SIA EDUCATION at ISC

Drones and Airspace Situational Awareness - The Evolving Security Paradigm

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In partnership with SIA EDUCATION at ISC

Built by RX In the business of building businesses

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- 8 Years Licensed Armed Security
- General Aviation Private Pilot
- Original FAA 333 Waiver Holder
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SAFEGUARDS CONSULTING

- 20+ Years in Security Industry
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- SIA Utilities Advisory Board
- SIA Autonomous Solutions WG
- SIA Video & Vision Subcommittee
- InfraGard Member & Speaker
- ISO Working Group TC292 ASIS Lead
- ASIS ARVP & Other Roles

PRESENTATION AGENDA

- Drone Industry Market Overview
- Drone (UAS) Technology Overview
- Airspace Regulatory Environment
- Challenges of Unauthorized Drones (UAS)
- Counter-Drone (CUAS) Technology Overview
- Building a Counter-Drone (CUAS) Program
- The Future of Airspace Situational Awareness
- Presentation Summary

**Acronyms: UAS - Unmanned Aircraft System, UAV - Unmanned Aerial Vehicle, CUAS - Counter-Unmanned Aircraft System*

Presentation Disclaimer: Recommendations Should Not Be Inferred

Safeguards Consulting is an independent consulting company and is not affiliated with any manufacturer. This presentation simply provides information on sample technologies and products, and is not intended to represent a recommendation or infer any specific guidance to anyone. Quoted statements from the manufacturer are included for information, but are not verified by Safeguards Consulting. Technology decisions should be made with professional consultation and based upon an organization's security operations and facilities, not just technology benefits. Images and quotations used are from public sources.

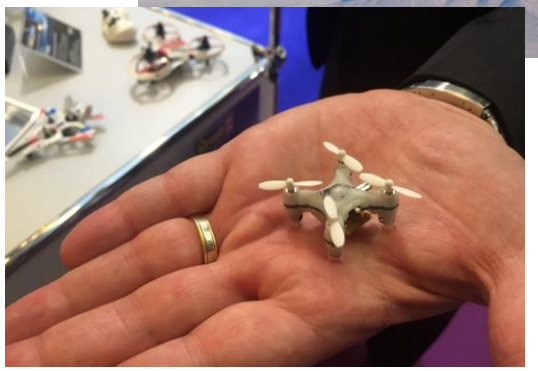
DRONE (UAS) INDUSTRY MARKET OVERVIEW

BUSINESS FACTORS: MASSIVE GROWTH MARKET

- 872,000 drones currently registered with the FAA
- 308,263 Remote Pilots Certified as of March 2023
- FAA estimates **2.5 million drones** in US Airspace by **2024**
- UAS Industry Valuation 2026: **$31-$46 Billion** USD (McKinsey & Company)
- Drones can capture aerial data at 10-20% of traditional costs (vs. helos)
- Drone Taxis (ODM): NASA estimates ~**750 million flights**/year in US by 2030
  - JOBY/UBER plans to offer limited service in near future

DRONE (UAS)
TECHNOLOGY OVERVIEW

A FLYING ROBOT BY ANY OTHER NAME IS STILL A DRONE



sUAS - Small Unmanned Aircraft Systems

- .55 - 55 Pounds (250 grams - 25 kilograms)
- Available from Hobby Stores, Target, Best Buy, etc.

Rotorcraft, Fixed Wing, VTOL, Tethered, Solar, Specialized

All commercial operators require Part 107 License

The commercial UAS industry is about capturing data - not about flying a drone

- Easier, faster, cheaper
- Autonomous operations are the future

Performance Capabilities - Easily Outperforms Regulatory Limitations

Speed > 172 MPH, Altitude > 10,000 Feet AGL,

Climb Rate > 6,000 Feet /minute Acceleration 0 to 60 mph < 1 second

AIRSPACE REGULATORY ENVIRONMENT

LEGAL: NATIONAL AIRSPACE SYSTEM (NAS)

NAS Definition:

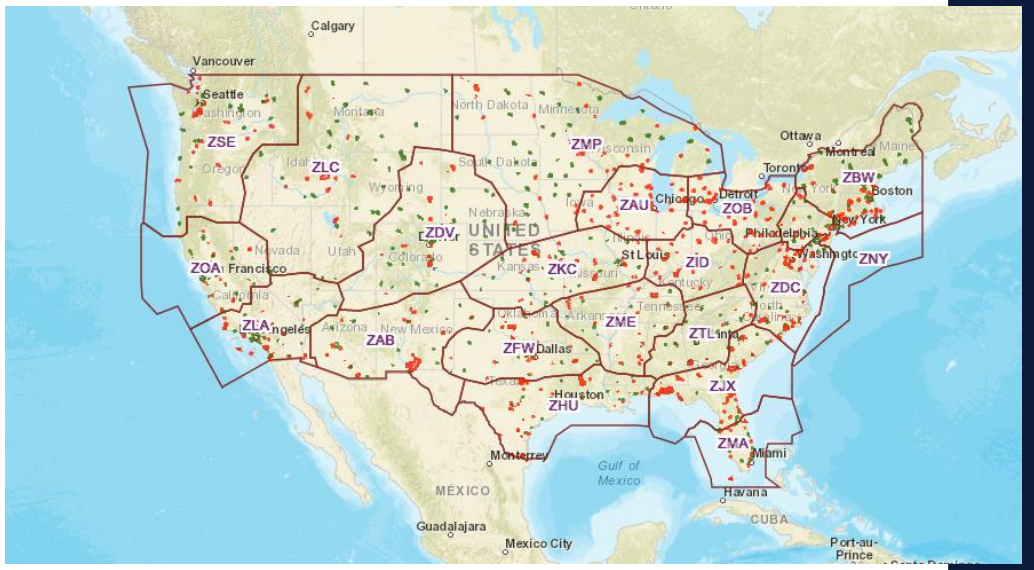
Is the airspace, navigation facilities and airports of the United States along with their associated information, services, rules regulations, policies, procedures, personnel and equipment.

What Is Reasonable Use Air Space (Private)

In 1926, Congress created an air traffic regulatory agency (which is now called the FAA) and declared that the air above minimum safe altitude of flight is public domain.

1946 Causby - Greensboro, NC: Supreme Court Case.

Inferred: Flights over private land are not a taking, unless they are so low and so frequent as to be a direct and immediate interference with the enjoyment and use of the land.



AIRSPACE BOUNDARIES

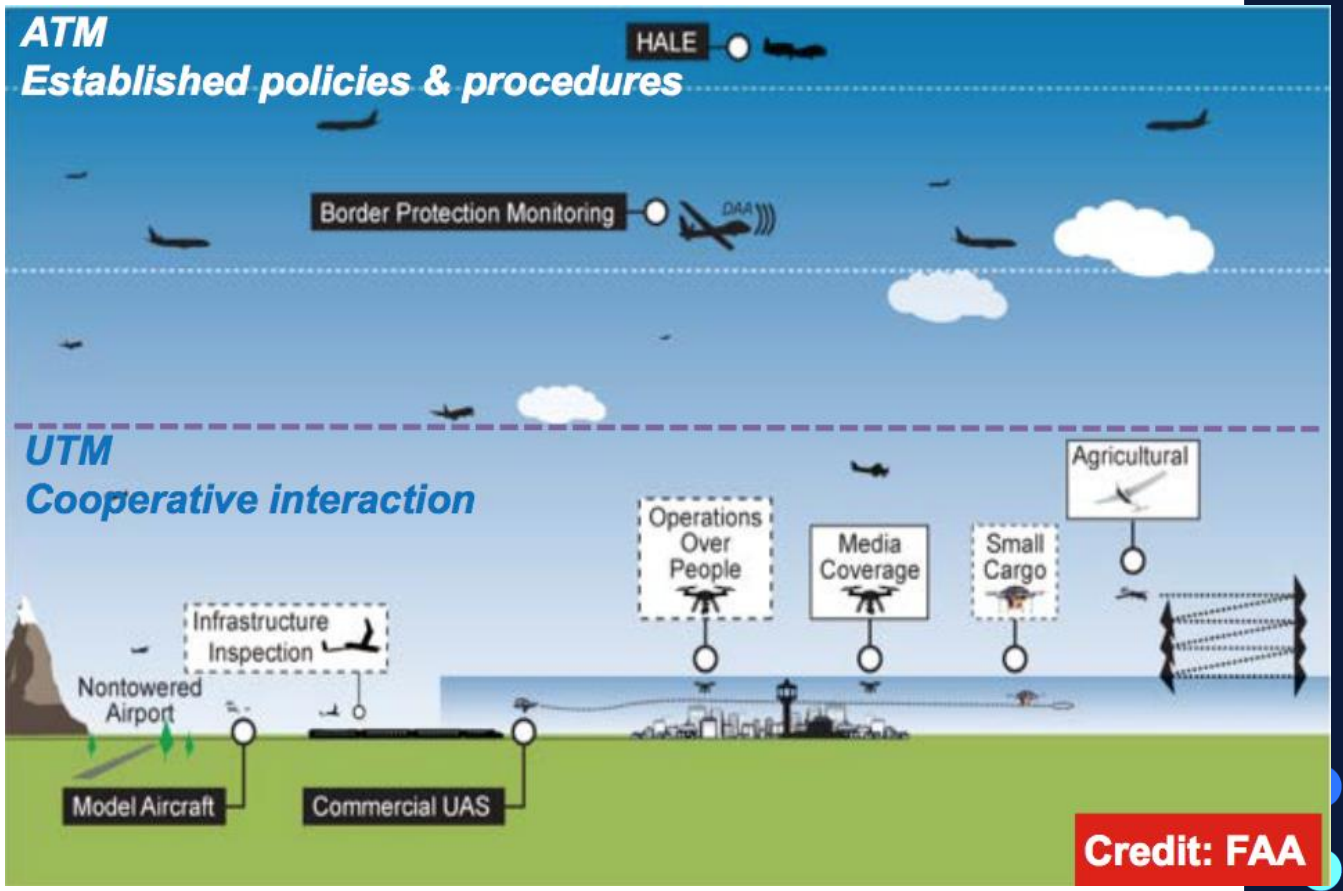
FAASafety.Gov

UAS LEGAL CONSIDERATIONS: REMOTE IDENTIFICATION IS AN ESSENTIAL ENABLER

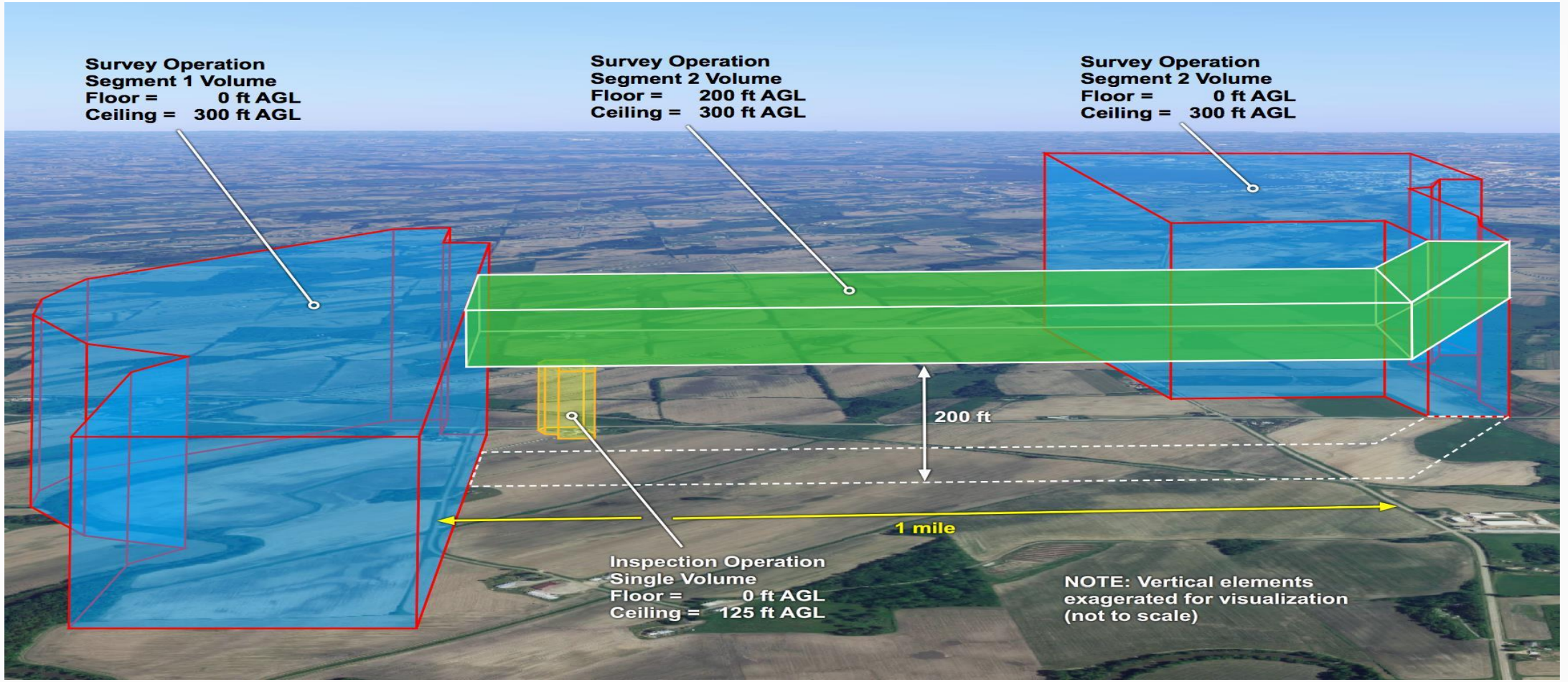
- Remote ID Enforced on September 16, 2023
- Three Ways to meet ID Rule
  - Standard
  - Module
  - FRIA (FAA Recognized Identification Areas)
- Privacy-Compliant Information Broadcasted
  - Unique Drone Identifier (Serial Number or Session Number), Drone Location, Altitude, Velocity, Control Station Location/Takeoff Location, Time Mark, Emergency Status
  - Wi-Fi or Bluetooth Communications

UTM IS LOW-ALTITUDE AIR TRAFFIC CONTROL FOR DRONES THAT IS LARGELY MANAGED BY MACHINES

- Universal Traffic Management (UTM) is an ecosystem for unmanned (and potentially manned) vehicles
- UTM utilizes industry's ability to supply services under FAA's regulatory authority where these services do not exist - UAS Service Suppliers (USS)
- UTM development will ultimately enable the management of large scale, low-altitude UAS operations along with other transportation
- UTM is required to enable BVLOS and Automation which will unlock the industry's potential to achieve financial expectations



3-D View of Operation Volume



Strategic Deconfliction

CHALLENGES OF UNAUTHORIZED DRONES (UAS)

Unauthorized Drone Demo Video

LIMITED LAW ENFORCEMENT

Local Law Enforcement Limitations

- Isn’t always easy to identify and detain the operator or the drone equipment
- Hard to determine intent even with an in-depth investigation
- Remote ID is critical for enforcement of applicable laws
- What Will Likely Be Enforced?
  - Destruction of private property
  - Trespassing (Only Land-Based)
  - Restraining orders
  - Peeping Tom

IMAGE SOURCE: GLYNNIS JONES / SHUTTERSTOCK.COM

LIMITED STATE AUTHORITY

State Regulatory Actions

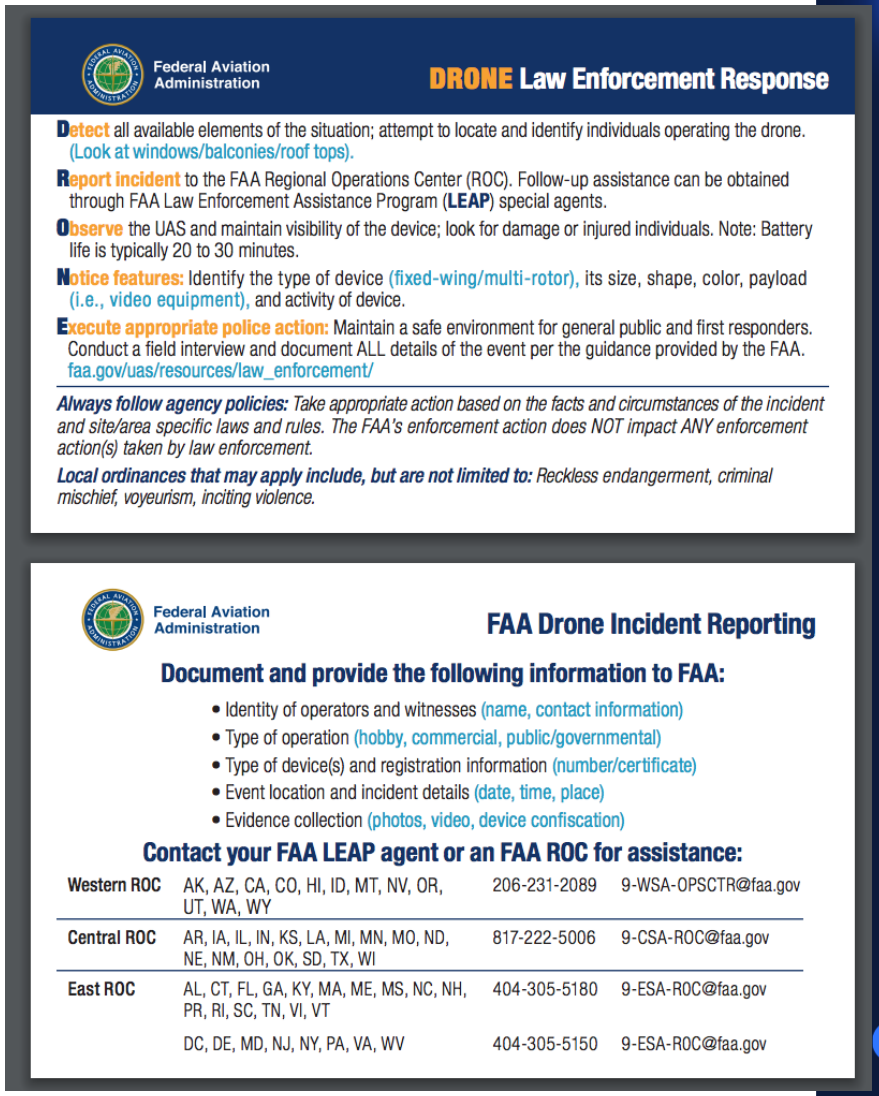
- **Mainly cover the initial take off and subsequent landing locations.**
- These restrictions are subject to litigation regarding determination of who has ultimate authority over navigable airspace.
- **The FAA cautions that any law that further restricts airspace may trespass into their congressional mandate**.

LAW ENFORCEMENT RESOURCES

FAA Resources:

FAA Public Safety Site:
https://www.faa.gov/uas/public_safety_gov/

LEAP Webinar:
https://www.youtube.com/watch?v=zezbqGiSP5c



Federal Aviation Administration

DRONE Law Enforcement Response

Detect all available elements of the situation; attempt to locate and identify individuals operating the drone. (Look at windows/balconies/roof tops).

Report incident to the FAA Regional Operations Center (ROC). Follow-up assistance can be obtained through FAA Law Enforcement Assistance Program (**LEAP**) special agents.

Observe the UAS and maintain visibility of the device; look for damage or injured individuals. Note: Battery life is typically 20 to 30 minutes.

Notice features: Identify the type of device (fixed-wing/multi-rotor), its size, shape, color, payload (i.e., video equipment), and activity of device.

Execute appropriate police action: Maintain a safe environment for general public and first responders. Conduct a field interview and document ALL details of the event per the guidance provided by the FAA. faa.gov/uas/resources/law_enforcement/

Always follow agency policies: *Take appropriate action based on the facts and circumstances of the incident and site/area specific laws and rules. The FAA's enforcement action does NOT impact ANY enforcement action(s) taken by law enforcement.*

Local ordinances that may apply include, but are not limited to: *Reckless endangerment, criminal mischief, voyeurism, inciting violence.*

Federal Aviation Administration

FAA Drone Incident Reporting

Document and provide the following information to FAA:

- Identity of operators and witnesses (name, contact information)
- Type of operation (hobby, commercial, public/governmental)
- Type of device(s) and registration information (number/certificate)
- Event location and incident details (date, time, place)
- Evidence collection (photos, video, device confiscation)

Contact your FAA LEAP agent or an FAA ROC for assistance:

Western ROC	AK, AZ, CA, CO, HI, ID, MT, NV, OR, UT, WA, WY	206-231-2089	9-WSA-OPSCTR@faa.gov
Central ROC	AR, IA, IL, IN, KS, LA, MI, MN, MO, ND, NE, NM, OH, OK, SD, TX, WI	817-222-5006	9-CSA-ROC@faa.gov
East ROC	AL, CT, FL, GA, KY, MA, ME, MS, NC, NH, PR, RI, SC, TN, VI, VT	404-305-5180	9-ESA-ROC@faa.gov
	DC, DE, MD, NJ, NY, PA, VA, WV	404-305-5150	9-ESA-ROC@faa.gov

LIMITED PRIVACY PROTECTION

Commercial or Personal Privacy

- The reasonable expectation of privacy is being diminished.
- **Effort is required on the owners' part to mitigate intrusions from drones**
- Invasion of privacy will most likely depend on the **purpose, frequency, duration, and payload** of the drone flight.

IMAGE SOURCE: RICKS FENCING & DECKING

LIMITED ACCESS TO FEDERAL ENFORCEMENT

DOD	DOE	DOJ	DHS	DOJ/DHS
• Nuclear Missile Defense • Special Ops • High Yield Explosive Depots • Facilities	• US owned & operated nuclear facilities	• FBI • Marshals • Prisons • Federal Courts	• FEMA • TSA • CBP / USCG • USSS VIPs • FPS (Court Houses & Gov't Bldgs) • NSSE SEAR	• Emergency response to non-persistent threat for "covered facilities or assets" (e.g., Gatwick scenario) • Direct request from Governor for mass gatherings • Support to law enforcement at the request of the Chief Executive of the entity to ensure protection at mass gatherings

Provides relief from Acts: Wire Tap, Aircraft Sabotage, Computer Fraud & Abuse, Penn Registry, FCC, etc.

COUNTER-DRONE (CUAS) TECHNOLOGY OVERVIEW

TAKE ADVANTAGE OF INDUSTRY RESEARCH

- Multiple CUAS Research Efforts Underway
  - Military
  - U.S. Federal Government
  - Industry
  - Individual Organizations
- Considerable Environmental Factors
- Still fall under same legal restrictions in many cases

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Research on Technology to Protect Power Facilities from Unmanned Aircraft Systems Intrusion

- Track latest developments on security topics for drones, including their use, detection, and neutralization
- Focus specifically on application in an electric utility environment
- Gain a better understanding of functional specifications and requirements to counter-UAS approaches

IMAGE/DOCUMENT FROM EPRI

CUAS OPERATIONS ADDRESSING DRONE THREATS - DRONE MITIGATION/COUNTERMEASURES

COUNTER-UAS: DETECTION

- Detection - Electro-Optical
- Detection - Compact Radar
- Detection - RF Sensors & Antennas
- Detection - Acoustical Sensors
- Detection - Large Area Radar

VIDEO AND IMAGE FROM SPOTTERRF

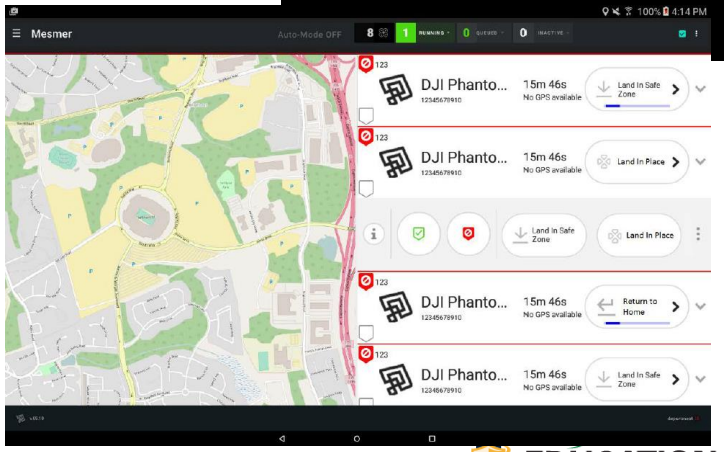


IMAGE FROM DEPARTMENT 13

CUAS OPERATIONS ADDRESSING DRONE THREATS - DRONE MITIGATION/COUNTERMEASURES

COUNTER-UAS: INTERVENTION

- Manual Intervention - Directional RF Jammer
- Manual Intervention - Netting Projectile
- Manual Intervention - Trained Raptors
- Automated Intervention - RF Interruption
- Automated Intervention - Cyber Attack?

PROHIBITED TO MOST IN USA

VIDEO FROM DRONESHIELD

VIDEO FROM GUARD FROM ABOVE

CUAS PROTECTION LAYERS ARE KEY

- **Because multiple CUAS sensors/solutions are needed, multiple manufacturers are commonly involved at every site.**
- **Sandia Labs: “No sensor type alone is able to provide sufficient tracking and identification capability to offer a reliable and effective defense against the LSS threat”… “To provide a satisfactory performance, the use of an adequate mix of sensors will be crucial”**
- **Command & Control (C2) Interface may also be critical to selection**
- **Partnerships and the role of Value-Added Distributors (VAD) is more applicable in this technology environment.**

BUILDING A COUNTER-DRONE (CUAS) SECURITY PROGRAM

CUAS PROGRAM ELEMENTS

- Policies
  - Stance on Unauthorized Drones
  - Purpose of CUAS, Limitations of CUAS
  - Legal Counsel
- Procedures
  - Safety-Focused
  - Detailed Process for Response

IMAGE SOURCE: NSG-INC.COM

CUAS PROGRAM ELEMENTS

- Drone Incident Reporting
  - Drone Inclusion in Suspicious Activity Reporting
  - Data/Evidence Capture
- General Staff Training
  - All Personnel
  - Security Personnel
- LEO Communications/Interface

IMAGE SOURCE: NSG-INC.COM

CUAS PROGRAM ELEMENTS

- CUAS Operator Training
  - Foundational Operator Trainings
  - Continuing Education/Skills Development
- Infrastructure
  - Power, Networking, etc.
  - Integration to Existing Security Systems
  - Maintenance & Repair Support

IMAGE SOURCE: EL DORADO INSURANCE

CUAS PROGRAM ELEMENTS

- CUAS Platforms
  - Huge variety of technologies, constant innovation
  - Match equipment to the need
- Planning for LEO Response for identified threat

IMAGE SOURCE: EL DORADO INSURANCE

THE FUTURE OF AIRSPACE SITUATIONAL AWARENESS

AIRSPACE SITUATIONAL AWARENESS

- Remote Command & Control
- Video Stream Import
- GSOC Potential

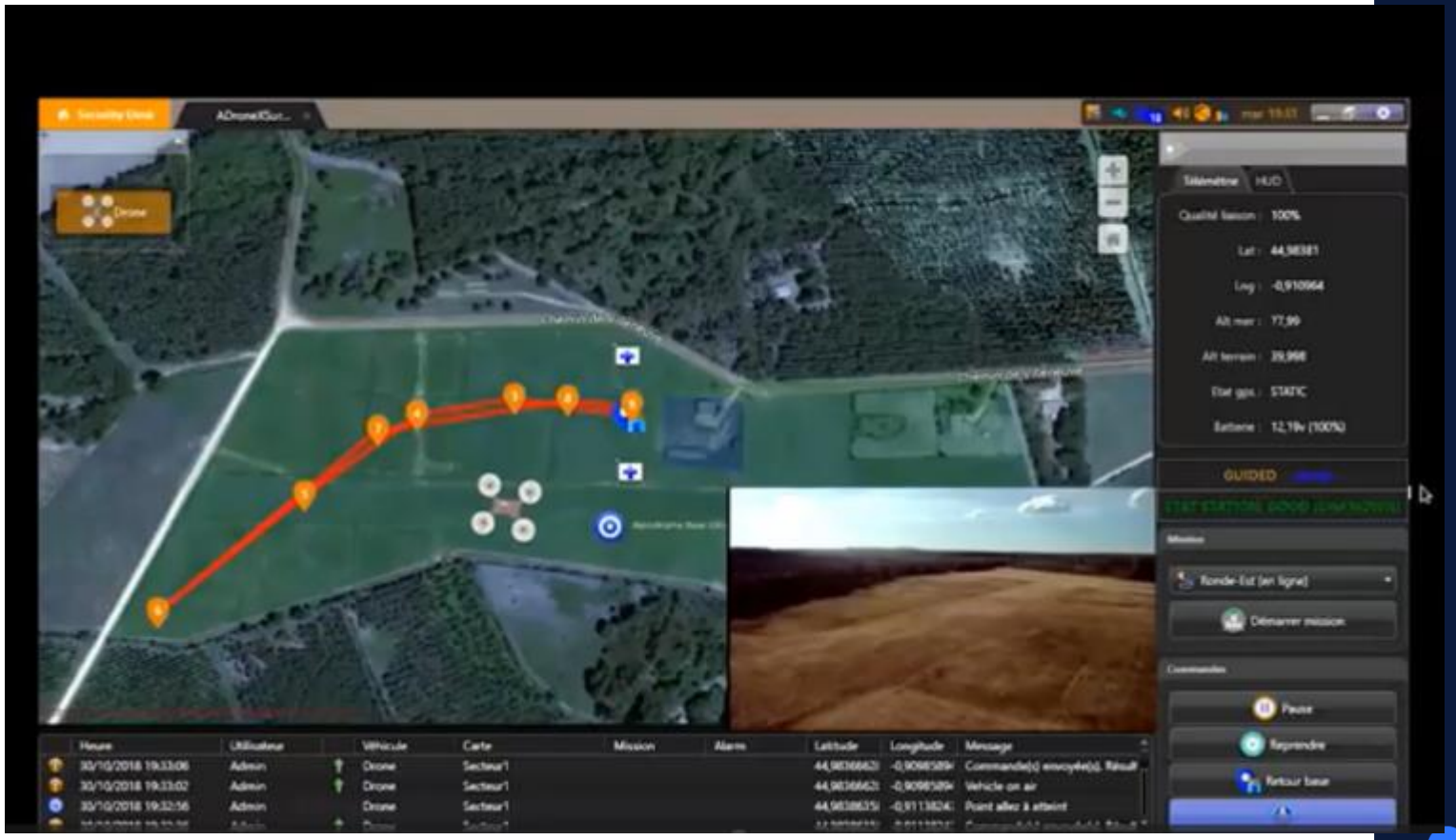


IMAGE SOURCE: AZUR DRONES

AIRSPACE SITUATIONAL AWARENESS

- Airspace Situational Awareness: Monitoring Remote ID & UTM
- Common Operating Picture
- GSOC Potential

IMAGE SOURCE: ONESKY

PRESENTATION SUMMARY

OVERALL TAKEAWAYS

- UAS/UAV - An important, **emerging technology** with significant security impact
- UAS technology has advanced greatly to make them **capable tools**
- Legislation and Oversight is **behind the technology curve**
- **Find resources**; national and local to continue your education & understanding
- Operation of UAS for Security Operations requires **appropriate** planning, implementation and additional **staffing/service resources**
- UAS countermeasures are advancing, but **not proven** technologies.

  Pentagon White Sands Testing:

  "Bottom line: Most technologies still immature"

OVERALL TAKEAWAYS

- Sandia Labs: *"No sensor type alone is able to provide sufficient tracking and identification capability to offer a reliable and effective defense against the LSS threat"… "To provide a satisfactory performance, the use of an adequate* ***mix of sensors*** *will be crucial"*
- UTM and **Remote Identification** will be key for authorized drone operations
- Moving forward, **facility design** will need to address the UAS threats
- Develop a **comprehensive program** for UAS & CUAS operations
- Be **adaptable** in your security planning to support legal & technology advancements

Q&A

THANK YOU FOR ATTENDING!

FOR QUESTIONS OR MORE INFORMATION, PLEASE CONTACT AND OF THE PRESENTERS:

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