

PROTECTING HONEYBEES, SEA TURTLES, CATTLE AND OSPREYS:

DRONE USE BRINGS UNEXPECTED BENEFITS TO FLORIDA COMMUNITIES

by John Egan



Drone cameras are changing the way Florida's municipally owned electric utilities are performing regularly scheduled maintenance and line repairs. Drones help boost electric reliability while lowering costs.

Lineworkers love them, customers are curious and there are plenty of unexpected benefits to using these aerial troubleshooters.

Beaches Energy Services: The Time Was Right to Use Drones

Allen Putnam remembers the moment he knew it was time to start using drones at Beaches Energy Services.

After Hurricane Matthew hit northeast Florida in 2016, Putnam — director of the utility serving about 35,000 customers in Jacksonville Beach, Neptune Beach, Ponte Vedra and Palm Valley — needed to do a damage assessment of the system's 23 miles of transmission lines.

Unfortunately, Matthew had turned about 75 percent of the land under transmission lines

into a swamp with waist-high water, alligators, snakes and assorted submerged dangers.

The traditional approach to damage assessment, to lay down heavy-duty 10-inch-by-10-inch construction mats onto which bucket trucks and heavy equipment could climb, was a non-starter in such deep water. Beaches needed an alternative — and quick. Beaches issued a request for proposal for transmission inspection services. "We got lots of bids from contractors that offered to do a pole-by-pole inspection by crews with bucket trucks," recalled Putnam. "I'm not sure how they would have done that, given the swampy conditions

under the transmission lines. They gave us bids that exceeded \$600,000. But a drone operator offered to do the work for less than \$25,000, and we got more and better detail faster than we would using any other method."

The experience with the contract drone operator was so successful that Beaches decided to buy its own drones to better prepare for future storms and other routine purposes.

"Using drones to conduct storm damage assessments makes so much sense," Putnam said. Beaches Energy first utilized its drones for damage assessment after Hurricane Irma in 2017.

"We looked at capabilities and costs before buying our first drone. Once purchased, we trained two or three line crew employees and had the drones registered through the FAA. The first model we purchased was about \$1,000 and our second drone with added capabilities was about \$3,000."

Beaches uses its two drones between 40 and 80 hours per year, estimated Wayne Hughes, the utility's construction and maintenance supervisor, but that number varies depending on the number of hurricanes that make their way up to far northeast Florida. Images from the drones are used as part of "before and after" presentations on the utility's system to its city council.

But Beaches has found other uses for the drones. The utility lends its drones to the City of Jacksonville Beach for pier inspections and crowd control during large public events.

Beaches' drones also are used by the Florida Sea Turtle Breeding Patrol to protect newborn sea turtles as they hatch.

"At night, lights on the beach can disorient newly hatched turtles," Hughes explained. "Instead of instinctively heading into the water, they move towards the lights on the beach or even the nearby streets. The breeding patrol uses drones to monitor the progress of the newly hatched turtles and the patrol can intervene if necessary to redirect the turtles back to the water."

"It's good public relations and a worthy cause," Hughes said.

Beaches plans to purchase two more drones in 2022 or 2023, and may place them in trucks to limit truck rolls for service calls. The utility could also use them as part of a digitalization effort that includes digitizing the map of their

system assets, updating their geographic information system (GIS) and deploying Light Detection and Ranging (LIDAR) to obtain a more detailed perspective of the physical clearance between transmission and distribution (T&D) assets and trees to help calibrate vegetation management efforts.

The utility also has plans to use its drones to perform preventive maintenance at its substations. The cameras can provide very detailed looks at substation connections that may be going bad and insulators that may be cracking. Outfitted with an infrared (IR) lens, a drone can detect heat signatures on equipment that could serve as an early warning sign the equipment needs to be repaired or replaced. So by facilitating preventive maintenance, Beaches' drone fleet can help improve electric reliability too.

Utilities Commission of New Smyrna Beach: Drones Change the Game

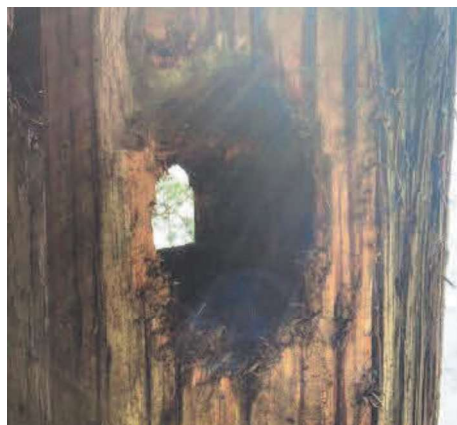
Bud VanArsdall, a lineworker for the Utilities Commission, City of New Smyrna Beach (UCNSB), is delighted his utility began using drones in 2020.

"Drones are changing the game," he said. "You know what you're in for before you start a job."

"When it comes to power line inspection, especially in inaccessible locations or storm restoration, we can accomplish in two hours [what] would have taken days in a bucket truck," he added. "And there's safety benefits too from not having our linemen go up in a bucket truck until the drone footage is accessed."

VanArsdall oversees the utility's vegetation-management contractor that maintains line clearances to minimize vegetation-related outages, improve reliability and reduce restoration time.

He recalled that tree trimmers found a massive honeybee hive in a large oak tree near a distribution line that fed the city's airport. Hundreds



of bees had hollowed out a section of the tree for their nest, and long branches posed a threat to distribution lines underneath.

The tree needed to be significantly trimmed, but the size of the nest meant moving it would pose serious safety risks for the tree trimmers and line personnel. With the assistance of a certified beekeeper, a lineman and an arborist, the large hollow bough that harbored the largest honeybee nest in Volusia County was safely removed and the bee colony was virtually undisturbed.

Even though the beekeepers, lineman and tree trimmers wore personal protective equipment (PPE), if the bees were angered, there was a risk they could attack all involved.

UCNSB's drone came to the rescue. Tree trimmers were able to use the images to plan their cuts without disturbing the nest.

"A world without honeybees would also be a world without fruits, vegetables, nuts and seeds," UCNSB commented in its "Save the Bees" video that won an American Public Power Association Excellence in Public Power Communications Award in October 2021.

"The Utilities Commission of New Smyrna Beach is committed to maintaining service reliability and being environmentally conscious," VanArsdall said.

He said the utility, which serves about 30,000 customers near Daytona Beach on the Atlantic coast, uses drones to do routine and proactive operations and maintenance (O&M) work, such as to monitor the condition of wood poles, check the setback for a line where trees may need to be trimmed, identify cracked insulators and scope out work that is hard to access either because of limited clearance space or because there's no road underneath a line.

Although VanArsdall recalled that no UCNSB lineworker has ever been seriously hurt climbing a pole, "we've had some close calls."



Alternatively, using helicopters to inspect lines also poses safety risks and is exorbitantly expensive, upward of \$15,000 per day.

UCNSB maintains about 21 miles of transmission line and 230 miles of distribution line, all currently under the watchful eye of UCNSB's drone.

A lot of UCNSB's transmission lines run over cow pastures. Using a helicopter to do a transmission line assessment could frighten the cattle and cause a stampede. "You don't have that problem with a drone," VanArsdall said.

"Woodpeckers wreak havoc on our wood poles, and our linemen are excited about not having to use bucket trucks when there are safer alternatives available," he added.

Brent Eite, a contract videographer working alongside VanArsdall, said drones have become much more affordable in recent years. The model UCNSB uses costs about \$1,000.



"Every day drones get smaller, faster, cheaper and better performing — mainly in the length of time they can fly and the resolution of the camera," Eite said.

VanArsdall estimated that since UCNSB started using drones in 2020, vegetation-related electric outages have dropped sharply, by as much as 40 percent. Not all of that can be attributed to drones, but a lot of it can, he added.

To any electric utility considering using drones, VanArsdall said, "Go for it, 100 percent. The newest models capture images in 5K pixels, and when you zoom in, you can see a blade of grass."

JEA: Linemen Now Spend Less Time Inspecting Beaver Dams and Osprey Nests

Like UCNSB and Beaches Energy Services, JEA in Jacksonville uses its eight drones to conduct post-storm damage assessments on its T&D system, perform scheduled maintenance inspections and facilitate better vegetation management, as well as for



preventive maintenance at substations and generation facilities.

And like its FMEA brethren, JEA is using the drones for other purposes, including checking on osprey nesting habits on their infrastructure and identifying beaver dams that hinder water flow.

"Beaver dams can block water in creeks/tributaries and wetlands of northeastern Florida, impeding our ability to manage nearly 5,000 acres of timber," said Kim Wheeler, P.E., a 30-year veteran of JEA. "By flying a drone over wetlands, we can identify beaver dams that need removing. Also, during the spring, when ospreys nest in and around our facilities, using a drone to assess the nests prevents the need to utilize a line crew and a bucket truck to check on the nests.

"If there are eggs in a nest, or newborn ospreys, we won't work on that structure," she said. "It's so much more economical, efficient and safer to fly a drone up there than it is to bring a line



crew and bucket truck into the field to check the nest."

Although ospreys are not on the endangered species list, people in Florida have a soft spot for the birds, who also are known as "fish hawks" for the way they use their razor-sharp talons to pluck unsuspecting fish out of the water.

"A lot of our T&D lines parallel or intersect with railroad rights of way," Wheeler continued. "Prior to our use of drones in 2017, whenever we inspected our equipment, we used a line crew and bucket truck, and we also needed to contract with a railroad flagman. Flagmen don't come cheap. Our use of drones has made that a thing of the past."

As for drones, JEA is interested in anything that keeps their employees out of harm's way and even out of a bucket truck. And if it expedites power restoration after a storm, or lowers costs compared to traditional methods, those are added benefits, she said.

JEA is a four-service utility, providing electric service to about 480,000 customers, water service to approximately 360,000 customers, sewer service to roughly 280,000 customers and reclaimed water service to about 15,000 customers.

Wheeler said JEA also uses a drone with a high-definition camera and an infrared camera to identify "hot spots" and damaged equipment. Currently, the utility uses contractors to perform LIDAR surveys along its electric lines. In the future, JEA hopes to utilize a LIDAR camera in-house. LIDAR cameras can collect data points that enable "root ball analysis" along electric lines. That analysis calculates the distance between trees and power lines and is used to make preventive tree-trimming decisions.

"If a 75-foot-tall tree is located 25 feet away from our lines, and that tree falls during a storm, it will likely come into contact with our lines. Therefore, the root ball analysis tells us which lines could be impacted if nearby trees are uprooted during a hurricane."

JEA also uses LIDAR to conduct "sag and sway" analyses to understand how much a conductor could move in the wind in order to perform preventive maintenance.

Like Beaches Energy Services, JEA began using drones after a recent hurricane.

"The water was high, there were no lights, and our employees faced unsafe power-restoration conditions in the field," Wheeler recalled.

The utility also displays its drone air force at school and community events, where Wheeler said, "The kids love them, there's a total 'wow' factor."

Drones are the kind of next-generation technology that tech-savvy employees love. As utilities continue their digitalization journey, using drones may present opportunities in recruiting the next generation of employees. ■