Legal & Regulatory Conference
Drones: Are They an Asset or Threat to Utility Infrastructure?

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Topics To Be Discussed

1. Understanding UAS Technology (generally and in the Energy Industry)
2. Understanding the Current State of Regulations
3. The Uses and Missuses of Drones
4. Types of UAS Counter – Technology and the Law
5. A Look onto the Future Uses of UAS Technology
Unmanned Aircraft Systems (UAS) or Drones

- Quadcopters
- Fixed wing
- Octocopters
- Ornithopter (Smart birds)
Advanced Technologies Include:

- Photography (Fixed / Video, Infrared)
- Lidar
- Thermography
- 3D / Orthomosaic Imagery
- Recognition / Smart Sensors
- Biological / Chemical Sensors
- Sonar Collision Avoidance
- Meteorological / Temperature Sensors
- Surveillance Audio
- Wifi and Hotspots
- Geo-fencing
- Payload / Cargo (food, medicine, tools, supplies, fire extinguishers…)

UAS are Used in Every Major Industry

- Photography / Film & TV
- Real Estate / Construction
- Agriculture / Ranching
- News Gathering / Media
- Education / Universities
- Health Science
- Local Governments
- Police and Fire Departments
- Hospitality / Resorts
- Railroads
- Telecommunication
- Insurance
- Environmental
- Electric, Natural Gas & Oil
- Security / Surveillance
- Mining (Gold, Silver, Copper)
- Sports & Entertainment
- Weather / NOAA
Legitimate/Valuable Uses
How Utilities Are Using UAS

• **Routine Maintenance and Inspection** of:
  – Electric and Natural Gas Distribution / Transmission Lines and Infrastructure
  – Boilers, Flu Stacks, Dams, Coal stockpiles, Ash ponds, Landfill
  – Substations, Switchyards, and Rights of Way
  – Conventional and Renewable Generating Facilities (Solar/Wind)
  – Vegetation management

• **Pipeline Mapping/Leak and Corrosion Detection**

• **Construction/Planning**

• **Emergency Response** to:
  – Storm reconnaissance and outage damage
  – Public Alerts and confirmatory information
  – Security/ Vandalism
Types of UAS Authorizations to Fly

- Commercial / Civil Operations
  - Part 107 Including waivers

- Public / Governmental Operations
  - Experimental or Type Certificates
  - Certificate of Waiver or Authorization ("COA") Section 334 Exemptions

- Hobbyist / Recreational
  - Part 101

- Section 333 Exemption (must also obtain a COA)
• Imposes Requirements and Responsibilities on Operators
  – To obtain a Remote Pilot Airman Certificate, small UAS rating
  – To register, mark, and inspect the UAS prior to flight
  – To maintain documents, to report accidents involving serious injury or property damage within 10 days, and to comply with state privacy laws
  – Prohibiting careless or reckless operations

• Imposes Operational Limitations and Conditions on the UAS
  – Time of day, weight, speed, and height limit, within visual line of sight, weather conditions, permissible persons and places for UAS flights (i.e., no flights over uninvolved persons)
  – Carriage and transportation of property for hire permitted within state (except DC and HI)

• Identifies Regulations that Can be Waived and the Process for Waivers

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More Regulations to Come
FAA Reauthorization Act – Signed into law on July 15, 2016

Section 2207
• Requires the FAA to create a specific exemption for beyond the line of sight, and night time UAS operations for critical infrastructure

Section 2209
• Permits parties to request that the FAA prohibit UAS operations near certain critical or sensitive facilities

Section 2210
• Requires the FAA to create an exemption process to respond to emergencies

Section 2205
• Prohibits interference with wildfire suppression, law enforcement or emergency response efforts; $20,000 penalty for "knowingly or recklessly interfering"

Section 2208
• FAA/NASA required to develop a plan for UAS Traffic Management
UAS Technology has Low Barriers to Entry

- Readily available for purchase by anyone
- Relatively inexpensive
- Require minimal sophistication to operate

Problem:
- Can be equipped with IoT hacking devices/nefarious payloads
- Can be used in cyber crimes (theft of trade secrets/technologies)
- Are capable of silently monitoring large areas/evading detection
- May not notice it, until its already within reach of property
- Can be used to disrupt or invade privacy
Misuses of UAS

Actual and Potential UAS Interference

- **China** – UAS crashed in powerlines causing 6 hour blackout (2016); UAS carrying small amounts of radioactive material landed on Prime Minister’s office (2015)
- **France** (where $\frac{3}{4}$ of generation portfolio is nuclear from 58 units) UAS reported within nuclear facilities airspace (13 times in 2014, 33 times in 2016)
- **US** - Numerous incidents of drone overflights at electric/nuclear power stations

Greenpeace Symbolic Intrusion (July 2018)

- Intentionally crashed a UAS sporting a Superman cape into a nuclear power plant in France to demonstrate the industry’s “extreme vulnerability”
UAS Not a Likely Threat to US Nuclear Plants

- Nuclear plants among most reinforced structures in the country
- Nuclear Regulatory Commission (NRC) tests defensive strategies and conducts regular assessments
- Cybersecurity controls implemented in 2002, are comprehensively monitored and inspected by NRC
- All US nuclear facilities have protocols in place to respond to suspicious aircraft
Government Recognizing UAS Threat

- **National Defense Authorization Act (2017)** – expanded DOD/DOT’s ability to protect from UAS, facilities and assets relating to US nuclear deterrent, missile defense or military space missions
- US Government is now seeking authorization to shoot down UAS
- Creating programs to allow Federal, State and local agencies to buy anti-drone systems from the General Services Administration

**GOAL:** Assist law enforcement, first responders, and other federal and state agencies that are responsible for sensitive sites

**PROBLEM:** Existing federal laws do not permit most federal, state and local governmental agencies to employ UAS countermeasures.
Private Sector UAS Countermeasures

• Private sector also has a growing interested in UAS Countermeasures

• Wide selection of technology (intercepts controls, jams communications, diverts flight path, physically captures UAS

   Completely legal to buy and sell many of these technology BUT...
   Completely illegal to operate such technology

SAME PROBLEM: Numerous Federal laws preclude the testing, evaluation and use of some counter-drone systems and no state, local or private sector entities have been granted legislative relief
Examples of Sources Limiting Countermeasures

U.S. Criminal Codes

18 U.S.C. § 1362 – prohibits willful interference with radio or computer communications
18 U.S.C. § 1367(a) – prohibits intentional interference with satellite communications
18 U.S.C. § 32 – prohibits willful interference (damage, destroy, disable, wreck) any aircraft
18 U.S.C. § 2511 – prohibits intentional interception or attempts to intercept or procure any wire, oral or electric communication.

U.S. Statute

49 U.S.C. § 46308 – prohibits intentional interference with US air

Communication Act of 1934

Section 301 – requires person operating or using radio transmitters to be licensed under the FCC rules.
Section 302(b) – prohibits testing, R&D, manufacture, importation, marketing or sale of unlicensed jammers within the US
Section 333 – prohibits willful interference with the radio communications authorized under the Act or operated by the U.S. government

1 47 C.F.R. §2.803
Types of UAS Countermeasures

**Passive**
- Surveillance/Detection
- Real-time Monitoring
- Obscuring target area
- Sounding Alarms
- Locating Staff Outside
- Documenting event
- Involve law enforcement

**Active**
- Nets/Capture Tools
- Shotgun/flamethrower
- Radio Frequency Jammers
- Control Override
- GPS Spoofing
- Electronic Fencing

Prohibited
**FAA is Taking Legal Action**

**Ralph Pirker**

1st Enforcement Action – ($10,000)
- Operating an unregistered aircraft
- Operating in careless/reckless manner in close proximity to people and structures, including the flight path of UVA Medical School helipad

**Result:** Settled for $1,100

**SkyPan International**

Largest Civil Penalty - ($1.9 million)
- FAA alleged 65 unauthorized flights / 260 violations in NYC and Chicago
- Operating an unregistered aircraft
- Operating in a careless/reckless manner in airport space without: 1) clearance; 2) two-way radio; and 3) altitude reporting equipment

**Result:** Settled $200,000 civil penalty ($150,000 if it violates any FAA regulation in 2017 and $15,000 more if fails to comply with settlement)

**Recent Issues**

Criminal Misconduct
Gangs using UAS to:
- intimidate witnesses
- monitor/case properties
- interfere with FBI sting
- smuggle goods into prisons, across boarders
Preemption

FEDERAL
(FAA responsible for safety of US airspace)

- Courts have preempted state law pertaining to air safety (i.e., efforts to limit times, frequency and altitude of flights)
- Courts have broadly interpreted definition of air safety (i.e., to include alcohol served on planes, planes towing banners…)

STATE
(Police powers govern safety and general welfare of citizens)

- Courts have found local ordinances narrowly tailored to protect specific safety concerns acceptable (i.e., ordinance prohibiting landing helicopters within 9 miles of national park within police power)

- Likely to find FAA authority preempts complete bans of UAS operations absent unusual circumstances
- Laws that contain limitations on flight altitude or impose “paths” or operational bans on anything in navigable airspace are likely to be scrutinized by courts
- Pending Drone Federalism Act (which provides states ability to regulate airspace 200 feet and below) likely to provide patchwork of regulation jeopardizing drone deliveries/services
UAS of the Future

Mail Drone On Streetlight Perch

Multi level fulfillment centre (item 100)

Walmart Floating Warehouse Patent

Amazon envisions its drone delivery fulfillment centers as beehives.

STINSON LEONARD STREET
Biggest UAS Challenge: Safety
~ Amazon

- July 2018 – Amazon awarded a patent to protect delivery drones from hijackers
- Amazon Delivery Drones will feature a “heartbeat” signal automatically transmitted every few seconds.
- If heartbeat stops, operations convert to mission “safety mode”
Utilities Are Creating Asset Risk Profile

• Reexamining security in light of UAS technology on an asset by asset basis:
  − Quantifying risk in terms of probability/impact
  − Establishing Critical and Non-Critical UAS Zones
  − Tailoring appropriate “Best Practices” Standard Operating Procedures and Alert Procedures (e.g., incident response, drone recovery, and contraband training programs)
• Anticipating and prevent incident before it happens
Recommended Security Practices

- Research and implement legal counter-UAS technology
- Know the air domain around your facility and who has authority to take action to enhance security
- Contact FAA to consider restrictions in close proximity to facilities
- Update/ Emergency/ Incident Plans to include UAS security and response strategies
- Build federal, state and local partnerships for adaptation of best practices and information sharing
- Report threats to authorities
Thank you for the opportunity to speak today!

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