NC Department of Health and Human Services

Drones in Nuclear Response

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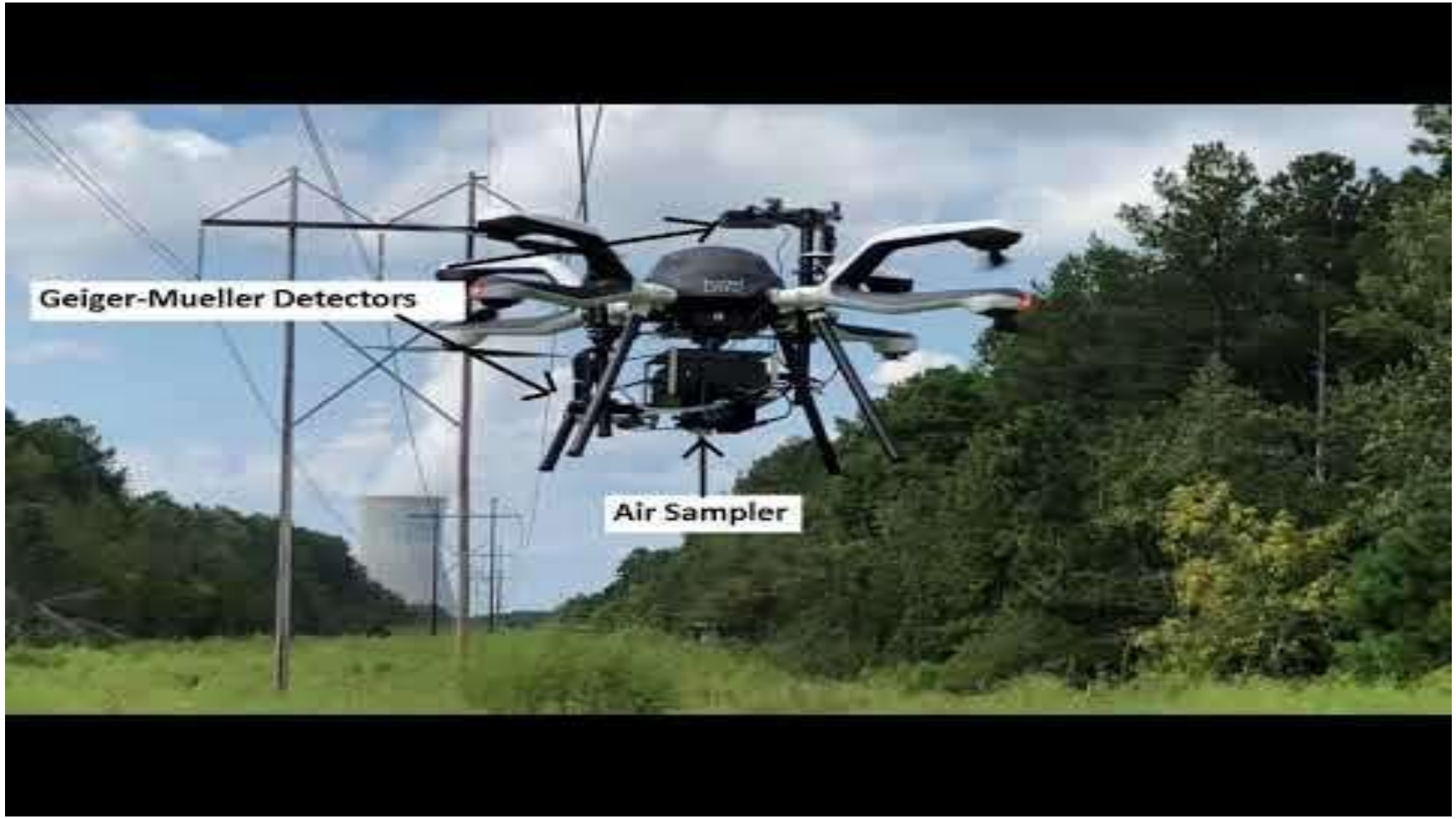
Dec 12, 2018

Video



The Process

Typical Nuclear Response

The Problem

- Team Response:

  Radiation field monitoring teams are deployed to enter the most contaminated and highly radioactive radiation fields to retrieve environmental radiation data. Data will be used by incident command leadership to determine protective action recommendations (PARs) for the public.

Typical Nuclear Response

The Problem

- Team Response:
- Minimum of two-2 person teams traversing contaminated area to characterize the potentially radioactive plume.
- Conduct radiation measurements to determine levels.
- Perform an air sample at the highest radiation level to determine isotopic mix and concentration of radioiodine.
- Retrieve environmental samples such as soil, vegetation and surface water to determine extent of contamination.

Typical Nuclear Response

The Problem

- *Consequences and Limitations:*
- Teams receiving excessive radiation dose.
- Vehicles and other expensive equipment becoming contaminated.
- Travel is limited to navigable roads.
- Rigid FEMA requirements.
- Potential high turnover rates-increased manpower needs.

Typical Nuclear Response

The Plan

- Identify partners interested in using the technology. (OEMS, NCHP, NCEM, Communications Office)
- Identify required training and provide funding for such training.
- Develop procedures for use and compliance with FAA and FEMA requirements.
- Identify roles and assign responsibility to different Branch personnel for the effective oversight and management.
- Develop and train on procedures for staff and partners so they may evaluate the effectiveness of the technology and program.

Typical Nuclear Response

Lessons learned/Challenges

- Contracts, Budget and Purchasing
- Support
- Training
  - Identifying and receiving adequate pilot training.
  - Individual passing the pilot test.
- Procedures, Compliance and Approvals
  - FAA
  - FEMA
  - Flight Acceptance
  - NC DOT
- Acceptance by responder agencies of this new technology

Typical Nuclear Response

Potential Outcomes

- Set precedent and a new normal for response to nuclear emergencies.
- Reduce radiation exposures and save lives of emergency responders.
- Reduce turnover of staff during a response.
- Foster a positive collaboration between the Branch and other responding agencies within the State.
- Using this tool for other departmental needs.

Technical-sUAS

- **DJI Phantom 4 Pro**
  - **Training**

- **FlyCam: Acecore-NEO octocopter**
  - **DJI flight controller: A2**
  - **Transmitter and ground station control**
  - **15 minute flights with payload**

  - **Pros: heavy lift capability, decent flight times**
  - **Cons: Unit has to be sent overseas for maintenance/support, sensitive controls**

Technical-Radiation Instruments

- Technical Associates/Overhoff
- Gamma/Beta
  - Probes at six inches and three feet (apprx)
  - Actuators for open and closed readings
- Air Sampler
  - Capable of taking a cartridge and filter sample
  - Internal detectors for instant reading of samples
  - Continuous flow at a few liters per minute
  - Design is being modified

Technical-Radiation Instruments

Technical-Software

- **Drone Rad-US Nuclear Corp**
- **Telemetric**
  - **Instantaneous data capture**
  - **Automatic, once per second data storage**

Lessons Learned

- Complexity of the program
- Battery life of drone
  - Smaller drone with alpha/beta equipment to find centerline of plume
  - Reduce some of the equipment onboard the larger drone
- Air-sampler flow rate
  - Different specs

Moving Forward

- **FAA waivers for deviating from Part 107 compliance**
- **Loss of line-of-sight**
- **Weather and operations**
- **Battery life and mission times**
- **Exploring alternative sUAS platforms**

Questions?

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