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Unmanned Aircraft Systems: The Law Around
Drones

Wesley K. Wright
Keller and Heckman LLP
Washington, District of Columbia

Mr. Wright is a partner with Keller and Heckman LLP. He regularly counsels clients in the energy industry on telecom and technology issues. He also serves as the General Counsel to the Energy Telecommunications and Electrical Association (ENTELEC).



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Wes Wright
Keller and Heckman LLP
1001 G Street NW
Suite 500 West
Washington, DC 20001
+1 202.434.4239
wright@khlaw.com
www.khlaw.com

Washington, DC • Brussels • San Francisco • Shanghai

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Background on FAA Treatment of Drones

- Current Restrictions – Commercial vs. Hobbyists
- 2012 FAA Reform Act
- Interim relief (agriculture, pipelines/power lines, film, flare stacks)
- Required Rulemaking
- Future Issues
- Enforcement
- Recent Waivers

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Terminology

- Drone
- UAV – Unmanned Aerial Vehicle
- UAS – Unmanned Aircraft System
 - sUAS – Small UAS
- UVS – Unmanned Vehicle System
- Model or R/C Aircraft

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Types of Drones



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Commercial vs. Hobbyists

- Hobbyists
 - Previously not well defined
 - Operations Restricted
 - Under 400 feet
 - Line of sight
 - Away from airports
 - Less than 55 lbs.
- Private, internal use by a company is not hobby use

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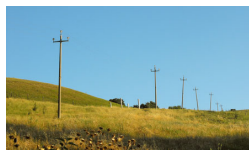
Energy Industry Uses

- Visual inspections – HD, thermal, multispectral, corona
 - Electric transmission and distribution lines
 - Power plants/substations
 - Natural gas transmission and distribution pipelines
 - Storage facilities and valves
- Surveying - LiDAR

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Energy Industry Uses

- Gas leak detection
- Supply delivery
- Communications repeaters
- Wire stringing?



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Benefits to Energy Industry

- Safety
 - Distance from equipment
 - Reduced fall hazard
 - Compare to conventional aircraft
- Lower cost
 - Fuel costs
 - Operating costs
 - Aircraft costs

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Benefits to Energy Industry

- Speed/Versatility
- Environmentally friendly
 - Fuel consumption
 - Avoid impact to environmentally sensitive areas
 - Quiet

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FAA Authorizations

- Certificate of Waiver/Authorization
 - Arctic circle approved June 2014
- Special Airworthiness Certificate
 - Experimental Class
 - San Diego Gas & Electric approved July 2014
- Section 333 Exemptions
 - No longer used

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2012 FAA Reform Act

- By September 30, 2015, FAA must adopt plan to safely accelerate the integration of civil drones into national airspace
- 18 Months after plan submitted - FAA must adopt rules allowing for civil operation of drones in the national airspace system
- FAA Roadmap

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FAA Test Beds

- **University of Alaska** - State monitoring, navigation, safety standards.
- **State of Nevada** - Operator standards and certification requirements, air traffic control procedures.
- **New York's Griffiss International Airport** - Sense and avoid capabilities, integrating UAS into congested airspace.
- **North Dakota Department of Commerce** - Airworthiness, and high reliability link technology.
- **Texas A&M University – Corpus Christi** - System safety requirements.
- **Virginia Polytechnic Institute and State University (Virginia Tech)** - Failure mode testing and identify and evaluate operational and technical risks areas.

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Section 333

- Section 333 Exemptions
- June 2014 – FAA began considering Exemptions
- Targeted Four Applications
 - Film Industry
 - Precision agriculture
 - Power line and pipeline inspection
 - Oil and gas flare stack inspection

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Section 333

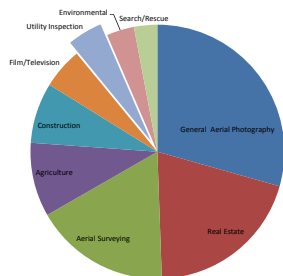
- September 2014 – FAA began granting Section 333 Exemptions
 - Thousands eventually granted

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First 1,000 Exemptions



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FAA Part 107

- June 2016 – FAA Adopts Part 107 Rules
 - Less than 55 lbs.
 - Visual line of sight
 - Daylight/twilight operations
 - 400 foot AGL, or 400 foot above structure if within 400 feet horizontally
 - Max speed 100 mph

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FAA Part 107

- No flight over people not involved in operation
 - Unless under covered structure or inside stationary vehicle
- Register aircraft
- Fly in class G airspace
 - Procedure for obtaining authorization in other classes
- Waivers available

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FAA Part 107

- Pilot must hold remote airman certificate with small UAS rating
 - Or be under supervision of certificate holder
 - Must be 16
 - Must pass knowledge exam
 - Current pilots can take online course

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Section 2209 Restrictions

- 2016 Act required FAA to adopt procedures to prohibit or restrict UAV flights near certain facilities:
 - Critical infrastructure, such as energy production, transmission, and distribution facilities and equipment.
 - Oil refineries and chemical facilities.
 - Amusement parks.
 - Other locations that warrant such restrictions.

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Section 2209 Restrictions

- FAA yet to adopt procedures
- No self-help allowed
 - Drones considered aircraft

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FAA Drone Waivers

- Fly a UAS from a moving aircraft or a vehicle in populated areas (§ 107.25)
- Fly a UAS at night (§ 107.29)
- Fly a UAS beyond your ability to clearly determine its orientation with unaided vision (§ 107.31)
- User a visual observer without following all visual observer requirements (§ 107.33)
- Fly multiple UAS with only 1 remote pilot (§ 107.35)
- Fly a UAS without having to give way to other aircraft (§ 107.37(a))
- Fly a UAS over a person/people (§ 107.39)

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FAA Drone Waivers

- Fly a UAS:
 - Over 100 miles per hour groundspeed
 - Over 400 feet above ground level (AGL)
 - With less than 3 statute miles of visibility
 - Within 500 feet vertically or 2000 feet horizontally from clouds
- § 107.51

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Future Issues

- Spectrum
- Privacy
- Data Management



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FCC/Spectrum Issues

- 5G will utilize low, mid, and high-band spectrum
- Interesting Spectrum Proceedings
 - Low-band – service to be deployed post incentive auction
 - Citizens Broadband Radio Service (CBRS)
 - Original 50 MHz between 3.65 and 3.7 GHz
 - Now from 3.55 GHz to 3.7 GHz
 - Tiered services
 - Incumbent Access Tier
 - Priority Access Licensee (PAL)
 - General Authorized Access (GAA)
 - Current Operations
 - Cutoff date – sites registered in ULS prior to April 2015 entitled to grandfathered protection through at least April 2020
 - New sites registered within existing footprint after April 2015 protected
 - New sites registered outside of zone after April 2015 not afforded any interference protection
 - FCC finalized additional changes to the priority tier impact CII (October 2018)
 - Licensed Area: licensed by county instead of by census tract (about 3,000)
 - Term: 10-year license term with a renewal expectancy
 - Next Steps – Two Key Benchmarks
 - Auctions for Priority Licenses
 - GAA tier could be available Q4 2019

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FCC/Spectrum Issues

- 6 GHz Band
 - Background
 - There has been a lot of recent action in the 4 GHz and 6 GHz bands in the past few years
 - FCC NOI asking about current use of 4 GHz and 6 GHz band (August 2017)
 - FCC proposed to open band for unlicensed use (October 2018)
 - Current Operations
 - Fixed services – point-to-point for backhaul
 - Broadcasters – use sliver of the band for over-the-air broadcast
 - Unlicensed Supporters
 - Include tech companies like Apple, Facebook, Hewlett Packard, and Microsoft
 - Fixed Services Supporters
 - Include large industrial companies that are ENTELEC members
 - Argue that interference with unlicensed users is inevitable
 - FCC's Next Steps
 - Voted on NPRM in the Spring that would allow unlicensed devices to operate in areas where they would not cause harmful interference to the licensed services and would protect incumbent fixed operators
- High Band
 - FCC Auctions
 - Auction 103: 37 GHz, 39 GHz, and 47 GHz (December 2019)
 - Auction 102: 24 GHz (Spring 2019)
 - Millimeter Wave Proceeding
 - Exploring options above 95 GHz for lightly-licensed, unlicensed and experimental uses

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Future Issues

- Operational Issues
 - BVLOS
 - Night flights
 - Use in commerce

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Enforcement

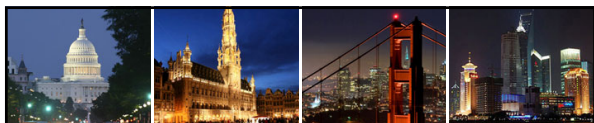
- October 6, 2015 FAA proposed \$1.9MM fine against SkyPan International
 - 65 unauthorized flights
 - Aircraft lacked airworthiness certificate and SkyPan did not have COA
- Settled for \$200,000



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Questions/Discussion

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Thank you!

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