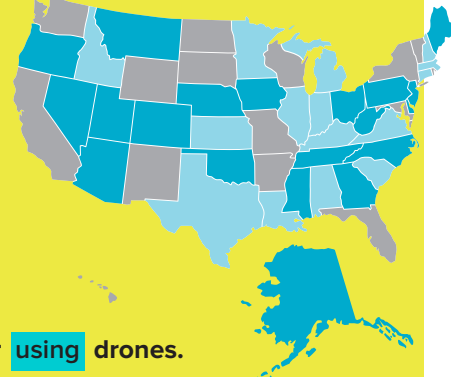


Survey Finds a Growing Number of State DOTs Are Deploying Drones to Improve Safety and Collect Data Faster and Better—*Saving Time and Money*

A March 2018 survey by the American Association of State Highway and Transportation Officials finds that 35 out of 44 state departments of transportation report that they are today deploying Unmanned Aerial Systems (UAS) or drones for a wide range of purposes. Twenty state DOTs have incorporated drones into their daily operations and 15 state DOTs are researching ways drones can be best deployed within their agency.



These DOTs report their agency is either **researching** or **using** drones.

Save Time

In 2017, NCDOT conducted a research study with the State Highway Patrol Collision Reconstruction Unit. The experiment involved a simulated, two-car crash in a controlled environment. The highway patrol took 1 hr., 51 min. to collect its data. Pilots using three different drones took just 25 minutes to complete the mission.



NCDOT Research Study

Research Driven Results

Innovation

Michigan Department of Transportation and Michigan Tech University are in the second phase of a joint research study. Phase one found drones to be a safe, reliable, and cost-effective tool for bridge inspections. In phase two, researchers are creating software to make the data collected user friendly.

“We’ve been studying drone applications for bridge inspections with Michigan DOT for more than four years now. In May, when we complete the second phase of our research study, we will have produced new software programs MDOT can use to help automate the detection of bridge problems such as concrete spalling and delamination. This new computer software will give bridge inspectors the ability to more accurately and consistently detect these problems.”

Colin Brooks, Senior Researcher, Michigan Tech University



Micro UAV



Two-Person Drone Crew



Drone Bridge Inspection

States Lead the Way

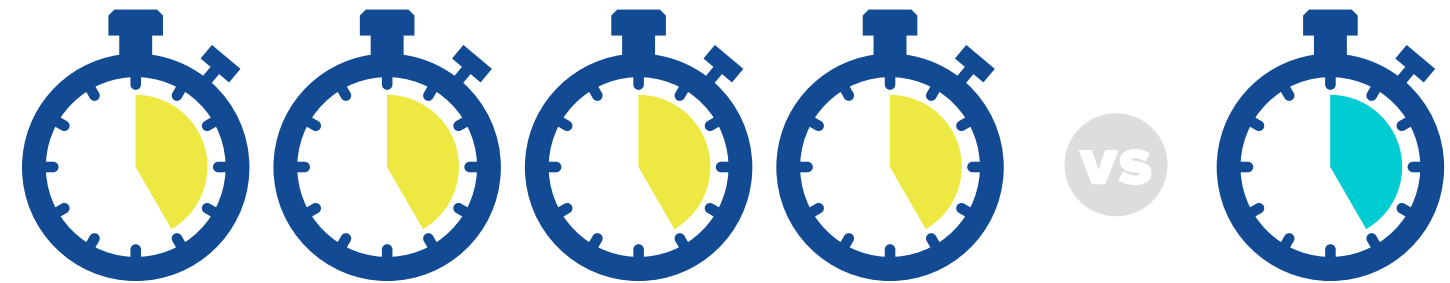
- 23 state DOTs have drone policies
- 27 state DOTs have full time drone pilots

“This is another example of how state DOTs are advancing innovation to improve safety and productivity for the traveling public,” said Bud Wright AASHTO executive director. “Drones are being used to significantly cut the time it takes to gather data, which is leading to major time and cost savings.”

Bud Wright, AASHTO Executive Director

Traditional vs. Drone Cost Comparison

Joint Research Study of Accident Reconstruction Investigation



Traditional: More than 4 times longer—111 minutes

DRONE: 25 minutes

Save Money

Clearing incident scenes quickly reduces the risk of secondary crashes and death or injury to emergency responders. It took the highway patrol more than four times longer to collect its data using traditional methods than it did using drones. NCDOT says had this crash occurred on I-95 it would have cost an estimated \$8,600 in lost productivity for every hour, one lane of the interstate was closed or \$12,900 to conduct the traditional investigation. Using drones dropped lost productivity to \$3,600 amounting to a \$5,000 savings.

Estimated User Delay Cost: \$8,600/hr

- For Interstate 95 in North Carolina
- One lane closed to traffic

Estimate does not include worker costs:

- 3 NCDOT crew needed for traffic control
- 2 NC Highway Patrol Investigators

All state DOTs deploying drones adhere to FAA’s Part 107 Rule or the state DOT has received a public Certificate of Waiver or Authorization (COA) from the FAA to conduct its

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“What we’re focusing on this spring is trying to get drones into the hands of employees in all 14 division offices in our state. We’re training our personnel and providing them with drones to meet their specific needs. By encouraging innovation from the ground up our employees will help NCDOT discover new applications for drone technology.”

Basil Yap, Manager of NCDOT’s UAS Program

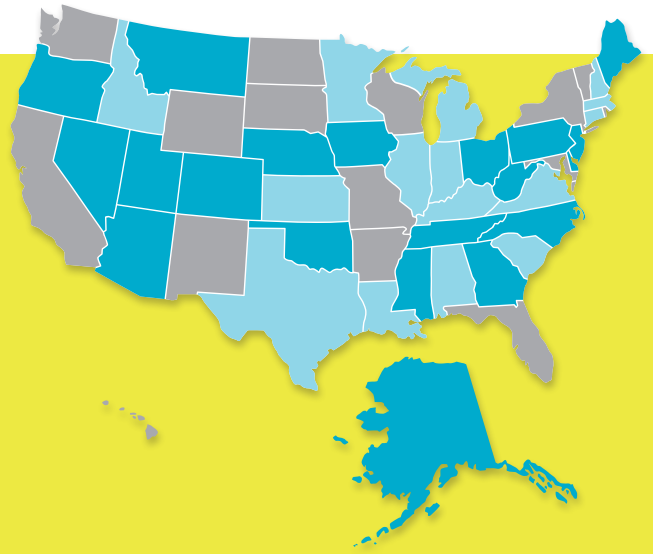
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drone operations. North Carolina was an early adopter of drone technology. In 2013 the state legislature designated NCDOT's Division of Aviation to be the statewide authority for drone operations. Its UAS program aims to make drone technology available to DOT employees across the state.

Putting Drones to Work

20 State DOTs Operating Drones on a Daily Basis

- All 20 using them to gather photos and videos
- 14 states using them for mapping and surveying
- 12 for public education and outreach
- 10 for bridge inspections,
- 8 for emergency response,
- 6 for pavement inspections,
- 5 for scientific research,
- 2 for daily traffic control and monitoring
- 1 for high-mast light pole inspections



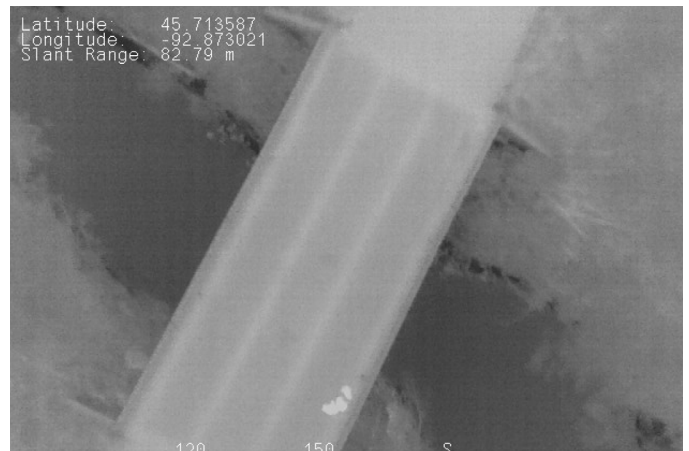
- **Using drones daily:** Alaska, Arizona, Colorado, Delaware, Georgia, Iowa, Maine, Mississippi, Montana, Nebraska, Nevada, New Jersey, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Utah, and West Virginia.
- **Researching the use of drones:** Alabama, Connecticut, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, New Hampshire, South Carolina, Texas, and Virginia.

Safer, Faster, Better Data Collection

- High-resolution images can pinpoint problems at the surface.
- LIDAR (Light, Detection, and Ranging) can turn photographs into three dimensional images that give researchers the ability to accurately measure space and distance without leaving the office.
- Tiny UAVs are capable of flying into confined spaces like culverts and pump stations to collect data and images.
- Thermal images can detect deterioration and other problems beneath the surface of concrete.



Photo Taken from a UAV



Thermal Image Captured from a UAV



Watch the AASHTO Transportation TV Special Report on the many ways state DOTs are utilizing UAV's at www.TransportationTV.org