



Drone Usage in the Broadband (Air)Space

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Four Objectives of Session



- UAV/Drones 101: Understanding the Basics and Terminology
- The Aeronautical Technology and RF Components of UAVs
- The Laws and Regulations of Operating UAVs
- The Commercial Applications of UAVs in Telecommunications, Utility, Wireless and Mobile Broadband Sectors



**UAV/Drones 101:
+ Understanding the
Basics and Terminology**



Acronyms

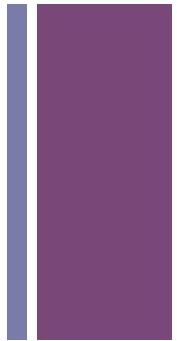



- UAV = Unmanned Aerial Vehicle
- UAS = Unmanned Aircraft System
- sUAV = Small UAV/UAS

....they all mean “DRONES”.



FAA Airspace Classifications





+ **The Aeronautical
Technology and RF
Components of UAVs**



UAV Aeronautical Technology

Most Common Type of UAV for both Hobbyists and Commercial Users is the “QuadCopter”



Sources: DJI Industries, Wikipedia and Technology.org



UAV Aeronautical Technology

However, for Surveying, LIDAR, Search and Rescue, Fiber, Pipeline and Agricultural Operations, Fixed-Wing Drone Usage is More Common





Typical UAV Equipment



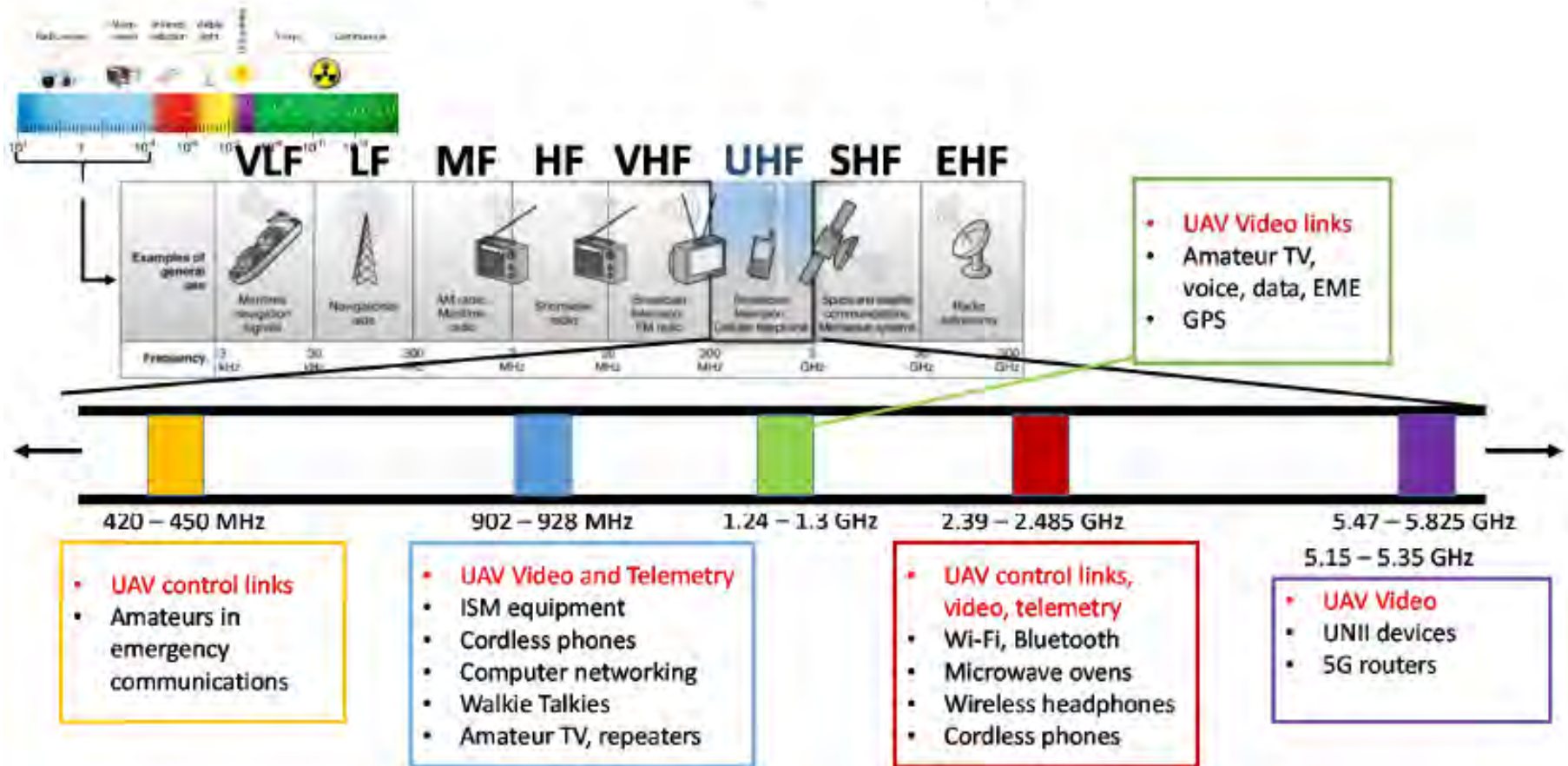
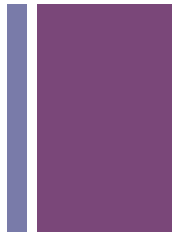
- UAV
- Transceiver and/or Controller
- Tablet, Monitor and Navigation Support
- Battery Pack
- Gimbal and Camera/AV Equipment
- Data Storage Drive
- Guards and Extra Rotors/Batteries



Source: Ritz Camera

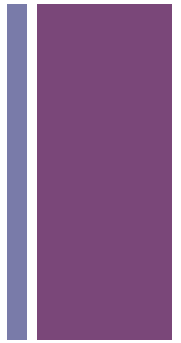


Radio Frequency Utilization



Source: ANDRO Computational Solutions, LLC

+ RF Basics: UAV Control and AV Transmissions



Source: DJI Industries

- Most “Modern” UAVs utilize Unlicensed 2.4 GHz and 5.8 GHz frequencies for Flight Control.
 - Always best to have 2 different frequencies to avoid interference between Flight Controls and Cameras/AV.
- GoPros use 2.4 GHz, so be careful adding separate systems!
- Others ranges are 900 MHz, and 1.2 GHz.



+

The Laws and Regulations of Operating UAVs



UAV Law: Overview



Like many aspects of modern society, UAV activities are controlled primarily by the Constitution, Federal laws and Federal regulations.

However, they are also supplemented by State and Local Laws/Regulations/Ordinances, and even common law doctrines.

This presentation deals primarily with the new Federal laws and regulations impacting “Commercial” UAVs.



Which UAV Laws and Regulations Apply?



**The most important question
to ask when operating a
drone:**

***Is my proposed sUAV activity
Commercial or Non-Commercial/
Hobbyist in nature?***



UAV Law: **MAJOR CHANGES!!!**



**However, effective August 29, 2016,
anyone flying a sUAV in a
“Commercial” manner must
strictly follow new Part 107 FAA
Rules!!!**



Does My UAV Use Qualify as Commercial?



The pivotal 2016 FAA Order (to be discussed shortly) actually lists the following specific examples of commercial UAV operations:

- Crop Monitoring/Inspection
- Research and Development
- Educational/Academic Uses
- Powerline/Pipeline/Bridge Inspections
- Rescue Operations
- **Antenna Inspections.**
- **Aerial Photography (Including Marketing Videos!)**

+ **Part 107 Rules: What Are They!?**

Basically, three major components:

1. **Operational Requirements/Limitations**
2. **Pilot-in-Command (UAV Operator) Requirements/Limitations**
3. **sUAV Requirements/Limitations**



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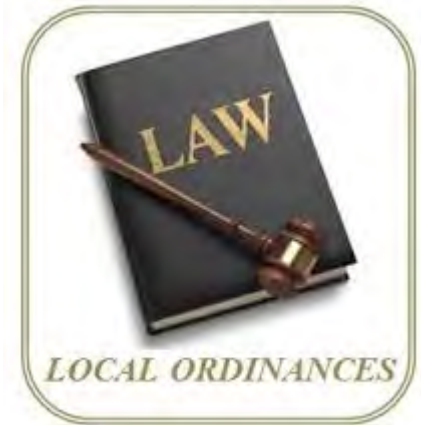
Other Laws and Regulations of Operating UAVs

+ Other Laws and Regulations

In addition to traditional Federal Administrative oversight by FAA, other legal and regulatory factors impact drone usage. What are they?



STATE LAWS





Other Laws and Regulations

Topics To Consider Beyond FAA Part 107 Rules:

- 1st Amendment
 - Freedom of Press (Rights to create Media/Photography)
 - Freedom of Speech (“No Fly Zones”/Advertising)
 - Freedom of Assembly/Photography
- 4th Amendment
 - Privacy, Surveillance, Law Enforcement Search and Seizure
 - NTIA Governs All Things “Privacy” Related Concerning Drones
 - NTIA “Best Practices”
https://www.ntia.doc.gov/files/ntia/publications/voluntary_best_practices_for_uas_privacy_transparency_and_accountability_0.pdf
 - *“Secured Covered Data” - **Cybersecurity Implications***
 - *Should be Encrypted Like a Laptop – Delete When Done!*
 - *Do Not Take Video of Children on School Playground!*
- National Security Implications
 - Export Control Laws (i.e., is there “militarization” of a UAV or components?).
Where did you get your Drone?
 - International Traffic in Arms Regulations (ITAR)
 - Export Administration Regulations (EAR)
 - *Make Sure All of Your Gear is LEGAL!*



Other Laws and Regulations

Topics To Consider Beyond FAA Part 107 Rules:

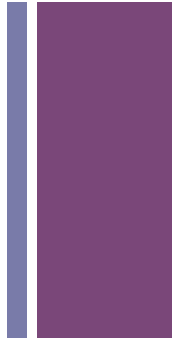
- “Common Law” Doctrines such as Torts, Trespassing and Takings.
 - Examples?
 - Drone Malfunctions and Hits Car;
 - Drone Hits Powerline Cutting off Town’s Power Supply;
 - Farmer Shoots Down Your Drone and Keeps It;
 - Flying Over Someone’s Land Without Permission
- Multi-Agency Oversight (e.g., BLM vs. USFS vs. NPS)
 - Most National Parks Forbid Drones w/o Extensive Permitting
 - Most State Fish/Game Agencies Forbid Wildlife Tracking/Hunting
 - Double Check Where You Fly and Who Controls Land Underneath
- Restricted Airspaces (DoD/Military/DHS)
- Multi-Jurisdiction Confusion (e.g., Federal vs. State vs. County vs. Local; Tribal?)
 - Federal Law Generally Preempts; But State/Local Still Applies
 - New Laws/Regs Popping Up Daily
- Contracting Out Drone Services?
 - Make Sure Contractor Meets Same Standards; Ignorance No Defense
- **When in doubt, contact an attorney before you operate or hire someone to operate a Drone!!!**



Special Considerations



Special Consideration: Obtaining a Remote P-I-C Certificate



How does my company's drone operator obtain the FAA's Remote P-I-C sUAV Certificate?

- Be vetted by TSA.
- Study Up:
http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/media/remote_pilot_study_guide.pdf
- Pass an Initial Aeronautical Knowledge Test at an FAA-approved testing center. 60 Questions. 2 Hour Limit. 70% Passing Grade.
- Complete FAA Airman Certificate and/or Rating Application (IACRA is web-based); submits application to FAA's Airman Registry.
- Download temporary Remote Pilot Cert. good for 120 days.
- Final Remote Pilot Cert. Mailed by FAA.
- Cost will be \$150 plus whatever testing center fees might apply.



Special Consideration: FAA Waivers of Part 107 Rules



Can I obtain a Waiver from Part 107 Rules?

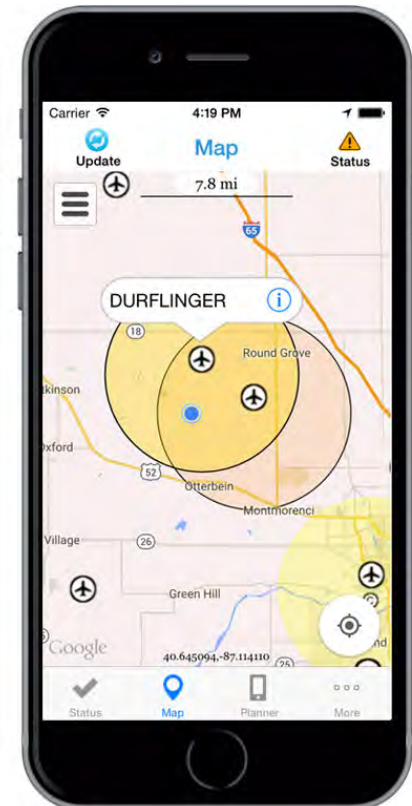
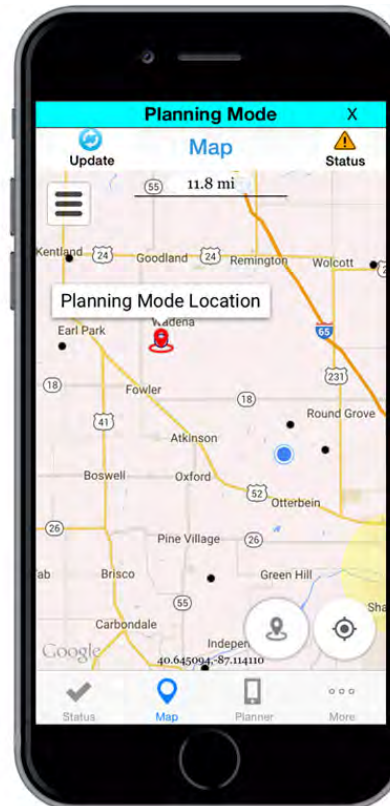
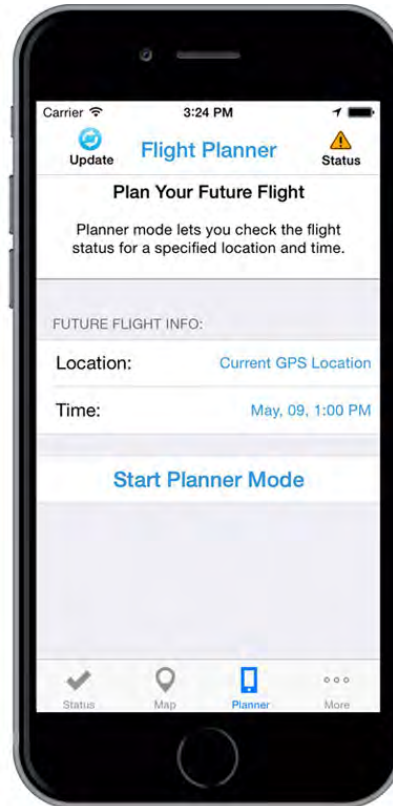
- Yes, but no guarantees it will be granted. Still a new process.
- Can either be submitted electronically (https://www.faa.gov/uas/request_waiver/) or via a paper-application process sent to FAA.
- Applicant must be in full compliance on all other Part 107 rules **prior** to submitting for the FAA Part 107 Waiver.
- FAA sUAV and P-I-C Registration databases (for now) are not searchable to public.
- But Part 107 Waiver requests/grants are open to the public.
- **If your company's remote P-I-C seeks a Waiver of FAA Part 107 Rules, we recommend you contact your attorney before submitting.**



FAA sUAV Flight App



**FAA App
Available
on
Android
and
iPhone**





Confused???


Summary of sUAV Operations and Regulations



Summary of Major Commercial Drone Operations Checklist



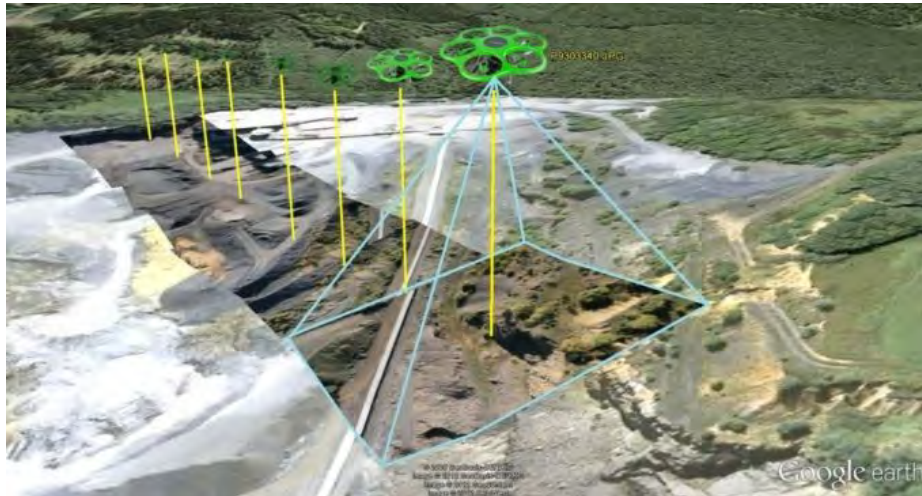
- Make sure Drone is company-owned, uses non-personal smartphone or tablet, and get a temporal or permanent insurance policy. Don't allow for personal use!
- Register your Drone!
- Make sure P-I-C has obtained Remote P-I-C Airman Certificate with sUAV Rating. No other users should fly the drone, period!
- Make sure P-I-C has (1) Certificate of Aircraft Registration, and (2) P-I-C Airman Certificate physically on him/her while operating sUAV.
- Make sure P-I-C performs a Pre-Flight Inspection of Drone.
- P-I-C should only fly during daylight and ALWAYS with VLOS!
- Operate it in accordance with all other Part 107 Flight Rules. Get insurance!
- **If you cannot meet these basic requirements, call your attorney before proceeding!**



**The Commercial
Applications of UAVs in
+ Telecommunications,
Utility, Wireless and
Mobile Broadband
Sectors**



What Can Drones Do For You?



+ Antenna and Tower Inspections

Chicago Tribune

Utilities see potential in drones to inspect lines, towers

"We want to start using drones next spring when the inspection season begins," said Alan Ettlinger, research and technology director for the New York Power Authority,



COMPUTERWORLD
FROM IDG

NEWS AT&T sees cost savings with drone inspections of cell towers

Carrier relies on new federal rule, Part 107, that permits commercial uses of drones



FORTUNE | Why BNSF Railway is using drones to inspect thousands of miles of rail lines

+ **Bonus: Future of UAVs?**

+ What is on the Drone Horizon?



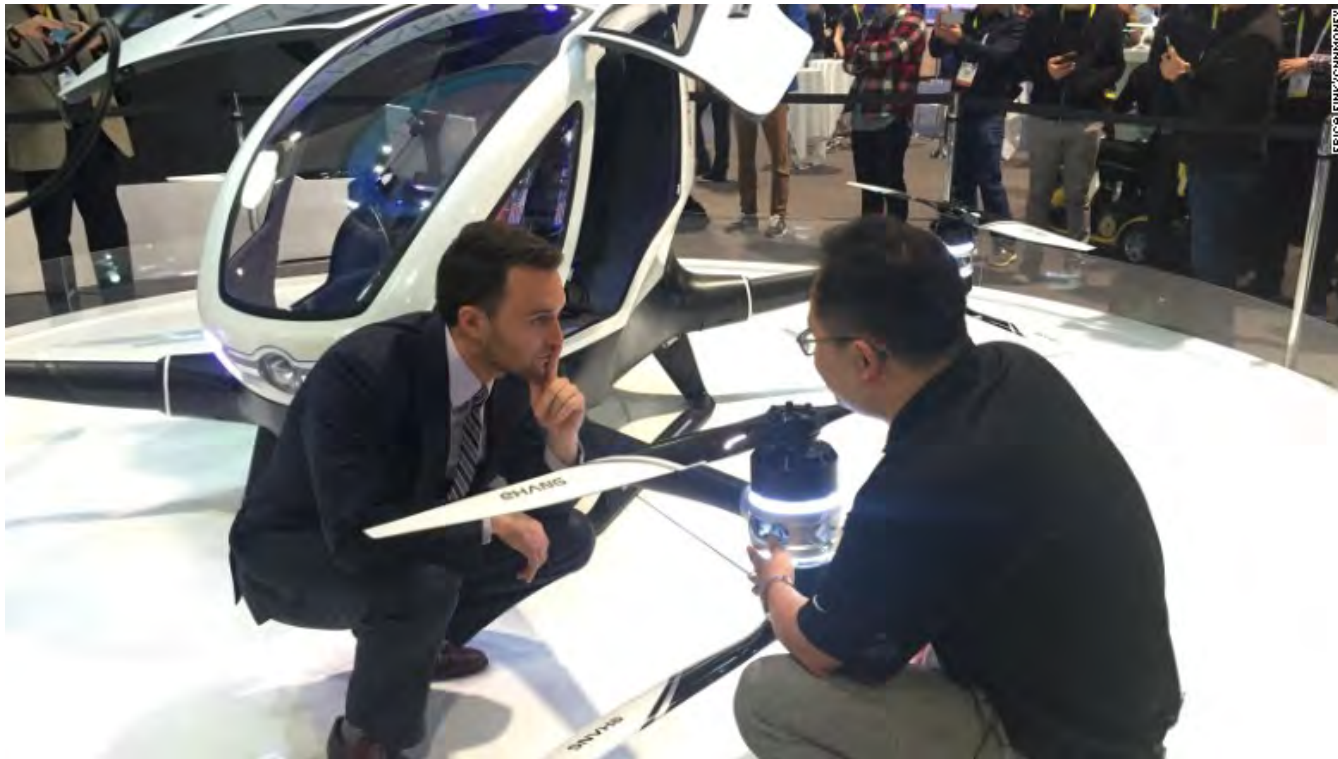
- **Commercial Delivery** – Profitability Requires Scalability
- **Public Safety/Law Enforcement** – Saving Lives
- **Medical/Disaster Aftermath/Firefighting** - Game Changer?

- **Waivers Galore!**
 - Night Flying
 - BVLOS – Beyond Visual Line of Sight Operations
- **Multi-UAV Control** (*i.e.*, 1 P-I-C for X Drones)
- **Built-In Geofencing**
- **Built-In Privacy-By-Design**
- **Automated UATM – USS Hub** (*i.e.*, Drone Corridors and Highways)
- **Local Landing Pads/LZs**



They Promised Us Jetpacks!

- Chinese manufacturer Ehang – Fully Autonomous Model 184
- Debuted at CES 2016 – Prototype in Testing Today!
- 11,480 Feet Ceiling, 62 MPH, 23 Minute Battery Life





QUESTIONS?

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