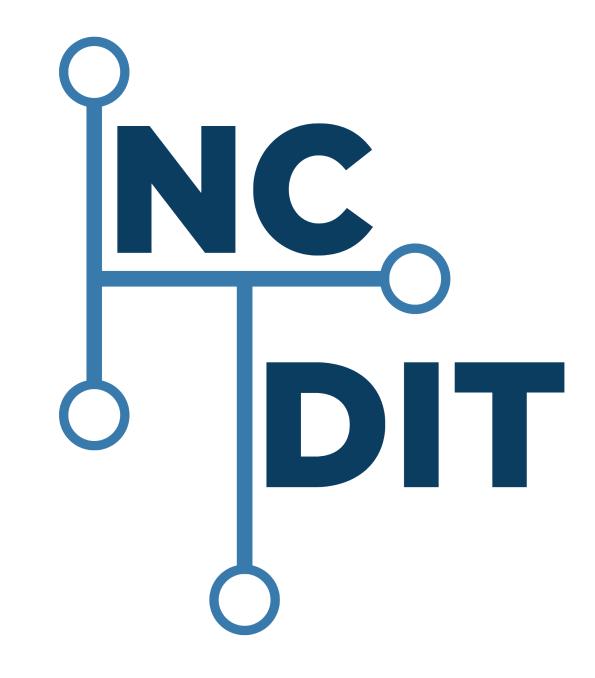# DEQ Drone Strike!

Michael Ware
DEQ CIO
5/21/2019

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DEQ Initial Flight

Two catalysts in 2018 that caused UAS to take-off in DEQ

Spring/Summer 2018; DMF Partnered with UNC-W for drone case study
- Estuarine Benthic Habitat Mapping (EBHM) Project collected data in area S024; 7,500 acres
- 3-person team can do 10 acres in one field day, 750 field days to complete (~$409K)
  - Can only be done during low-tide
- Drone successfully completed 600 acres in 1 day; (2-hours)

2018 Hurricane Michael & Florence

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DEQ Business Cases

We have a need; are there similar needs?

- Hurricane After-Actions
  - Damage assessment
  - Pending Dam failures
  - Coal Ash Structural Landfills and Lagoons
  - Hog Lagoons
  - Chicken/pig deaths
    - ~4M farm animal deaths during Florence
    - ~2M farm animal deaths during Michael
  - Marine Patrol Search & Rescue operations

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DEQ Business Cases

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Shellfish Leasing:
- Each lease application must be investigated for shellfish and Submerged Aquatic Vegetation
  - Drone can collect data for 10-acre lease in under 10 mins
  - Current method is to take grab samples; time consuming & disturbs habitat

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DEQ Business Cases

Division of Marine Fisheries

Harmful Algal Blooms (HAB) Monitoring
- Drone can accurately map extent of HAB's without exposing staff
- Increases safety, speed, and accuracy

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DEQ Business Cases

Division of Marine Fisheries

Rhodamine Dye Studies: https://www.youtube.com/watch?v=IacQ5FBkZu0
- Accurately track / map dispersion, timing, and extent of dye
- Reduce staff, boat, and equipment needs by 50%

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DEQ Business Cases

Drone Strike!

Program could be stood up in as little as 30 days and cost ~$5000
- $3200 one-time drone cost plus additional batteries
    - One battery lasts ~ 20 minutes but can cover ~ 100 acres
- $1500 annually software licensing; issued by name
    - Can be re-issued throughout the year
- Insurance – DOI has policy in-place cost is $50/drone/year for liability
- Pilot FAA Exam fee is $150; good for two years
- Most drone manufacturers have cheap replacement warranties

Future consideration for expansion; fixed wing, high-end cameras, FLIR, Google Street View

Drone Piloting
- Most use-cases utilize flight programming vs manual flight controls

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DEQ Standard Operations Procedures (SOP)

Getting the Program Off the Ground

Contacted DOT
- This is the first step & they are incredibly helpful
- They know all the rules

Develop & staffed DEQ UAS Policy
- Referenced all the legal areas

DEQ GeoTeam is the primary oversight body
- Limit drone models & software used
- Tracks pilot certification, inventory, & annual/routine maintenance

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DEQ Standard Operations Procedures (SOP)

Getting the program off the ground

Develop UAS Flight Operations SOP (DEQ adopting DOT's SOP)
- Flight operations that DOT has developed & honed over the years

Develop UAS Data SOP that handles how we will process data gathered from missions
- Many UAS manufacturers are based in China with a corresponding cloud option based in China

Develop a UAS Procurement SOP
- Working on providing DEQ's GEO Team with their own accounts

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References

Authorities

N.C.G.S. §§ 15A-300.1 (Restrictions on use of UAS)

15A-300.2 (Regulation of launch and recovery sites)

15A-300.3 (Use of UAS near a confinement or correctional facility prohibited)

14-7.45 (Crimes committed by use of UAS)

14-280.3 (Interference with manned aircraft by UAS)

14-401.24 (Unlawful possession and use of UAS (weapon attached))

14-402.25 (Unlawful distribution of images)

113-295 (Unlawful harassment of persons taking wildlife resources)

63-94 (Applicability of Article), 63-95 (Training required for operation of UAS)

63-96 (License required for commercial operations).

Session Laws 2014-100, 2015-232, 2016-90, 2017-160, 2017-179

14 C.F.R. Part 107 (Federal Aviation Administration (FAA) Small UAS Rule).

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