DRONES IN EMERGENCY RESPONSE

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AGENDA

- Introduction
- Drone Operations
- Drone Applications in Emergency Response
- Best Practices
- What to Watch for…
- Resources
INTRODUCTION

- Drones + North Carolina + me
  - 12/17/1903
  - Feb 2000- Joined Applied Systems Intelligence, Inc
  - 2012- Launched NGAT at NC State University
  - 3/21/2013- First FAA Authorized UAS Flight
  - 2015- Selected to ASSURE Team
  - 2017- Led NC UAS Integration Exercise (post-Matthew)
  - 2017- Member of FAA Remote ID ARC
  - 2018- NC Selected to FAA UAS IPP
  - 2019- Joined CNSP to support DHS Robotics Integration

- Public Safety + Air Transportation + Drones
  - Ubiquity
  - Safety
  - Digital Transition
  - Connectivity
  - Low cost, rapid deployment
  - Wide range of missions
CHEROKEE NATION UAS/DRONE CAPABILITIES

- UAS Program Management
  - Program Strategies and Roadmaps
  - Program Development
  - System Engineering- Analysis of Alternatives
  - Proof of Concept Coordination
  - Test and Evaluation
  - Transitioning to “Fully Operational Capability”
  - Program Operations and Maintenance

- UAS Data Management
  - Data Life Cycle Management (collection, verification and validation, analytics, storage, processing, usage, archiving, destruction, etc.)
  - Data Infrastructure Management (tier 1, 2, 3 secure storage, networking, security, software, load balancing, etc.)
Boeing 737
94 ft Wingspan
Weight 138,500–150,000 lb

General Atomics MQ-9, Predator
66 ft Wingspan
Weight 10,500 lb

Cessna 172
36 ft Wingspan
Weighs 2,450 lb.

Boeing ScanEagle
10 ft Wingspan
Weighs 50 lb.

Lancaster
6 ft Wingspan
Weighs 5 lb.

Mavic Pro
< 1 sq ft
Weighs 1.6 lb.
DRONE OPERATIONS

- Authorizations
  - FAA
    - Small UAS
    - Part 107 Certification
    - Waivers / Exemptions
  - Local
    - NC General Statutes
    - NC Permit
    - Agency policies
- Training
- Proficiency
PART 107 SUMMARY

- Aircraft less than 55 lbs
- Visual Line of Sight only
- Daylight only
- Max airspeed: 100 mph
- Max altitude: 400’ AGL
- Requires preflight inspection
- No careless and reckless operations
- Visual Observer is optional
- 1 aircraft per 1 operator
- Aircraft registration # required

- Aircraft must not operate over anyone not involved in the operation
- Can fly in Class B,C,D and E airspaces with ATC permission
- Can fly in Class G airspace without ATC permission
- No transportation of hazardous materials
- Transportation of products for compensation are allowed, under some stipulation

- Operator must pass an aeronautical knowledge test for small UAS Type Certificate under Remote Pilot License
- Operator is vetted by TSA
- Operator must report accident within 10 days
- Operator must be 16 years old minimum

FAA has published the process for requesting waivers for most of these requirements.
ELEMENTS OF A DRONE PROGRAM

- Mission types
- SOPs
- Access
- Budget
- Acquisition

- Flight crew (pilots, observers)
- Data Analysts
- Training
- Checklists
- Contact Lists

- Aircraft
- Sensors
- Spares
- Batteries
- Radios
- Maps/charts
- Computing- hw/sw

- Communications
- Data Management
- Working with vendors
- Working with “Volunteers”
- Training
- Reporting
- Procurement

Flight Planning Checklist
- Description of operating area
- Air traffic approval needed / clearance provided
- Identify minimum and maximum elevations in flight area
- Identify property in structures, above ground utilities, etc.
- Identify line of sight limitations
- Identify launch, landing, and dish locations
- Obtain Landowner permission, as required
- Carbon required or potential crowd control concerns identified, if necessary
- Public Right of Way considerations
- Establish Communication plans
- Weather Conditions
- Citizen (agency specific)
- Risk Rating Models score calculated (#10)
EMERGENCY RESPONSE WITH DRONES

- Preparedness
  - Formal Aerial Surveys
    - GIS products for impact analysis
    - Forensics
    - Damage assessment
    - Reporting / recording

- Response
  - Initial Response: actionable intelligence
    - Situational awareness
    - Search
    - Resource allocation

- Prevention and Mitigation
- Recovery
DRONE EMERGENCY RESPONSE APPLICATIONS
Drone Deployment in Action

I-40 after Hurricane Florence 2018

Images courtesy of NCDOT

Henderson Field Airport, Wallace, NC

Morgan County AL:
April 2016 -- UAS aerial survey of EF-2 storm damage

Damage from the tornado extended up and down multiple hills and through thick forested areas.

Imagery provided courtesy of "enGies" in Huntsville, AL.
DRONE BEST PRACTICES (1 OF 2)

- **Program Planning Basics**
  - Establish operational thresholds and/or trigger points for drone asset use and reassignment.
  - Develop agency specific Drone Incident Response Pocket Guide.
  - Continuously monitor local TFRs and Special Use Airspace (controlling agency, time of use)
  - Pre-established COAs and Part 107 waivers for expected operations.

- **External Interaction Policies**
  - Have pre-vetted vendors, assets, operators documented to ensure safety and adherence to rules and regulations.
  - Establish a “Volunteer Aircraft Policy” for the agency prior to incident (vetted pilots/aircraft with knowledge of the IMT structure available at the discretion of the IC)
DRONE BEST PRACTICES (2 OF 2)

- **Expectation Management**
  - Mission Management- profile, definition, plan
  - Sharing the airspace
  - Equipment Life
  - Documentation- Federal, State, Organizational, Personal, Annual

- **Operating Procedures**
  - PreFlight
  - During Flight
  - Post Flight
  - Emergency
  - Flight Area Management
  - Communications

- **Crew Selection and Qualifications**
  - Flight team- PIC, VO(s)
  - Data Analyst
  - Air Boss (when operating with more than one aircraft)
  - Training

- **Policies**
  - Contracting versus Internal Development
  - Manned versus Unmanned Decision
  - Training
  - Platform Selection
  - Working with Vendors
  - Access to Land

- **Public Outreach**
WHAT TO WATCH FOR

- New Technologies / Applications
  - New sensors
  - Medical Supply Delivery
  - Multiple aircraft collaboration
  - UAS Traffic Management
    - LAANC Expansion
    - Counter-UAS

- New Rules
  - NPRM for Operations Over People
  - NPRM for Night Operations
  - Remote Identification
  - FAA Public Safety Best Practices Recommendations
DRONE RESOURCES

National
- FAA Drone Zone: https://faadronezone.faa.gov/
- FEMA Region IV, Travis Potter
- Airborne Public Safety Association
- AUVSI Trusted Operator Program (TOP) Certification
  - 3 levels, based on system safety requirements
  - Certifications for Individuals and Organizations (service providers)
  - https://www.auvsi.org/remote-pilots-council

Local
- Tim Camelin, FAA Flight Safety Director Office (Greensboro)
- Darshan Patel, Wake County Emergency Management
- Tom Zajkowski, NC State University
- Gary Thompson, NC Emergency Management
- Basil Yap, NCDOT Division of Aviation
- Community Colleges
  - Wake County
  - Montgomery County
  - Pitt County
- Chris Keon, Synergistic Solutions Inc
- Troy Hittle, SenseFly
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