill sets required to design and manage the complex and expansive needs of offshore wind projects."

While the offshore wind market is in the early stages in North America, Burns & McDonnell is engaged in work on approximately 80 percent of the announced projects. The firm's involvement includes services for new and updated onshore substations, overhead/underground transmission lines including HDDs and transition join bays, offshore export cables with voltages from 66-kV to 275-kV, interconnection stations with voltages from 69-kV to 345-kV, HVDC converter stations, and station ratings from approximately 100 to 900 MW. The firm has undertaken interconnection studies, system analysis reviews, grid connection analyses, harmonic measurements, permitting, overall project management, FEED packages and bid development support.

**MORE INFO** www.burnsmcd.com

MAINTENANCE

## WWS delivers blade, composite repair service

As part of its long-term growth strategy, World Wind & Solar (WWS), a Pearce Services Company and a leader in repair and maintenance services for commercial and utility-scale renewable Wind, Solar, and Energy Storage System (ESS) assets, recently announced a new capability to provide blade and composite repair services to customers that own and operate wind-power assets.

Regarding WWS Blade and Composite Repair services, Vice President of Wind Services Scott Bryan, said, "World Wind & Solar has a great reputation for quality, safety, and services. Following our acquisition by Pearce Services, we enhanced our focus and investments into broadening the specialized services we provide for our customers. Having a team of technicians and field service engineers solely focused on blade and composite repairs means that WWS is truly a one-stop shop for any and all services required on a wind or solar farm."

WWS is now offering these new services across the nation:

- Full blade and composite repair services, including blade inspection, leading edge repair/upgrade, vortex generator installation, lightning strike repair, and major structural repair.
- Field service engineering support for specialized composite repairs and blade inspections.
- Specialized lifts to enable safe, effective, and efficient repairs.
- A team of highly trained, elite technicians with 10-plus years of industry experience.
- Full composites supply chain and inventory management capabilities from WWS' 32,000-square-foot warehouse just outside Chicago, Illinois.

In March 2020, WWS was acquired by Pearce Services, which reinforced its mission as an independent service provider for critical infrastructure in the renewable energy industry.

"The growth of our team at WWS and our industry has been extraordinary this year," said Mark McLanahan, the leader of the renewables division for Pearce Services. "Our integration with Pearce Services and the alignment in our mission to safely service our customers has made our platform stronger than ever and well-positioned to meet our customers' expanding needs with these new technical capabilities."

Each year, WWS has met the rapid growth of the industry by enhancing its service capabilities and growing its team. With more than 500 technicians now working in the field, WWS works to serve its OEM, owner, and operator customers with an elite workforce. These new wind technical services are a natural evolution in the company's ability to serve a diverse set of customers and extend the career path for its professionals. Furthermore, in-house technical training programs have been developed to ensure technicians safety, while efficiently and expertly delivering results in the field.

**MORE INFO** www.worldwindsolar.com

World Wind & Solar offers blade and composite repair services to customers that own and operate wind-power assets. (Courtesy: WWS)

MAINTENANCE

## ONYX signs contract with Japan's largest wind-farm owner

ONYX InSight, a leading provider of data analytics and engineering exper-

ONYX InSight's ecoCMS condition monitoring systems (CMS) will monitor drive train performance in multiple turbine models across the two Japanese wind farms. (Courtesy: Eurus)

tise to the global wind industry, has been selected by Eurus to monitor and analyze the health and performance of 33 wind turbines at two wind farms in Japan. Following a competitive tender, ONYX InSight and Eurus have agreed a two-year predictive maintenance contract covering 59 MW of the Japanese developer's portfolio. Under the contract, ONYX InSight began installing 33 ecoCMS monitoring systems in August 2019.

ONYX InSight's ecoCMS condition monitoring systems (CMS) will monitor drive train performance in multiple turbine models across the wind farms. The innovative system uses Micro-Electro Mechanical Systems (MEMS) technology to increase coverage of sensors on the drive train. Coupled with IoT technology, ONYX InSight's ecoCMS monitoring equipment empowers operators to re-evaluate the real-life costs of CMS and helps them reap the benefits of online monitoring and predictive maintenance.

The ecoCMS hardware will be coupled with fleetMONITOR, ONYX InSight's monitoring software, to analyze the performance and health data across the turbines. Cloud-based fleetMONITOR will enable Eurus to constantly track the health and performance of all the turbines with ecoCMS installed and provide early failure detection to support strategic predictive maintenance decisions.

By investing in robust and reliable predictive maintenance technology and monitoring services, Eurus strengthens its potential for O&M cost savings. By monitoring and analyzing turbine data from the ecoCMS technology over two years, ONYX InSight will help Eurus to make significant O&M cost savings across the monitored wind turbines.

Japan is making strides toward nurturing the growth of wind energy in the region. The consultancy Institute for Energy Economics & Financial Analysis identified in a 2017 report that there is the potential for 10 GW of offshore wind in Japan by 2030. If the Japanese government maintains its commitment to support offshore wind, the country is set to become one of the most promising markets for the sector over the next decade.

This means that asset owners and operators will increasingly be looking to reduce O&M costs, while maximizing asset availability and profitability, as investors look to optimize their return-on-investment (ROI) to reflect the profitability of the European wind industry.

"By adopting predictive maintenance technologies, Eurus has positioned itself as a market leader in Japanese wind," said Noah Myrent, Global Head of Monitoring, ONYX InSight. "Eurus will benefit from being one step ahead in an increasingly digital market, allowing the company to better manage operational budgets and improve turbine performance."

**MORE INFO** www.onyxinsight.com

MANUFACTURING

## GRTC's new turbine can be used as mobile power station

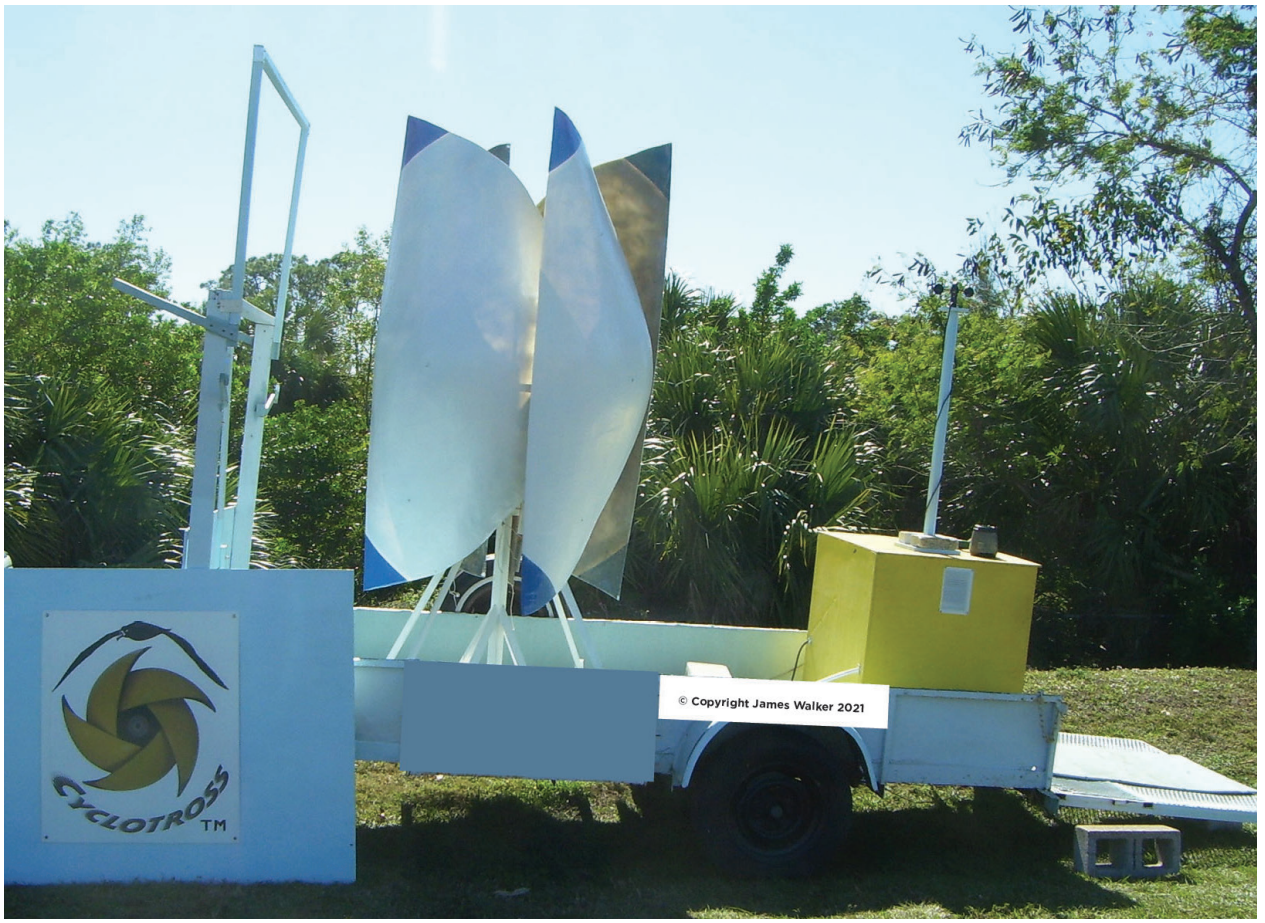
Fort Myers, Florida-based Golden Ratio Turbine Concepts (GRTC), a pioneering Golden Ratio rotary device creator, has built a new Golden Ratio Turbine. The new prototype is the most recent in the company's "CYCLOTROSS ™" line of vertical axis wind turbines (VAWT), and it reveals a new innovative golden spiral wing design.

GRTC spokesman James Walker said the company's previous smaller prototype success had prompted the development of a larger device that could be trailer-mounted and transported to remote areas as a temporary or prolonged power station. The VAWT has at its core a 1 KW-3 phase AC axial flux PMG generator and incorporates an intelligent 48-volt hybrid wind/solar AC/DC power converter/controller. The power load center compartment is in the rear of the trailer and houses the 4-deep cycle, 12-volt storage batteries along with the charge controller, a pure sinewave DC to 120 volt AC inverter, and the 3-cup anemometer wind speed display electronics.

As well as the 120-volt 60-cycle AC output, the station provides 12- and 24-volt DC ports for accessories and charging needs. The hybrid controller enables the combined inputs of a solar array and the new VAWT to provide clean power anywhere the sun shines and the wind blows (even on a floating barge or a mountain top), all of which creates a versatile new electrical power generator station that is adaptable to provide clean-energy solutions for a diversified variety of applications.

Walker said the new power station features a locking stow-pin mechanism in the rotor to prevent rotation when in transit. The rotor assembly also includes a mechanical brake apparatus on the pedestal (in addition to the electrical brake on the controller front panel). The modified utility trailer also has a removable wind shield (with logo) and a protective sleeve fitting over the rotor wings that minimizes apparent wind effects on the turbine while traveling. A retractable pivoting canopy top and framed side coverings provide storage of the station when not in use.

GRTC said an initial wind test demonstrated the new prototype exhibits the same features as its smaller counterparts and begins to charge the 48-volt battery bank in a light 9-mph breeze. Likewise, this newest golden




GRTC's previous smaller prototype success prompted the development of a larger device that could be trailer-mounted and transported to remote areas as a temporary or prolonged power station. (Courtesy: GRTC)

spiral wind turbine is quiet and graceful to behold in motion.

**MORE INFO** www.goldenratioturbine concepts.com

MANUFACTURING

## Auburn Bearing & Manufacturing acquires Aurotek TSB

As of February 1, 2021, Auburn Bearing & Manufacturing Inc., an American-based designer and manufacturer of thrust bearings, custom bearings, and precision components, recently announced that it has acquired the assets of Aurotek TSB, Inc.

Aurotek TSB, Inc. specialized in the production of precision thin section bearings for a broad array of industries. These bearings are used in a variety of applications.

Peter Schroth, president of Auburn Bearing & Manufacturing, notes this acquisition aligns with the company's strategy to expand its product offerings to include American-made precision radial bearings, along with its current thrust ball and roller bearings, in low- to mid- volume production runs and with reasonable lead times.

Aurotek TSB was founded by Dr. Don Cancelmo, who spent his entire career working in the thin section bearing industry. Auburn Bearing & Manufacturing had been a supplier of rings and bearing components to the company since 2011 and is happy to move forward in adding this to its trusted line of bearing products.

Previously located in Herkimer New York, the operations and assets of Aurotek TSB will be moved to Macedon, New York, where the business will continue to operate within the Auburn Bearing & Manufacturing facility at 4 State Route 350, Macedon, New York 14502.

Founded in 1989, Auburn Bearing & Manufacturing, Inc. is one of the oldest continuously operating thrust ball bearing manufacturers in the U.S., and is known for its exclusive line of "V" groove thrust bearings, which are designed to reduce rolling friction. Today, ABM specializes in manufacturing custom ball and roller thrust bearings in low- to mid- volume, as well as in custom manufacturing of precision machined components.

**MORE INFO** auburnbearing.com