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Title: UAS Blue Force can be used to detect, respond and mitigate adversaries/threats in the protection of nuclear material

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UAS Blue Force can be used to detect, respond and mitigate adversaries/threats in the protection of nuclear material

5/1/2020

Outline

- History/background
- What is UAS Blue Force
- UAS/CUAS Technology
- Using UAS Blue Force to detect, respond and mitigate adversaries/threats in the protection of nuclear material
- Emerging/Future technologies

Background

- Unmanned Aerial Systems (UAS) have existed for many years. Within the last 10 years the availability of high-tech UAS platforms has increased and skills required to operate such high-tech platforms has drastically decreased.
- Relatively advanced off-the-shelf drones are readily available and the operator's skill required is minimal.
- Historically, radio controlled (RC) pilots required an in-depth understanding of flying in order to successfully operate a RC aircraft. Today, these fundamental skills are limited to operating a cell phone and pressing a few buttons.
- High Definition video/photo surveillance and light payload capabilities are easily accomplished with mid-grade equipment for minimal cost.

Background (cont)

- Autonomous operations are becoming more integrated into the UAS platform and 3rd party software renders integrated flight restrictions useless.
- Cellular UAS integration is growing in popularity. Advantages include:
  - Extreme operating range (cell phone data reception dependent)
  - Visual line-of-sight for strong radio frequency link is no longer required.
  - 4G and 5G networks can carry HD quality live video transmission to the operator and even streaming live on the internet.
  - Operates on widely used frequency bands. Indistinguishable between normal cell phone data traffic and a UAS.

What is Blue Force

- The idea behind Blue Force is to augment physical security responses using UAS technologies.
- One of the advantages to UAS in Blue Force is the ability to reduce the response time to potential threats.
- Blue Force overcomes geographic constraints that could otherwise increase the response time to immediate threats on nuclear facilities.
- Providing real-time situational awareness and tracking to central alarm station (CAS) operators
- Ability to “guide” physical responders in real-time
- Potentially provide key evidence for prosecution
- Provide an element of deterrence depending on the response time

Why have a Blue Force UAS program?

- Leverages current Blue Force capability on the ground
- Provides extra “eyes in the sky”
- Response to ground-level events
  - UAS enhances building or area alarm response
    - First to arrive at scene
    - Radio communication and coordination with ground forces
    - Provides expanded situational awareness, which increases ground force survivability
    - Communicates safe approaches with ground forces
    - Communicates adversary actions, e.g., attempt to escape the area
    - Provides critical information to ground forces, e.g., vehicles and numbers, descriptions of vehicles and personnel, direction of travel, weapons, etc.
    - S.A.L.U.T.E.
      - Size, Activity, Location, Unit identification, Time, and Equipment.

Why have a Blue Force UAS program? (con't.)

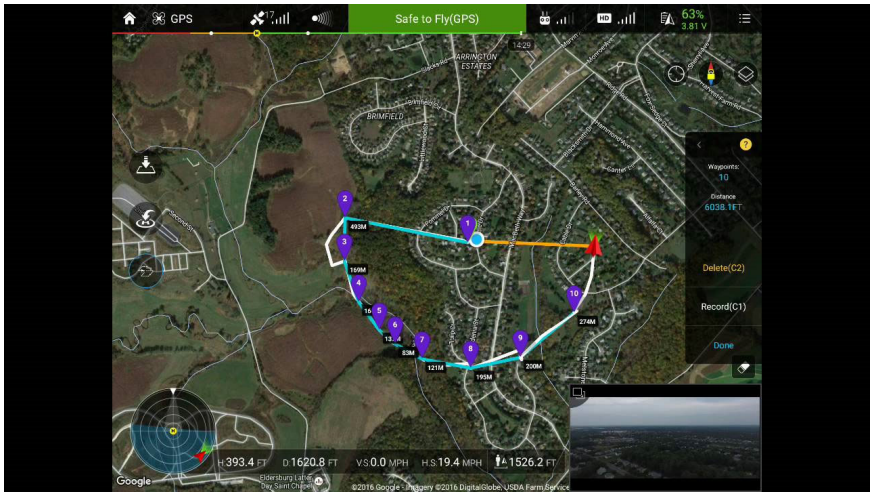
- Possible deterrence factor; incursion mitigation
- Search and rescue of Blue Force personnel
- Can provide documentation of a variety of operations
  - Construction projects
  - Security exercises
  - Security training completion and proficiency
  - Security response performance testing
  - After Action Reporting and training of Blue Force personnel
- Provides random patrol capabilities over a wide area
  - Can enhance ground force presence
- Near-immediate response to attacks
- Live-stream unfolding events to ground force tactical commanders and Tactical Operations Centers (TOCs)

Why have a Blue Force UAS program? (con't.)

- Ground force "duress" signal verification
- Active shooter response
- Hostage or barricaded suspect events
- Response to industrial explosions or accidents
  - Live feed of video to Emergency Operations Centers
  - Can assist in safe assessment and recovery operations
    - Protection of response personnel
    - Can assist in PPE determination
  - "State of controls" assessment, e.g., valve positions, etc.
  - Post-event infrastructure assessments
  - Chemical or radiation event assessment and response

UAS/CUAS Technology

- Current UAS have intelligent flight modes that can automatically assist in:
  - Collision avoidance
  - Altitude holds and limits
  - Subject tracking
  - Waypoint flying
  - Fully automated flight plans
- Ability to adapt multi-faceted optics
  - Night vision
  - Radiation detection systems



UAS/CUAS Technology (con't)

- Multiple platforms available
  - Lightweight and rapidly deployable
    - Not only can UAS assets be deployed from a remote location, but they can also be deployed by response personnel as overwatch for close quarters situations.

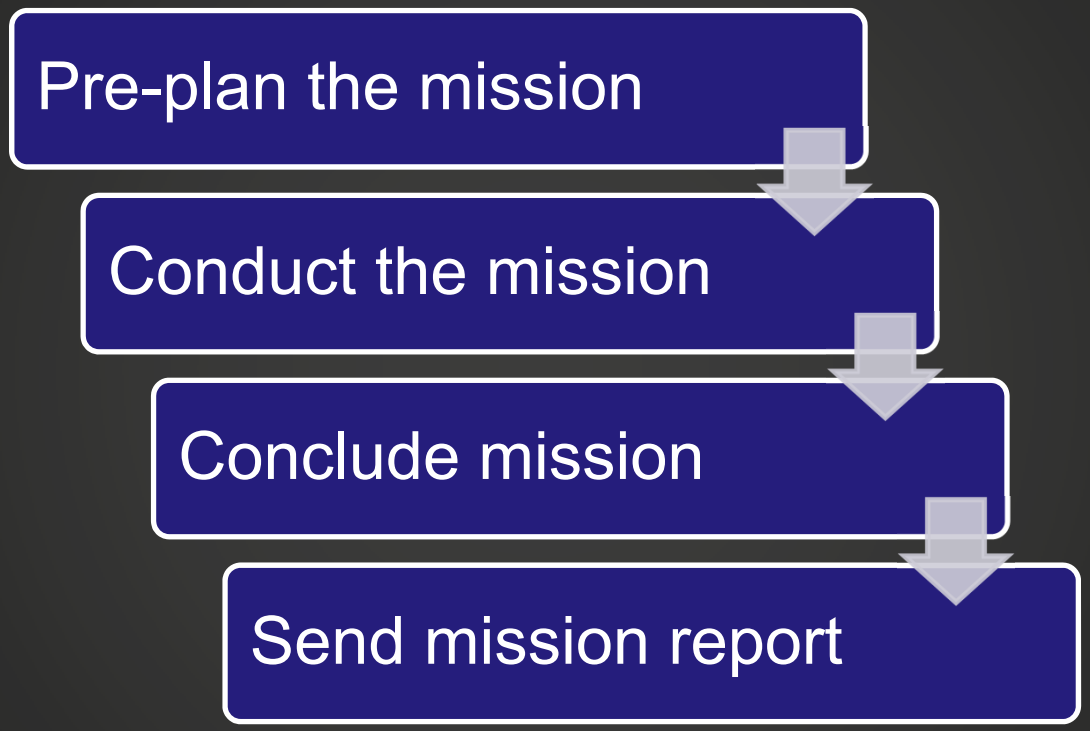
UAS Blue Force can be used to detect, respond and mitigate adversaries/threats in the protection of nuclear material

- Identify how the Blue Force is going to be applied to the situation
  - “First responder”, “supporting assets”, ”deterrent”….
- Determine what role the UAS is going to fill in your security architecture
- Application of technology
  - Autonomous, waypoint, manual flight

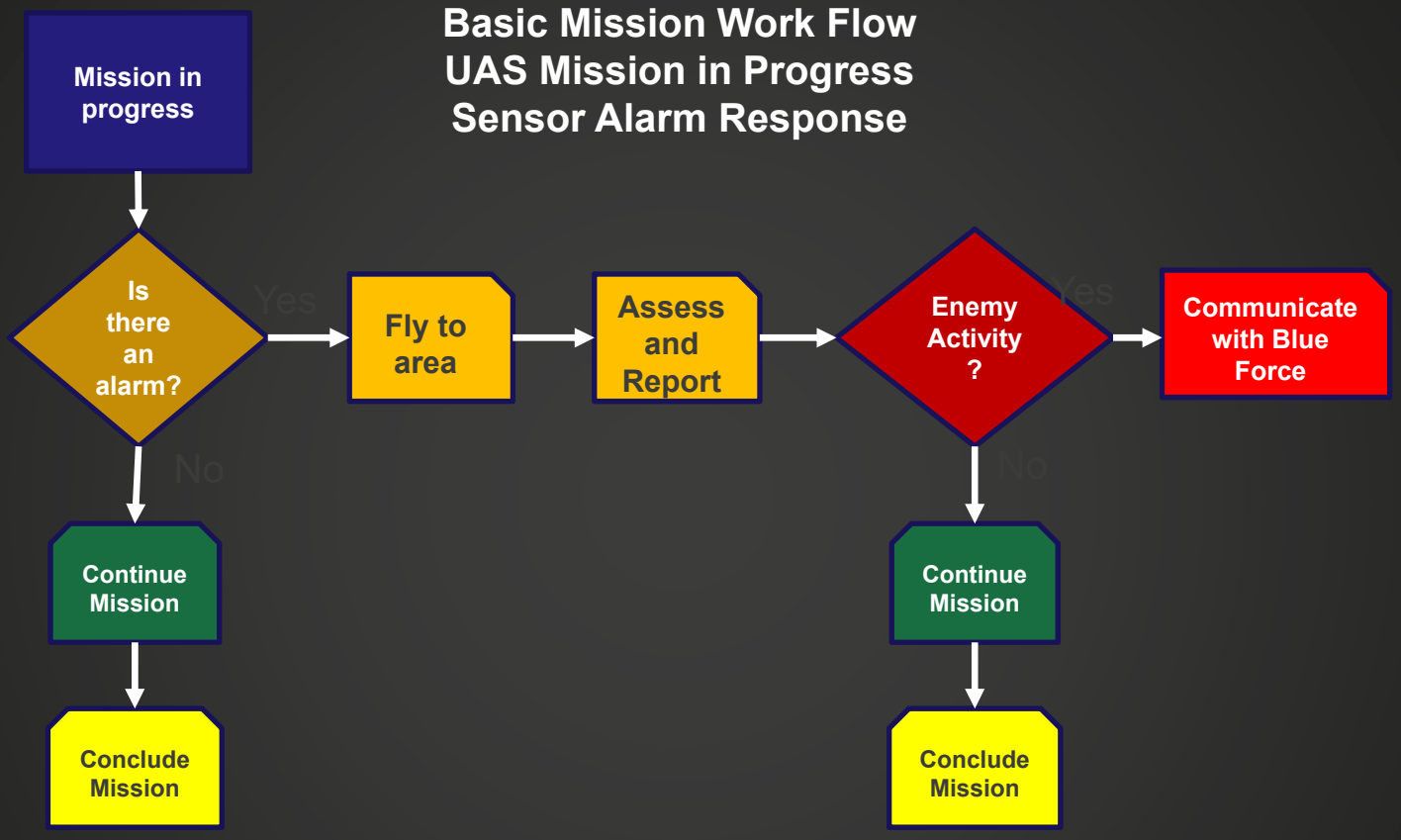
Understanding UAS Limitations

- Most UAS vehicles require limited obstructions in order to reliably transmit control and video information
- Flight distance in “clean” RF environments
- CUAS capability whitelist
  - Prevent “friendly” UAS assets from being interfered with
- Atmospheric interference to GPS and RF
  - Solar flares
  - Weather (rain, snow, wind)
  - Visibility (VLOS or flying in IMC conditions)

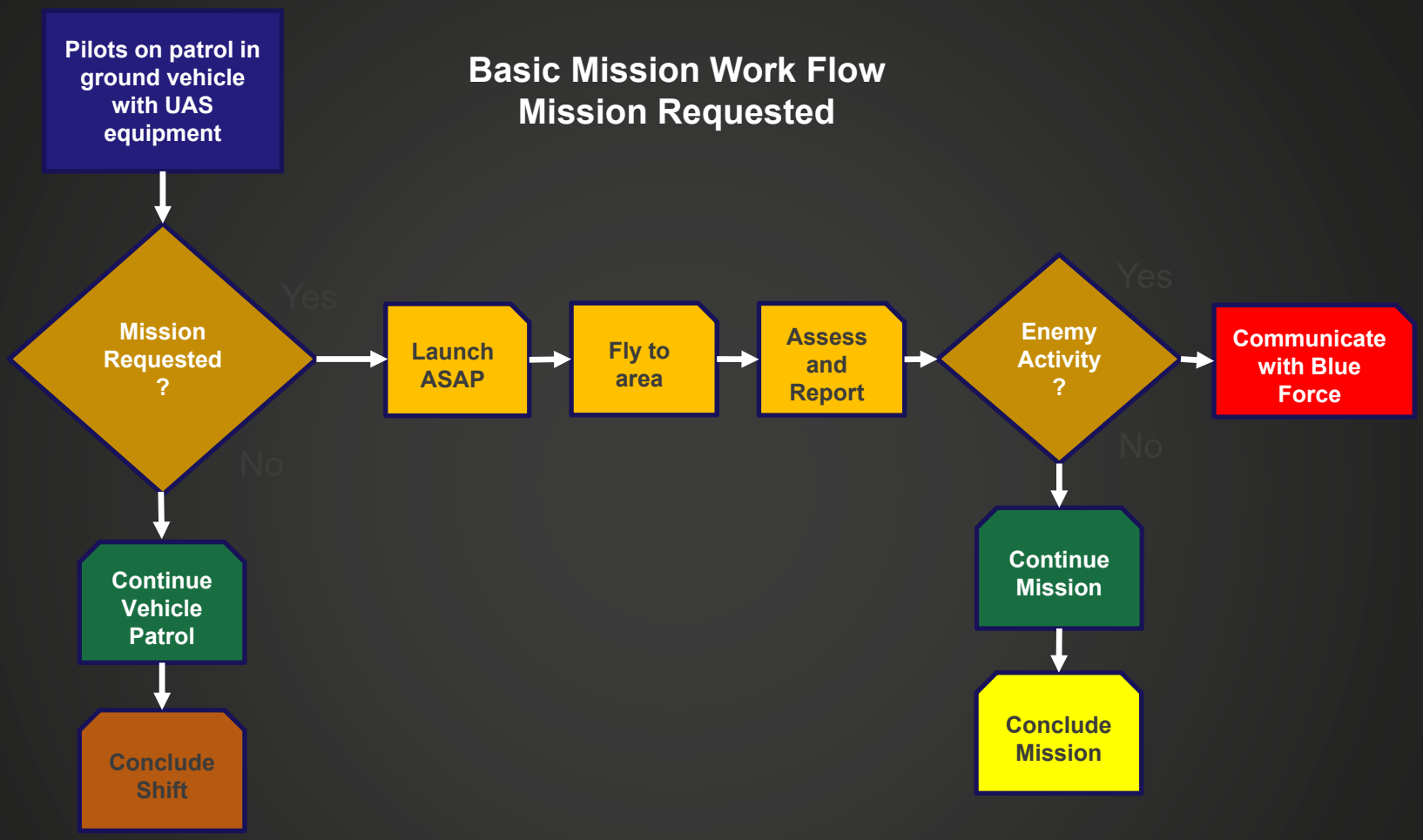
Normal Mission Work Flow



Basic Mission Work Flow
UAS Mission in Progress
Sensor Alarm Response



Basic Mission Work Flow
Mission Requested



Future UAS Technology

- Cellular infrastructure is saturating our environment
  - 3G, LTE, 5G GSM and CDMA network can be leveraged to operate UAS
  - Plug and play application to current UAS prosumer vehicles
  - Virtually limitless range (assuming adequate network coverage and battery endurance)
  - Geographically remote launch and capture
- Multi-UAS coordination
  - Synchronizing multiple UAS assets to “converge” or cover a specific target
    - Allows redundancy and immediate situational awareness of a large target area