

# RISE OF THE DRONES:

## A PRIMER ON DRONES, APPLICABLE LAW, AND POTENTIAL USES BY CLIENTS

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# Topics

- Basic knowledge of current drone technology (civil);
- Current federal and state law governing personal and commercial use of drones;
- FAA proposed regulations governing commercial use of drones;
- Ability to obtain exemptions from FAA for commercial use of drones;
- Test sites;
- Privacy concerns with drones;
- Current technological advancements and limitations with drones

# Terminology

- UAS: *unmanned aircraft system*

- unmanned aircraft and associated elements (including communications links and the components that control the unmanned aircraft) that are required for the pilot in command to operate safely and efficiently in the national airspace system.

- UAV: *unmanned aerial vehicle*

- aircraft with no pilot on board that can be remote controlled or can fly autonomously based on preprogrammed flight plans or more complex dynamic automation systems



- sUAS

- Small unmanned aircraft system weighing less than 55 lbs

- NAS: national airspace system

- Generally, everything above your head

# Terminology cont.

- FAA and DOD have adopted UAS and *unmanned aircraft* (UI) as standard terminology.
- FAA Modernization and Reform Act of 2012, (FMRA) encouraged the acceleration of unmanned aircraft programs into NAS.



# What is a Drone?



- General Atomics MQ-9 Reaper

- Used by USAF and CIA
- Over past 5 years estimated 2,400 deaths from drones.



## “Nano Drone” by Morrison Innovations

- Touted as “world’s smallest” quadcopter
- \$28 retail
- Capable of flying for 5-8 minutes on a single charge at a distance up to 150 feet away.



## DJI Phantom 2 Vision Quadcopter

- One of the most popular consumer drones.
- Retails for about \$800 (no gimbal or camera)





## Precision Hawk: Lancaster Platform

Recently obtained 333 exemption from FAA



# Drones in action:

# Economic impact of Drones

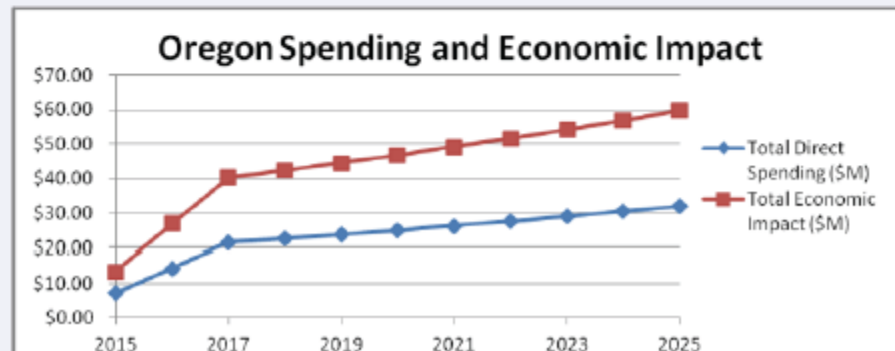
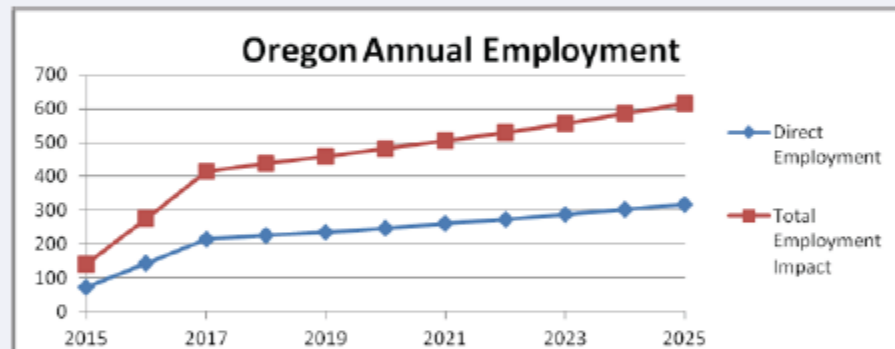
- The UAV global market is currently \$11.3 billion (Teal Group)
- Over the next 10 years, the UAV global market will total \$140 billion
- The economic impact of US airspace integration will total over \$13.6 billion in the first three years and will grow sustainably for the foreseeable future, cumulating to over \$82.1 billion between 2015 and 2025 (assuming integration in 2015)
- Every year that airspace integration is delayed will cost the U.S. over \$10 billion in lost potential economic impact, which translates to \$27 million per day

# Potential Applications for Drones

- Delivering vaccines and medicines to remote areas
- Search and rescue missions
- Border Security
- Arctic Research
- Firefighting
- Flood Monitoring
- Railroad Surveying
- Mining Farming
- Aerial Photography and Cinematography
- Real Estate
- Goods Delivery
- Pollution Monitoring
- Storm Research
- Humanitarian Aid
- Asset monitoring
- Event Security
- Port Security
- Construction
- Cargo
- Broadcasting
- Search & Rescue
- Volcanic Research
- Pipeline Monitoring
- Filmmaking and Photography
- Aerial News Coverage
- Wildlife Monitoring
- Forensic Photography
- Power line Surveying
- Damage Assessment

Table 1: Total Economic Impact of UAS Integration in the United States						
State	2015 - 2017			2015-2025		
	Economic Impact \$(M)	Taxes \$(M)	Jobs Created	Economic Impact \$(M)	Taxes \$(M)	Jobs Created
Alabama	\$294	\$2.43	1,510	\$1,765	\$14.60	2,231
Alaska	\$19	\$0.00	95	\$112	\$0.00	141
Arizona	\$561	\$2.59	2,883	\$3,371	\$15.55	4,260
Arkansas	\$80	\$0.94	411	\$481	\$5.63	608
California	\$2,390	\$13.64	12,292	\$14,372	\$82.03	18,161
Colorado	\$232	\$1.79	1,191	\$1,392	\$10.76	1,760
Connecticut	\$538	\$4.32	2,764	\$3,232	\$25.97	4,084
Delaware	\$17	\$0.16	88	\$103	\$0.97	131
Florida	\$632	\$0.00	3,251	\$3,801	\$0.00	4,803
Georgia	\$379	\$3.72	1,949	\$2,279	\$22.34	2,880
Hawaii	\$32	\$0.39	166	\$194	\$2.35	245
Idaho	\$29	\$0.36	149	\$174	\$2.16	220
Illinois	\$204	\$1.71	1,049	\$1,226	\$10.30	1,549
Indiana	\$208	\$1.18	1,067	\$1,248	\$7.12	1,577
Iowa	\$159	\$0.92	817	\$956	\$5.53	1,208
Kansas	\$489	\$4.84	2,515	\$2,941	\$29.13	3,716
Kentucky	\$89	\$0.90	459	\$537	\$5.41	678
Louisiana	\$213	\$1.44	1,097	\$1,282	\$8.67	1,620
Maine	\$107	\$1.26	548	\$641	\$7.56	810
Maryland	\$335	\$2.64	1,725	\$2,017	\$15.85	2,549
Massachusetts	\$386	\$3.36	1,985	\$2,321	\$20.22	2,933
Michigan	\$188	\$1.37	965	\$1,128	\$8.26	1,426
Minnesota	\$142	\$1.68	730	\$853	\$10.08	1,078
Mississippi	\$162	\$1.10	832	\$973	\$6.60	1,230
Missouri	\$260	\$1.73	1,338	\$1,565	\$10.37	1,978
Montana	\$14	\$0.15	74	\$86	\$0.91	109
Nebraska	\$25	\$0.22	128	\$149	\$1.30	189
Nevada	\$38	\$0.00	196	\$229	\$0.00	290
New Hampshire	\$85	\$0.00	439	\$514	\$0.00	649
New Jersey	\$263	\$3.24	1,353	\$1,582	\$19.50	1,999
New Mexico	\$101	\$0.73	518	\$606	\$4.41	765
New York	\$443	\$4.66	2,276	\$2,661	\$28.05	3,363
North Carolina	\$153	\$1.79	785	\$918	\$10.75	1,160
North Dakota	\$14	\$0.07	71	\$83	\$0.40	105
Ohio	\$359	\$2.43	1,844	\$2,156	\$14.60	2,725
Oklahoma	\$106	\$0.93	545	\$637	\$5.61	805
Oregon	\$81	\$0.41	416	\$486	\$2.47	614
Pennsylvania	\$393	\$2.02	2,021	\$2,363	\$12.12	2,986
Rhode Island	\$42	\$0.38	217	\$253	\$2.28	320
South Carolina	\$99	\$1.16	507	\$593	\$6.99	749
South Dakota	\$9	\$0.00	48	\$56	\$0.00	71
Tennessee	\$112	\$0.00	578	\$675	\$0.00	853
Texas	\$1,087	\$0.00	5,588	\$6,533	\$0.00	8,256
Utah	\$143	\$1.21	735	\$859	\$7.26	1,085
Vermont	\$36	\$0.47	184	\$215	\$2.81	271
Virginia	\$463	\$4.47	2,380	\$2,783	\$26.86	3,517
Washington	\$1,312	\$0.00	6,746	\$7,888	\$0.00	9,967
West Virginia	\$47	\$0.47	240	\$280	\$2.83	354
Wisconsin	\$88	\$0.96	450	\$527	\$5.76	665
Wyoming	\$5	\$0.00	24	\$28	\$0.00	36
<b>Total</b>	<b>\$13,657</b>	<b>\$80.22</b>	<b>70,240</b>	<b>\$82,124</b>	<b>\$482.39</b>	<b>103,776</b>

Oregon Economic Impact						
Year	Direct Employment	Total Employment Impact	Total Direct Spending (\$M)	Total Economic Impact (\$M)	Total State Taxes (\$K)	Percent Change Over Previous Year
2015	71	139	\$7.21	\$13.48	\$68.59	
2016	143	277	\$14.43	\$26.96	\$137.18	100%
2017	214	416	\$21.64	\$40.43	\$205.77	50%
2018	225	437	\$22.72	\$42.46	\$216.06	5%
2019	236	459	\$23.86	\$44.58	\$226.86	5%
2020	248	481	\$25.05	\$46.81	\$238.20	5%
2021	260	506	\$26.30	\$49.15	\$250.11	5%
2022	273	531	\$27.62	\$51.61	\$262.62	5%
2023	287	557	\$29.00	\$54.19	\$275.75	5%
2024	301	585	\$30.45	\$56.90	\$289.54	5%
2025	316	614	\$31.97	\$59.74	\$304.01	5%





## Bottom line: Drones are coming

Within 10 years drones (especially sUAS) will be ubiquitous in the NAS.

# Evolution of technology in 10 years

iPod Nano released (2005)



iPhone 6 (2015)





# Who can fly Drones?

Depends on  
who you  
are...

- ☐ Hobbyist (includes for recreation)
- ☐ Government / Public
- ☐ Commercial
- ☐ Military


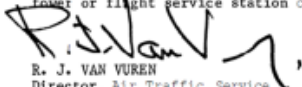
# Hobby or Recreation

- Hobby is a “pursuit outside one's regular occupation engaged in especially for relaxation.”
- Recreation is “refreshment of strength and spirits after work; a means of refreshment or diversion.”
  - ▣ *FAA Interpretation of Special Rules for Model Aircraft*

# Federal law governing hobbyists

## FAA Advisory Circular AC 91-57

### (1981)

AC 91-57	
DATE June 9, 1981	
<h2 style="margin: 0;">ADVISORY CIRCULAR</h2>	
	
<small>DEPARTMENT OF TRANSPORTATION Federal Aviation Administration Washington, D.C.</small>	
<hr/>	
<b>Subject:</b> MODEL AIRCRAFT OPERATING STANDARDS	
<p>1. <u>PURPOSE.</u> This advisory circular outlines, and encourages voluntary compliance with, safety standards for model aircraft operators.</p> <p>2. <u>BACKGROUND.</u> Modelers, generally, are concerned about safety and do exercise good judgment when flying model aircraft. However, model aircraft can at times pose a hazard to full-scale aircraft in flight and to persons and property on the surface. Compliance with the following standards will help reduce the potential for that hazard and create a good neighbor environment with affected communities and airspace users.</p> <p>3. <u>OPERATING STANDARDS.</u></p> <p style="margin-left: 40px;">a. Select an operating site that is of sufficient distance from populated areas. The selected site should be away from noise sensitive areas such as parks, schools, hospitals, churches, etc.</p> <p style="margin-left: 40px;">b. Do not operate model aircraft in the presence of spectators until the aircraft is successfully flight tested and proven airworthy.</p> <p style="margin-left: 40px;">c. Do not fly model aircraft higher than 400 feet above the surface. When flying aircraft within 3 miles of an airport, notify the airport operator, or when an air traffic facility is located at the airport, notify the control tower, or flight service station.</p> <p style="margin-left: 40px;">d. Give right of way to, and avoid flying in the proximity of, full-scale aircraft. Use observers to help if possible.</p> <p style="margin-left: 40px;">e. Do not hesitate to ask for assistance from any airport traffic control tower or flight service station concerning compliance with these standards.</p>	
 R. J. VAN VUREN Director, Air Traffic Service	
Initiated by: AAT-220	

# FAA Advisory Circular 91-57



Generally limits operations for hobby and recreation to below 400 feet, away from airports and air traffic, and within sight of the operator.

FAA may take enforcement action against model aircraft operators who operate their aircraft in a manner that endangers the safety of the national airspace system.

Permits non-commercial use of UAVs in the National Air System (“NAS”)

Excludes individuals or companies flying model aircraft for business purposes

# FMRA § 336 prohibits regulation of “Model Aircrafts” (i.e., hobbyists)

(a) IN GENERAL.—Notwithstanding any other provision of law relating to the incorporation of unmanned aircraft systems into Federal Aviation Administration plans and policies, including this subtitle, the Administrator of the Federal Aviation Administration may not promulgate any rule or regulation regarding a model aircraft, or an aircraft being developed as a model aircraft, if—

(1) the aircraft is flown strictly for hobby or recreational use;

(2) the aircraft is operated in accordance with a community-based set of safety guidelines and within the programming of a nationwide community-based organization;

(3) the aircraft is limited to not more than 55 pounds unless otherwise certified through a design, construction, inspection, flight test, and operational safety program administered by a community-based organization;

(4) the aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft; and

(5) when flown within 5 miles of an airport, the operator of the aircraft provides the airport operator and the airport air traffic control tower (when an air traffic facility is located at the airport) with prior notice of the operation (model aircraft operators flying from a permanent location within 5 miles of an airport should establish a mutually-agreed upon operating procedure with the airport operator and the airport air traffic control tower (when an air traffic facility is located at the airport)).

# “Model Aircraft” defined

1. Unmanned aircraft;
2. Capable of sustained flight in the atmosphere;
3. Flying within visual line of sight (VLOS) of the person operating the aircraft; and
4. Flown for hobby or recreational purposes.

# Permitted hobby or recreational use.

## Hobby or Recreation

- Flying a model aircraft at the local model aircraft club.
- Taking photographs with a model aircraft for personal use.
- Using a model aircraft to move a box from point to point without any kind of compensation
- Viewing a field to determine whether crops need water when they are grown for personal enjoyment.

## Not Hobby or Recreation

- Receiving money for demonstrating aerobatics with a model aircraft.
- A realtor using a model aircraft to photograph a property that he is trying to sell and using the photos in the property's real estate listing.
- A person photographing a property or event and selling the photos to someone else.
- Delivering packages to people for a fee ("free shipping" prohibited).
- Determining whether crops need to be watered that are grown as part of commercial farming operation.

# Public / Government

- FAA issues a Certificate of Waiver or Authorization (COA) that permits public agencies and organizations to operate a particular aircraft, for a particular purpose, in a particular area.
- The COA allows an operator to use a defined block of airspace and includes special safety provisions unique to the proposed operation.
- FAA outsourcing regulation.



# Commercial

- FAA's position is that federal law prohibits ALL commercial drone use.
- Commercial operators are only authorized on a case-by-case basis (until FAA rules are enacted).
  - ▣ §333 Waivers
  - ▣ Special Airworthiness Certificate
- Critical to advise clients that any commercial use of drones is in violation of federal law.
- \$10,000 civil penalty

# Federal prosecution of commercial drone use?

- Only one case has been adjudicated dealing with the alleged commercial use of UAV.
- *Huerta v. Pirker* (National Transportation and Safety Board)
- FAA issued \$10,000 civil penalty for drone use in violation of Federal Aviation Regulation (FAR) Section 19.31(a): “No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another”

# Huerta v. Pirker

## □ NTSB ALJ decision:

- FAA lacked authority to issue civil penalty because there was no enforceable FAA rule or FAR regulation applicable to model aircraft or for classifying model aircraft as a UAS

FAA appealed to full National Transportation of Safety Board; outcome would determine whether any regulations govern the use of commercial drones until FAA completes comprehensive rules

# NTSB full board decision:

- Two main points:
  1. UAS are “aircraft” within the FAA statutory and regulatory definitions;
  2. UAS are prohibited from operation in a careless and reckless manner under FAA regulations.
- NTSB did not address:
  1. Legality of FAA’s decision to prohibit commercial use without an exemption;
  2. Privacy concerns; and
  3. Various constitutional issues.

# FAA Modernization and Reform Act of 2012 (FMRA)

- After 5 years, and 23 extensions, Congress passed an FAA bill on 14 Feb. 2012
- For the first time ever, Congress included language requiring the FAA to safely integrate drones into the NAS
- The bill creates a number of deadlines for the FAA to meet on their way to the safe integration of UAV by 30 Sept. 2015
- Major provisions include:
  - ▣ First responder access
  - ▣ Arctic provision
  - ▣ Six UAV test sites (Oregon one of six test sites)
  - ▣ UAV Roadmap
  - ▣ Small UAV rule

# FMRA Specifics

- ▣ 3 types of UAVs:
  - ▣ Public
    - Operated by federal, state, and local government entities for governmental use
  - ▣ Civil
    - Operated by civilians for non-governmental use
    - Commercial → used for business purposes
  - ▣ Model aircraft
    - Recreational or hobbyist use
    - FMRA definition: “an unmanned aircraft (1) capable of sustained flight in the atmosphere; (2) flown within visual line of sight of the person operating the aircraft; and (3) flown for hobby or recreational purposes”

## □ Under FMRA, Congressionally mandated actions include:

- Publishing a 5-year roadmap (completed 11/7/2013)
- Establishing 6 testing sites (completed 12/30/2013)
- Adopt rules for commercial sUAS (proposed rules commenced February 15, 2015)
- Safe integration of UAV into the national airspace by Sept. 30, 2015 (not going to happen)

## ■ Public and commercial UAV

- Currently, public UAV and small commercial UAV can operate but only with FAA authorization, under FMRA Section 333 exemption or COA.

## ■ Model aircraft

- Hobbyists do not need FAA authorization required under FMRA
- But FAA has authority to enforce civil penalties against hobbyists for violations of Federal Aviation Regulations (Huerta v. Pirker)

# Proposed Rules for sUAS



- ❑ Issued in February 2015.
- ❑ Comments due April 24, 2015.
- ❑ Thousands of comments expected.
- ❑ Once final rules issued, numerous appeals expected.
- ❑ Likely effective date: 2017



# Summary of proposed rules for sUAS

## □ Operational Limitations

- ▣ UAS must be under 55lbs
- ▣ UAS must be operated within visual line of sight
- ▣ FPV is not permitted (First Person View – aka video piloting)
- ▣ Operator must not fly over people not involved in the operation
- ▣ Daylight operations only
- ▣ Maximum speed of 87 knots
- ▣ Maximum altitude 500 feet
- ▣ A single person cannot act as an operator for more than one UAS operation at a time

# Summary of proposed rules for sUAS

- Operator Certification and Responsibilities
  - ▣ Be citizen, at least 17, and cleared by TSA
  - ▣ No physical or mental impairment
  - ▣ Operators must pass an aeronautical test
  - ▣ Operators must obtain an sUAS operating certificate
- Aircraft Requirements
  - ▣ Airworthiness is NOT required
  - ▣ Aircraft markings required
- Model Aircraft
  - ▣ Proposed rule would not apply to model aircraft
  - ▣ Proposed rule would codify the FAA's enforcement authority in respect of model aircraft operators who are endangering the safety of the national airspace

# Washington, Oregon, California

## Regulation of drones

- NPRM does not contain any discussion of preemption of state and local laws.
- To be addressed in comments to NPRM.

# Oregon : House Bill 2710 A

- Allows property owners to sue a drone operator if
- (1) a drone has flown less than 400 feet above the owner's property at least once,
- (2) the property owner has told the drone operator that he/she does not consent to the drone flying over his/her property, and
- (3) the operator then flies the drone less than 400 feet above the property again.
- If these three conditions are met, the property owner can seek injunctive relief, "treble damages for any injury to the person or the property," and attorney fees if the amount of damages is under \$10,000.

# Oregon: House Bill 2534 (proposed)

- Would direct the Oregon Department of Fish and Wildlife to adopt rules that would prohibit UAV use “for the purposes of angling, hunting, harassing or tracking as an aid to angling or hunting.”
- Oregon law already prohibits hunting within eight hours of using UAV for scouting animal whereabouts.

# Washington: House Bill 1093 (proposed)



- ❑ Prohibits drones with active sensing devices from collecting personal information, including images of an individual, on private property without the individuals consent unless the federal government has provided specific authorization or the drone is clearly labelled with the name and contact information of the owner
- ❑ Establishes regulations on limitations on how biometric data could be collected and used in the commercial and retail industries
- ❑ Violations may result in criminal and/or civil penalties

# Cal. Civ. Code §1708.8(b)

- A person is liable for constructive invasion of privacy when the defendant attempts to capture, in a manner that is offensive to a reasonable person, any type of visual image, sound recording, or other physical impression of the plaintiff engaging in a private, personal, or familial activity, through the use of any device, regardless of whether there is a physical trespass, if this image, sound recording, or other physical impression could not have been achieved without a trespass unless the device was used.

# Options available to clients in light of FAA delay?

- ▣ Secretary of Transportation has authority to determine if certain UAV may be used for commercial purposes before the FAA has completed the comprehensive plan for UAV integration and rulemaking.
- ▣ “Section 333 Exemptions”



# Avenues for commercial operation of drones.

1. §333 waivers
2. Special Airworthiness Certificate

## § 333 Waivers

- By law, any aircraft operation in the NAS requires a certificated and registered aircraft, a licensed pilot, and operational approval.
- § 333 of FMRA grants the Secretary of Transportation the authority to determine whether an airworthiness certificate is required for a UAS to operate safely in the NAS.
- This authority is being leveraged to grant case-by-case authorization for certain unmanned aircraft to perform commercial operations prior to the finalization of the Small UAS Rule, which will be the primary method for authorizing small UAS operations once it is complete.
- As of 4/21/2015, 207 Petitions granted

# Requirements/limitations for §333 Waivers

- Valid sport/recreational pilot's license
  - ▣ Cheaper and faster than private pilot license
- Valid driver's license
- Vetted by DHS
- Visual line of site
- Additional visual operator (i.e. “spotter”) required
- FPV is prohibited

# Requirements for §333 Waivers

- ❑ UAS smaller than 55 pounds.
- ❑ Daylight operations only.
- ❑ 400 max flight ceiling / 100 mph speed limit.
- ❑ 500 feet from all persons, other than operator and “spotter”.
- ❑ Cannot operate within 5 miles of airport without coordinating with airport.
- ❑ Cannot operate with less than 5 minutes of battery power.
- ❑ If link is lost, UAS must be able to return predetermined location.

# §333 Summary grant process

- Most §333 grants fall into two categories:
  1. Film/television production
  2. Aerial data collection
- Exemptions petitions in these areas will be handled under summary grant process.
- Available when FAA has granted similar exemption.
- “Me too” petitions.
- No public comment.
- Not published in *Federal Register*

# §333 Summary grants

- List of §333 waivers located at [www.faa.gov/uas/legislative\\_programs/section\\_333/](http://www.faa.gov/uas/legislative_programs/section_333/)
- Piggy back onto previous petition:
  - ▣ Use
  - ▣ Aircraft
    - DJI
    - Property Design
    - Aeryon
    - 3D Robotics
    - Etc.

# Special Airworthiness Certificate (experimental category)

- Alternative to §333 Waivers
- Applicants must be able to describe how system is designed, constructed, and manufactured, including engineering processes, software development and control, configuration management, and quality assurance procedures used, along with how and where they intend to fly.
- Very expensive and time consuming.
- FAA Order 8130.34C explains process.



# Oregon Test Site under FMRA



# FMRA Set up Six Test Sites for UAV Testing

- State of Oregon was chosen as one of the six test sites nationwide.
- Within Oregon, three test ranges:
  1. Pendleton
  2. Tillamook
  3. Warm Springs
- Sites authorized to issue experimental airworthiness certificates.
- Compliance with state and federal privacy laws
  - ▣ Written plan for data use and retention

# Privacy and drones

- NPRM does not contain discussion of privacy issues.
  - ▣ Lawsuit filed against FAA for not addressing
- Same day as NPRM released, Presidential Memorandum Promoting Economic Competitiveness While Safeguarding Privacy, Civil Liberties in Domestic Use of Unmanned Aircraft Systems (“PMPECWSPCLDUUAS”).
- Numerous limitations on governmental use of drones and data collection.
- Requires the Department of Commerce, through the National Telecommunications and Information Administration, and in consultation with other interested agencies, to initiate a multi-stakeholder engagement process within 90 days to develop a framework for privacy, accountability, and transparency issues concerning the commercial and private use of drones in the NAS.

# Privacy and drones

- Tension between privacy regulation at federal or state level.
- Most state law aimed at government use of drones.
- As technology improves and drones become cheaper, they will see their way into more hands.
- Privacy matters are traditionally state-law matters.
- States will likely take the lead, with FAA in support.

# Drone jamming

- FCC stepping up enforcement of marketing, sale, and use of illegal cellphone, RF, and GPS jamming devices.
- FCC recently fined Chinese company \$35MM for selling GPS signal jammers.
- Becoming more prevalent as more drones in the air.
- Easily purchased on interwebs.

# Technology and drones

What issues are limiting commercial drone use in the NAS?

# Technical challenges



- Detect and avoid / controlling airspace
- Lost connection
- Radio frequencies
- Battery life
- Power-to-weight ratio

# Detect and avoid (aka sense and avoid)

- Current technology does not allow for complete sense and avoid for autonomous UAVs.
- Insufficient payload and power to have radar or other sensors to detect other aircraft.
- FAA technology is unable to accurately track drones.
- LATAS: Low Altitude Tracking and Avoidance System
  - ▣ Precision hawk
  - ▣ Flight planning, tracking and sense & avoidance to each drone that flies within the NAS

# Lost connection

- What happens with the drone loses connection with the operator (Wi-Fi) or GPS?
- Many drones have programmed return, will hover, or will land.
- Hardware / software problems not uncommon
  - ▣ DJI Phantom numerous “flyaways”
- Will be resolved with improved technology



# Radio frequencies

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- Limited bandwidth for drones.