

NCDOT Division of Aviation UAS Program Real-time Data and Imagery for Hurricane Response

“This isn’t a river, it’s a highway.” This NCDOT tweet with drone-captured video of a flooded Interstate 40 near Wallace, N.C., went viral on social and news media outlets around the world on Sept. 17, crystallizing the extent and urgency of the crisis posed by Hurricane Florence for everyone who viewed it.

North Carolina’s Unmanned Aircraft Systems (UAS, or drones) Program clearly demonstrated its value in its first test in a disaster situation:

- Communicating conditions to the public to get people off the road.
- Monitoring evacuation routes and traffic as conditions changed so transportation officials could manage detour routes.
- Gathering and pushing real-time information on infrastructure and conditions to government agencies, utility companies, military units and the public to support planning and deployment of emergency responses.
- Post-storm, assessing damage so first responders and disaster officials could plan for repairs.

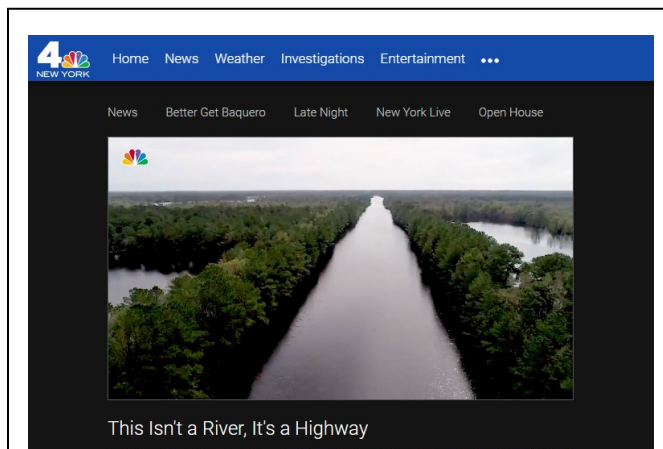
Bob Huber, State Local Tribal (SLT) program manager for the Federal Aviation Administration’s Unmanned Aircraft Systems Integration Pilot Program praised the NCDOT team’s drone response.

“I have not seen such a cohesive, selfless, focused and collaborative team operate the way your team does in quite some time,” Huber said.

Mobilizing UAS Assets

The Division of Aviation (DoA) launched its UAS response nearly a week before Hurricane Florence reached the North Carolina coast, mobilizing its network of public safety, infrastructure and UAS experts to support the state’s emergency response.

The objective: complement the state’s traditional manned aviation response, well-suited for search, rescue and long-range observation and assessment, with drones’ pinpoint close-up views of the state’s transportation infrastructure – roads, highways, bridges, airports, ferry terminals, waterways and dams. Drones are particularly useful for approaching, hovering and



NCDOT Hurricane Response

- 15 drone teams
- 260+ missions
- 8,000+ videos and images
- Live streaming of data
- 7 supported agencies:
 - NCDOT (Ferry, Highway, Traffic and Mobility, Rail)
 - NCDPS (Emergency Management, State Highway Patrol)
 - N.C. Department of Environmental Quality (Dam Safety)
 - N.C. National Guard
 - U.S. Coast Guard
 - Federal Emergency Management Agency
 - Federal Aviation Administration

observing infrastructure details from much closer distances than manned aircraft.

DoA established a command center staffed with UAS Program staff, other airspace experts, UAS pilots from partner agencies and contractors, and the N.C. Department of Public Safety State Highway Patrol – all key partners in the Division’s work to integrate drone technologies into government and commercial operations across North Carolina.

The Division formed 15 drone teams and deployed them before the storm near areas expected to be hardest hit: Ocracoke Island, Wilmington, Jacksonville, Fayetteville, Lumberton and other nearby communities. Pre-storm flights were conducted to assess conditions of key roads



Dam breach at Boiling Springs Lake, NC

and coastal regions to provide a baseline for post-storm assessment.

DoA deployed for the first time a new drone tracking and management system, developed with industry partner AIRMAP for North Carolina’s FAA UAS Integration Pilot Program. This allowed the Division and other responding agencies to identify where drones were flying and how they could avoid contact with manned aircraft, including helicopters performing search and rescue missions.

In addition, a social media campaign alerted the public about “No Drones in Disaster Zones” – aiming to keep hobbyists from interfering with air response efforts. **No incidents of civilian drones interfering with response and recovery operations occurred during this event.**



Intersection of U.S. 70 and U.S. 258, Kinston, NC

Real-time Imagery for Emergency Response

Within a day of Florence coming ashore, NCDOT teams began gathering data, photos and video of transportation infrastructure, including road closures and access routes to and from coastal regions. Teams flew missions over public airports to assess their condition for operating and supporting manned air emergency responses.

That information was provided to emergency responders through a custom-designed [online dashboard](#) and to the public via traditional and social media.

As the week unfolded, NCDOT flew more than 260 drone missions and captured more than 8,000 videos and images of roads, bridges and dams, helping state agencies assess conditions, deploy emergency responders and divert public movement away from endangered areas.

Some flights occurred in or near restricted and controlled airspace or beyond visual line of sight, authorized for these special circumstances by the Federal Aviation Administration.

Drone footage clearly showed how some roads, open in the early hours of the storm, became washed out and unusable days after the storm as floodwaters increased. Public mobility, a critical issue as the storm progressed, was enhanced by UAS flights that monitored road conditions and traffic backups, enabling the Department of Public Safety to reroute traffic to support evacuations and alleviate congestion.

View a [video](#) of select drone-captured images.



US 421 near Wilmington, NC

Successful First UAS Crisis Deployment

All told, NCDOT’s UAS effort supported seven government agencies with a highly agile response, much lower in cost and quicker in deployment than traditional manned flights, and unprecedented in both scope and integration of the latest technical capabilities in UAS, communications, data, and information transfer and management.

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