Hurricane Florence
2018 Storm Stats

Hurricane Florence – Sept. 14

Total Outages: 1.8 million (1.6 million in NC)

Workforce: Duke Energy mobilized an army of more than 20,000 people, the largest storm response workforce in its history, who were staged throughout the Carolinas and immediately deployed as soon it was safe to begin restoration efforts.

Damage: 142 substations and 53 transmission lines out of service, more than 220 miles of downed wire, approximately 5,700 downed poles, and 2,200 damaged transformers across the Carolinas’ system.

Restoration: Storm made landfall on Sept. 14, 2018. More than 86 percent of (DEP) customers were restored within 72 hours, and full restoration was accomplished for all customers able to receive power nine days later (Sept. 23).
HURRICANE FLORENCE DAMAGE ASSESSMENT WITH UAS: ANALYSIS, BENEFITS AND LESSONS LEARNED

NCBIWA – November 12, 2019

MCKIM&CREED
McKim & Creed is honored to have worked with Duke Energy for +25 years. Our UAS program has been producing survey grade mapping products for Duke Energy since 2016.

One week prior to the landfall of Hurricane Florence, we reached out to Jacob Velky (Duke Energy Manager Unmanned Aerial Systems - Aviation Services) to offer our UAS services for Damage Assessment. With an unknown location of landfall, McKim & Creed secured 4 UAS crews to participate in this disaster response mission.

Currently, McKim & Creed employees 32 FAA Part 107 Remote Pilots throughout our company footprint, with 12 UAS crews specifically trained for emergency response situations.
HURRICANE FLORENCE PROJECTED PATH
HURRICANE FLORENCE BY THE NUMBERS

• Landfall as a Category 1 Hurricane
• Approximately 9 trillion gallons of rain in North Carolina
• Over 30 inches of rain recorded in Swansboro NC
• NC DOT reported more than 600 road closures
In North Carolina hundreds of roads have closed due to flooding from Hurricane Florence.
DISASTER RESPONSE

- Recent experience:
  - NCDOT NC 12 on the Outer Banks - Hurricane Irene
  - USACE coastal damage at Sea Bright NJ - Hurricane Sandy
  - Bald Head Island coastal erosion following major storm events

- Due to the vast devastation caused by this storm, there were several unknowns:
  - Location of deployment (where UAS services will be needed)
  - Amount of provisions and lodging (logistics)
  - Equipment supplies - electricity and fuel

- Duke Energy provided immediate:
  - Chain of command with instructions on deployment locations
  - Staging areas with supplies for personnel and equipment
  - Lodging, provisions, medical assistance, etc.
  - FAA COA for UAS operations
DISASTER RESPONSE

• Our key objectives for this mission:
  • Assist Duke Energy Damage Assessment crews with aerial visual inspections of critical infrastructure prior to re-energizing distribution lines
  • Maintain a communication link between Duke Energy Command Centers, FAA, field crews, and McKim & Creed Air Command.
  • Be on-call and ready to deploy to a new locations as needed
  • Safe UAS operations by following our risk assessment protocol
  • Monitor FAA communications & Temporary Flight Restrictions (TFR)
  • Monitor Federal, State and Local emergency response efforts
DAMAGE ASSESSMENT WITH UAS

- Equipment selected for this mission was the Parrot ANAFI:
  - 4K HDR video
  - 1/2.4” 21MP CMOS Sony® Sensor*
  - Wide-angle f/2.4 ASPH lens
  - 35mm focal length equivalent: 23-69mm (photo), 26-78mm (video)
  - 180° tilt gimbal and up to 2.8X lossless zoom
  - 3 axis image stabilization
  - Ultra-compact foldable
  - Quiet operations
  - Resistant to extreme weather conditions 50kmh or 31mph
  - 25 minute flight time per battery
  - Weight 320 grams = 0.70 lbs.
  - Dual band antenna (2.4GHz & 5GHz) for video streaming and the piloting experience up to 2.5mi away*
DAMAGE ASSESSMENT WITH UAS
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• Wilmington missions:
DAMAGE ASSESSMENT WITH UAS

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• Wilmington missions:
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- New Bern missions:
RISK ASSOCIATED WITH FLOODWATERS

- Floodwater often contains infectious organisms, including intestinal bacteria such as E. coli, Salmonella, and Shigella; Hepatitis A Virus; and agents of typhoid, paratyphoid and tetanus.

- Floodwaters also may be contaminated by agricultural or industrial chemicals or by hazardous agents present at flooded hazardous waste sites.

- Pools of standing or stagnant water become breeding grounds for mosquitoes, increasing the risk of encephalitis, West Nile Virus or other mosquito-borne diseases. The presence of wild animals in populated areas increases the risk of diseases caused by animal bites (e.g., rabies) as well as diseases carried by fleas and ticks.
AERIAL IMAGERY FOR TRAFFIC FLOW

• Wilmington North (Cape Fear Community College):
AERIAL IMAGERY FOR TRAFFIC FLOW

• Wilmington South:
UAS ANALYSIS, BENEFITS & LESSONS LEARNED

• Duke Energy was able to successfully leverage UAS technology to conduct Damage Assessment field operations safer and faster than with conventional methods
• The ANAFI provided live images and GPS locations for DA crews
• Duke Energy customers benefited by experiencing a shorter outage
• Life360 application for live tracking of assets proved to be highly beneficial
• Challenges and Lessons Learned:
  • Mobilization: Road closures
  • Logistics: Lodging, Food, Fuel, Human Support systems, Medical (First Aid)
  • Standard Operating Procedures (SOP): Air Command, Communications, Failsafe options, Risk Assessment
  • Equipment: Safe Condition, Spare Parts for Repairs, File Sharing
CONCLUSION

• Advantages:
  • Less people (Cost)
  • More accurate (Quality)
  • Faster deliverable (Speed)
  • Greater safety

“I don’t think it’s an exaggeration to say that the hurricane response will be looked back upon as a landmark in the evolution of drone usage in this country.”

Michael Huerta, Former FAA Administrator
SPECIAL THANKS TO:

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  • Matt Coleman
  • Terry Tripp
  • Don Hamilton
  • Jack McNeal

• Duke Energy Command Center in New Bern:
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  • Steven Blakley
  • Carl Trenton

• All Duke Energy Damage Assessment crews

• Duke Energy Sutton Plant:
  • Dan Atkinson
  • Evan Andrews

• Duke Energy Survey Project Manager/Coordinator:
  • Jay Hallman

• McKim & Creed UAS Disaster Response Team
HURRICANE NESTOR
GORDON LANDING
Thank you for the opportunity.

Questions

Hurricane Florence Damage Assessment with UAS

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