

A drone that can avoid obstacles helped win a sweeping new approval for aerial inspections of power facilities

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A power station like this one includes many structures that can be safely and efficiently inspected by drone. Credit: Dominion Energy

Since the Virginia Tech Mid-Atlantic Aviation Partnership was designated by the Federal Aviation Administration (FAA) as an official drone test site in 2013, its research has helped shape drone integration in

the U.S.

In the process, it has carved out new opportunities for companies that see powerful ways to use the technology that stretch the boundaries of current regulations. One of the latest wins is a waiver from the FAA that gives Dominion Energy, one of the region's largest energy companies, permission to use drones to inspect power-generation facilities in seven states.

Drones have become a popular tool for inspections of bridges, buildings, and other structures because high-resolution aerial imagery is a convenient alternative to an assessment that could be time-consuming or dangerous to do in person. What makes this particular waiver so valuable for Dominion is a feature that's widely coveted but still relatively rare: It doesn't require the operator to be able to see the aircraft the whole time it's being flown.

Keeping the [drone](#) within "visual line of sight" is a standard requirement written into drone regulations to reduce the risk of collision with low-flying crewed aircraft such as helicopters and small planes. Breaking this barrier and flying beyond visual line of sight has become a central priority in the drone industry because of the efficiencies that accrue when an operator has the flexibility to cover longer distances or—more relevantly for this type of work—maneuver around corners or behind obstacles.

Dominion will conduct its inspections with an aircraft from U.S. drone manufacturer Skydio with sophisticated, autonomous obstacle avoidance capabilities. That feature allows the drone to be safely flown in close proximity to structures. Virginia Tech helped Skydio and Dominion make the case to the FAA that flying close to structures on the facility kept the drone out of the way of other potential air traffic, making the risk of collision so low that the FAA could safely waive the requirement

for the pilot to see the drone or for an additional crew member to constantly scan the airspace.

"Two major goals of our research are helping firms like Dominion develop safe, practical ways to use drones to enhance their operations and helping drone companies like Skydio find opportunities to leverage the power of their technology to enable new kinds of operations," said Tombo Jones, the test site's director. "This waiver achieves both of those things."

Spearheaded by Dominion's uncrewed aircraft systems program in partnership with Skydio's regulatory affairs team and Virginia Tech, the project unfolded under the umbrella of the FAA's BEYOND program. That federal initiative focuses on enabling drone operations beyond visual line of sight in situations—such as infrastructure inspection—where drones can offer significant advantages that will only be fully realized with those more ambitious flights.

The Virginia Tech Mid-Atlantic Aviation Partnership leads Virginia's BEYOND team in collaboration with the Virginia Innovation Partnership Corporation. Dominion's infrastructure inspection project is one of three applications the team is tackling, along with residential package delivery with Wing and insurance inspections with State Farm.

The waiver request, developed by Skydio's regulatory affairs team, covers more than 40 of Dominion's facilities in Connecticut, Georgia, Indiana, North Carolina, South Carolina, Virginia, and West Virginia. These facilities undergo routine inspections, and using a drone to do them avoids having to send an inspector up scaffolding, down walls, or into areas with high temperatures or other hazards. Adding the ability to fly beyond line of sight upgrades that safety advantage with a dramatic increase in efficiency: Now, the pilot can potentially conduct an entire facility inspection from a single location, sometimes even in a single

flight, rather than traveling from place to place to keep the drone in view.

Dominion Energy first deployed drones in 2014, focusing primarily on identifying electrical transmission line defects. Since then, Dominion has expanded its drone program to include approximately 50 drones and drone pilots serving multiple operational business segments. At power generation facilities, Dominion Energy drones take volumetric measurements and assess construction progress, provide surveying and mapping services, and inspect infrastructure.

"A 20-minute inspection by a battery-powered drone will increase safety for our colleagues, who will no longer need to rappel down the side of a structure, as well as save time during inspection-related preparations," said Nate Robie, the manager of Dominion Energy's unmanned systems program. "As a pioneer in beyond visual line of sight drone use, Dominion Energy contributes to a safer, greener future as well as potentially lowering operations and maintenance costs, which ultimately benefits our customers."

Developing regulations that would allow flights beyond visual line of sight to become routine and scalable, instead of permitted on a case-by-case basis through individual waivers and exemptions, is the focus of significant effort across the drone industry and at the FAA. Programs such as BEYOND provide real-world examples of strategies for conducting operations like this in ways that are practical, beneficial, and, crucially, safe.

"This pivotal approval brings Dominion Energy, Skydio, and the entire drone industry one step closer to advanced drone operations at scale," said Jenn Player, Skydio's director of regulatory affairs. "When it comes to scaling beyond visual line of sight operations, having an intelligent drone makes all the difference, and Skydio was proud to support

Dominion Energy in obtaining this waiver that enables them to inspect critically important power facilities."

The test site, Dominion, and Skydio all served on an advisory committee convened by the FAA last year to develop recommendations for rulemaking on operations beyond visual line of sight. The committee submitted its recommendations to the FAA last spring.

"The overwhelming majority of economically viable drone operations will require flying beyond visual line of sight," Jones said. "It's the key to reaching the tremendous potential that we all recognize is there. There's still a lot of research and testing that needs to be done to get to that point, but operations enabled by waivers like this one give us a window into what the future could look like."

Provided by Virginia Tech

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