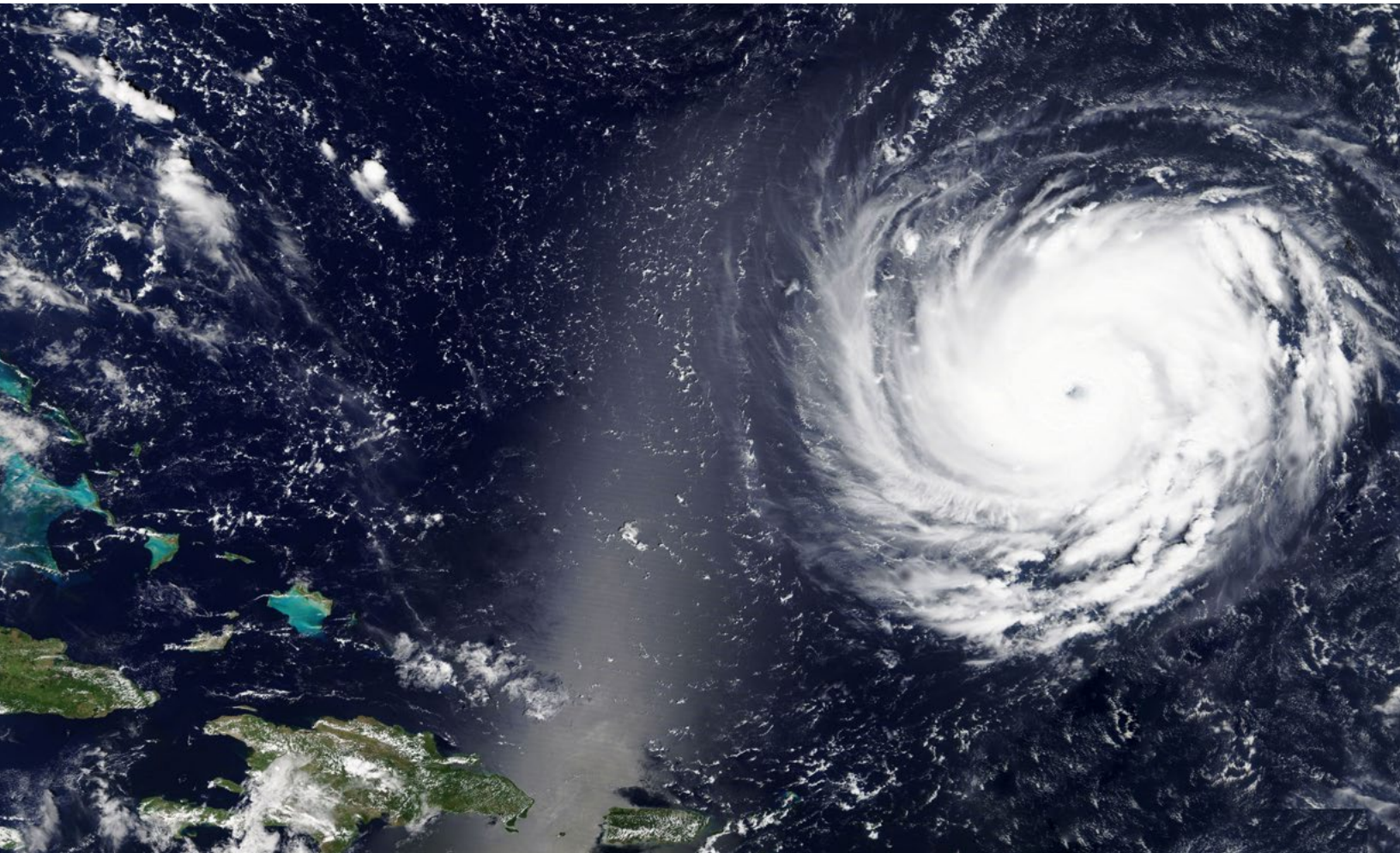




Improving Hurricane Response with Drone-Based Aerial Intelligence



Every year, hurricanes threaten electric utilities with power outages that can be dangerous to customers. Here's how one large utility replaced helicopters and ground inspections with drones to increase safety and speed repairs.

Hurricane season is a dangerous time for utilities—and their customers.

Extreme weather has been increasing in the U.S. over the last 50 years, including more heavy downpours and hurricanes.¹ And over the long term, **the weather is forecasted to become even more volatile**, according to climate experts.² Four of the costliest hurricanes on record have occurred since 2012: hurricanes Sandy (2012), Harvey (2017), Maria (2017), and Irma (2017). The costliest storm on record was Hurricane Katrina in 2005.

THE ATLANTIC HURRICANE SEASON...

which impacts the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico—runs from June 1st to November 30th. The Eastern Pacific hurricane season, which in the U.S. affects the Hawaiian islands, runs from May 15th to November 30th.³ The states most affected by hurricanes are, in order of the number of landfalls, Florida, Texas, Louisiana, North Carolina, and South Carolina.⁴



FLORIDA



TEXAS



LOUISIANA



N. CAROLINA



S. CAROLINA

¹ <https://nca2014.globalchange.gov/highlights/report-findings/extreme-weather>

² <https://www.politico.com/story/2018/11/15/report-points-to-difficult-and-worrying-2019-for-us-agriculture-966944>

³ <https://www.nhc.noaa.gov/climo/>

⁴ <https://www.cnn.com/2017/09/11/us/hurricanes-landfall-by-state-trnd/index.html>

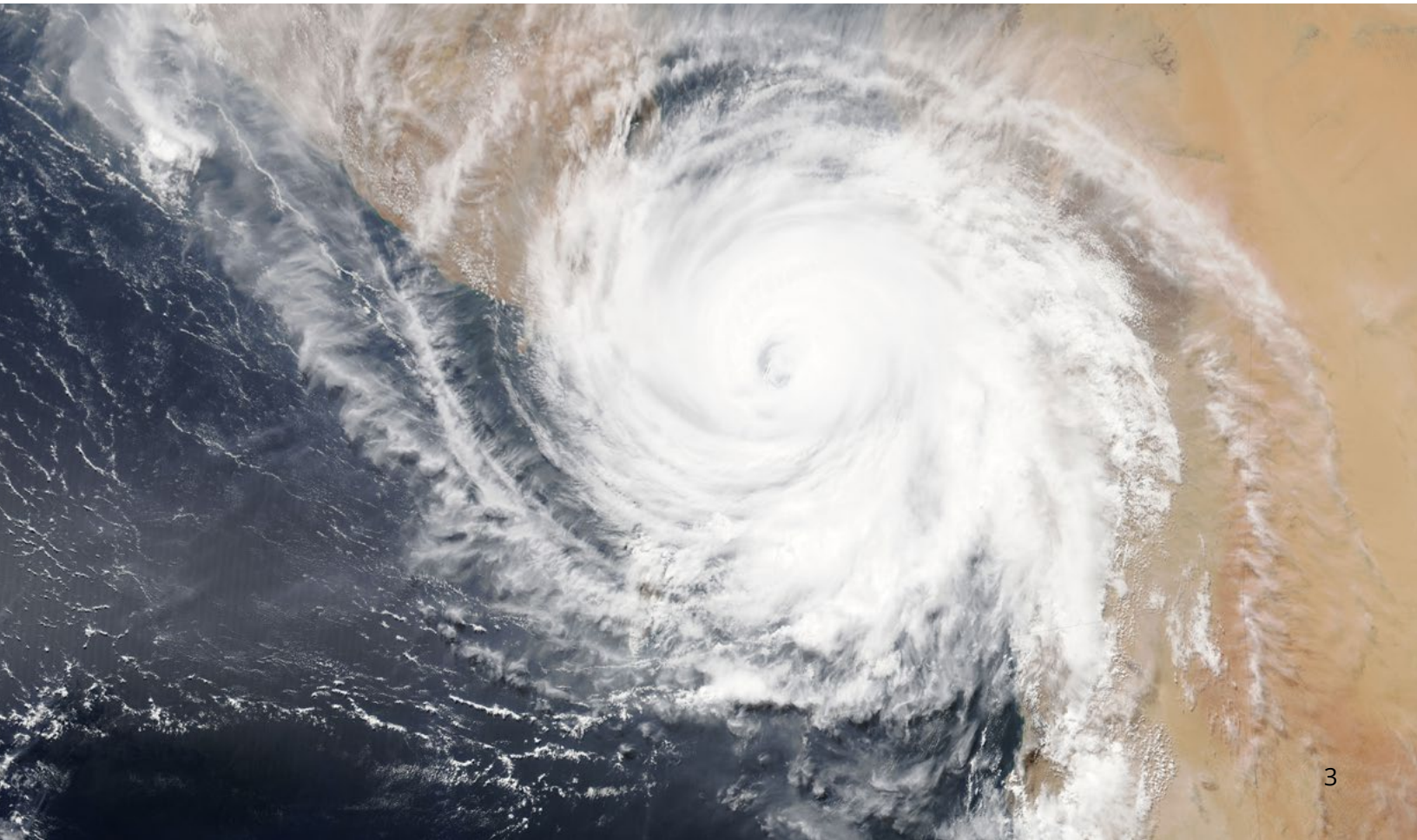


Hurricanes impact power customers when these vicious storms knock down electric poles and wires. For example, Hurricane Katrina, the most expensive natural disaster in recorded history, put 181 transmission lines and 263 substations out of service.

This is more than an inconvenience: Costs ramp up as customers have to replace spoiled food or buy generators—and **power outages are dangerous because they can affect communications and medical equipment**, and they put customers in hot areas of the country at risk when their air conditioning fails.

⊕ THE NUMBERS

Hurricane Katrina, put 181 transmission lines and 263 substations out of service.



HOW UTILITIES RESPOND TO HURRICANES: THE INCUMBENT METHOD

After a storm, utilities typically rely on helicopters and ground crews to assess damage. The problems: First, technicians might miss issues as they fly by at 40 miles per hour. Second, they often use paper checklists that they pass on to the operations center after the mission, delaying repairs. Finally, many utilities don't have enough helicopters to conduct all the patrols needed after a hurricane.

“Fatalities are not uncommon in helicopter-enabled inspections, and wire strike safeguard devices provide only limited protection.”

Helicopter missions are dangerous, as well; a mission can be impacted by lingering bad weather or cloud cover, and pilots need to maneuver their helicopters without colliding with hard-to-see lines or transmission towers. Even though pilots on post-hurricane missions encounter challenges that the typical helicopter pilot doesn't face, the Federal Aviation Administration doesn't require a special examination for pilots who fly helicopters for utilities inspections.⁸ Fatalities are not uncommon in helicopter-enabled inspections,⁹ and wire strike safeguard devices provide only limited protection.¹⁰



HELICOPTER INSPECTION



DRONE INSPECTION

In addition, ground crews often have trouble accessing the areas they need to inspect due to downed trees and impassable roads, and face dangerous conditions like swampy areas and downed electric lines.

⁸ <https://www.robbrobb.com/Helicopter-Wire-Strikes.html>

⁹ <https://www.insurancejournal.com/news/east/2018/11/01/506282.htm>

¹⁰ <https://www.robbrobb.com/Helicopter-Wire-Strikes.html>

THE NEW WAY: STRENGTHENING HURRICANE RESPONSE WITH DRONE-BASED AERIAL INTELLIGENCE

To overcome the challenges associated with traditional hurricane response methods, **PrecisionHawk provides a drone-based solution** that includes data collection, analysis, and reporting in a fast, streamlined solution.

The result:



Shorter downtimes for power customers



Fewer expensive, dangerous helicopter missions



Faster fixes to issues



Higher margin of safety

In sum, utilities get faster resolutions and higher customer satisfaction rates—not to mention safer conditions for their staff and customers alike.



PRECISIONHAWK'S DATA VALUE CHAIN

The hurricane response process is a value chain, where **each professional, procedure, and tool should speed response and add value to the final outcome.** PrecisionHawk's hurricane response data value chain, which you'll see at work in the upcoming case study, is this:



Thanks to this data value chain, PrecisionHawk's drone-based solution is purpose-built for the entire hurricane response data lifecycle.

CASE STUDY: A 7-MILLION-CUSTOMER UTILITY PARTNERS WITH PRECISIONHAWK TO IMPROVE HURRICANE RESPONSE

In 2016, a large electric utility partnered with PrecisionHawk to get power back up faster in storm-battered areas.



Hurricane Florence hit two years later, causing 900,000 people in North Carolina, and 95,000 people in South Carolina, to lose power—and **PrecisionHawk was there to find accessible routes to areas of concern, help ground teams assess the damage, and relay information back to the utility’s operations center** so it could deploy repair crews to the right places with the right equipment.

➔ THE NUMBERS

Hurricane Florence caused almost one million people in the Carolinas to lose power.

Ground Teams and Pilots Collect the Data

Before Hurricane Florence hit, PrecisionHawk's pilots gathered at the utility's operations center to create flight plans. These pilots, like all of PrecisionHawk's pilots, had been trained in safety procedures, mission planning procedures, and emergency management.

PrecisionHawk's Flight operations teams are run by a former Navy fighter pilot with 20 years of experience; bringing that background into the flight ops experience ensures that safety is a prime consideration.

The safety procedures include:

- Use of checklists.
- Briefs in the morning and evening.
- Briefs before and after each flight.
- A "lessons learned" program to help operators increase their knowledge with each deployment.
- Procedures for disseminating all key details across the flight ops teams.



In the case of hurricane response, **PrecisionHawk's pilots also use a checklist to make sure they not only have the right UAVs and sensors to support the mission requirements,** but also that they have the water, fuel, and other supplies required to successfully and safely conduct a mission in what could be a dangerous environment.

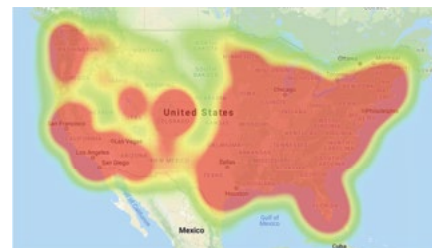
Once the wind from Hurricane Florence died down to below 30 knots and the pilots were assembled and equipped, six teams of two people each—a PrecisionHawk pilot and a lineman from the utility—deployed. Using the utility’s internal knowledge of the situation and the crowdsourced navigation app Waze, the teams navigated to the storm-damaged areas. Operators arrived by land and by water: at one point, teams had to pilot a boat to an area of concern due to flooding.

Each team had two drones, or UAVs (Unmanned Aerial Vehicles). “We call it ‘two to make one,’” says Dave Culler, GM of Utilities at PrecisionHawk. “So if one goes down for whatever reason, we’ve got a backup.” **Energy companies secure a blanket waiver for emergencies that will allow the airspace to be utilized by unmanned systems and helicopters, and PrecisionHawk assists request FAA clearance as well if needed.**

Most of the drones were the DJI M100, a lightweight UAV. They were equipped with Zenmuse Z30 aerial zoom cameras, 25 megapixel sensors that capture video and still images at up to 30x optical zoom. “That sensor allows us to look at the big picture, but then we can also zoom in and get some very, very fine details,” Culler explains. If the team suspected hotspots, it could also pull up infrared imagery to assess the situation.

PRECISIONHAWK’S DRONE PILOT NETWORK

With PrecisionHawk, you get immediate access to drone operators on a global scale. **The largest of its kind in the world, PrecisionHawk’s Drone Pilot Network boasts 15,000 licensed operators who are available to respond to emergencies anywhere in the United States within 24 to 72 hours.**



DRONE PILOT NETWORK HEATMAP

“That sensor allows us to look at the big picture...”



After tens-of-thousands of flight hours, we’ve learned what it takes to maintain a zero-incident record. **This excellence is reflected in our A-rating from ISNet.**

Once a team was in an area of concern, the pilot deployed a UAV along the length of the electric line. Because utilities need to assess damage on a macro level—in other words, they're looking for downed lines and poles, not closely inspecting for damaged cotter pins and corroded galvanized coatings—**hurricane response inspections are much faster than comprehensive visual inspections (CVIs)**. As an example, a pilot can fly a drone out three-quarters of a mile, and then use the 30x optical zoom camera to look another mile-and-a-half down the line, covering over two miles in only about 15 minutes.



Ground Teams Immediately Assess the Damage and Share Imagery with the Utility

Thanks to the ability to provide a live video feed from the UAV, teams were able to make assessments in near-real time. They also shared images and video with the utility's operations center, resulting in faster decision-making; when the team saw a critical issue, the utility was able to send a repair crew there immediately.

A major benefit of the PrecisionHawk solution over the utility's original hurricane response method was that it offered context. "We came back with empirical data, where you could see the exact context and the exact situation on the ground at the time the image was taken," says Ed Hine, PrecisionHawk's VP of Operations. "That's compared to the old method where somebody came back with a clipboard checklist that said a pole was down, but with no context surrounding it. The context we offered armed the maintenance crews for success, and allowed them to be much faster and more efficient."

➔ DID YOU KNOW?

A pilot can cover two miles of lines in about 15 minutes.

Adds Hine, “Instead of coming back and telling them a power line is down, we were able to tell them, **‘The power line is down here. Here are images of exactly what it looks like, here are access points to that location, here’s the exact hardware that’s failed or damaged, and here’s the environment around it in context...so you can see exactly what you’re walking into before you get to it.’** The aerial data also pinpointed inaccessible areas and alternative paths to those sites, making it easier for repair crews to reach the damaged equipment and make repairs.

In all, the teams spent about seven days on the mission, dispersing to a different location each day.



The Utility Increases the Speed and Safety of Critical Repairs

Thanks to the PrecisionHawk hurricane response solution, the utility’s repair crews were immediately deployed to the most critical issues after Hurricane Florence; these crews knew exactly what equipment to bring, and were able to help identify fast, safe routes to those areas. The utility mitigated the danger to its workers, and sped up the repair process to restore power to customers more quickly.

Says Hine, “Drone-based aerial intelligence will hopefully make the older, slower, more dangerous hurricane response obsolete—for the benefit of utilities and their customers at a time when hurricane activity is on the rise.”

WHY CHOOSE PRECISIONHAWK?

PrecisionHawk has the experience, expertise, and technology to help utilities understand their assets, predict and prevent problems, comply with storm-hardening and similar regulations, and improve hurricane response.



Experience—We specialize in serving major enterprises, counting among our clientele top 50 utilities, oil and gas supermajors, Fortune 100s, and federal and state agencies. Our staff includes experts in business, policy, geographic information systems, and technology.



Scale—More than 15,000 licensed drone operators are available to fly any site in the United States within 24 to 72 hours.



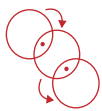
Safety and Operational Excellence—Our flight operations are founded on Naval aviation principles, earning an A-rating from ISNet.



Regulatory Leadership—We've partnered with NASA and the FAA to help define practices in Beyond Visual Line of Sight (BVLOS) operations and universal traffic management, among other regulatory areas.



Machine Intelligence—PrecisionAnalytics Distribution runs on the latest artificial intelligence platforms.



Cutting-edge Geospatial Science—Our industry-leading team of PhD-holding and remote sensing-accredited geospatial scientists help ensure the quality and accuracy of our systems.



Hardware Expertise—Career pilots and engineers maintain PrecisionHawk's portfolio of cutting-edge drones, sensors, and ground-based equipment.



THE BOTTOM LINE

by deploying PrecisionHawk's drone-based solution, enterprises can improve every step of their hurricane response process—from collecting data to deploying repair crews. And through it all, we're with you every step of the way.

Partner with PrecisionHawk to Improve Your Asset Management Process



Learn more about PrecisionHawk. <https://www.precisionhawk.com/utilities>

To speak with one of our consultants about the hurricane response solution, [contact us](#).

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