



The Growing Use of Unmanned Aircraft Systems and the Environment

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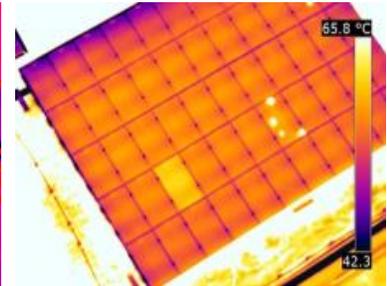
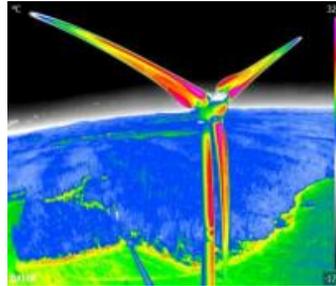
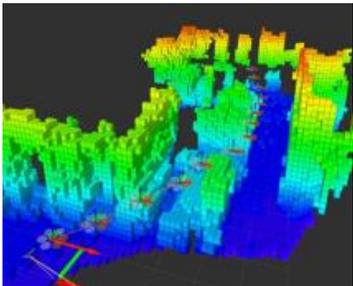
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What are Unmanned Aircraft Systems?



Examples of Advanced Technologies

- 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...)



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Industries using Small UAS

- Photography/Film & TV
- Real Estate/Construction
- Agriculture/Ranching
- News Gathering/Media
- Manufacturers
- Education/Universities
- Local Governments/ Police and Fire Depts
- Hospitality/Resorts
- Railroads/ Telecommunication
- Insurance
- Environmental
- Electric, Natural Gas & Oil
- Security, Emergency Response
- Mining (Gold, Silver, Copper)
- Sports & Entertainment



How is the Environmental Industry Using UAS?

- **Emissions**

- Agricultural (crop soil, burns) evaluation of manmade or disasters (fires, spills, damage) lagoons and landfill emissions, leak detection, air monitoring to conform to air quality impact

- **Environmental Assessments and Monitoring**

- Size and extent of waste / coal ash piles, inspection of spills, pipeline inspections/leaks, large or difficult to reach/dangerous areas
- Change detection / integrity assessment
- Water / land ecology

- **Emergency Response**

- Reconnaissance & public alert
- Confirmatory information



Benefits of Using a UAS

- Increased worker safety- decreases time and increases distance of exposure, limits or avoids worker involvement in dangerous, dull or dirty jobs
- Available on short notice, less costly and intrusive than helicopter/fixed wing
- Performs tasks in minutes that previously took hours or days
- Provides more/closer angles of review and maneuverability
- Drones flights can be preprogramed to repeat for periodic review
- Recorded data is storable and can be used / overlaid to show changes
- Technology is constantly refined for unique industry needs

Part 107 – UAS Regulations¹

- **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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¹ Operation and Certification of Small Unmanned Aircraft Systems, 81 Fed. Reg. 124 (June 28, 2016); 14 C.F.R. §107.

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

What Are the Major Legal Obstacles/Issues?

1. Acceptance of UAS data by federal departments/agencies
2. Preemption Issues
3. Privacy Issues
4. Security and Counter-Offensive/Defensive UAS Technology
5. Intellectual Property Issues

Acceptance of UAS Data

- 2-15-15 Presidential Memorandum directed all federal agencies/ departments to establish and adopt a UAS policy within one year
- DOJ, DOA, DOD, NOAA have complied and have a policy
- DOI issued a Policy and 5 year Integration Strategy supporting use of UAS through “better **Science**, greater **Safety** and increased **Savings**”
 - Bureau of Indian Affairs
 - Bureau of Land Management
 - Bureau of Ocean Energy Management
 - Bureau of Reclamation
 - Bureau of Safety and Environmental Enforcement
 - National Park Service
 - Office of Surface Mining and Reclamation and Enforcement
 - US Fish and Wildlife Service
 - US Geological Survey
- EPA has yet to develop a UAS policy

 10-31-17 Presidential Memorandum – UAS Integration Pilot Program

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...)

- Likely to find that 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 (provides states ability to regulate airspace 200 feet and below)

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)

Privacy

FAA has made no specific pronouncement on privacy

Proposed state and federal legislation seek to allay public concerns (re: spatial privacy, unwarranted physical presence, noise and anxiety of not being able to assess/control the situation)

- Public places (less concerns) versus Private place (high concerns)
- Public is very distrustful of professionals, hobbyists, companies, governments
- May result in patchwork of regulations adversely impacting interstate commerce

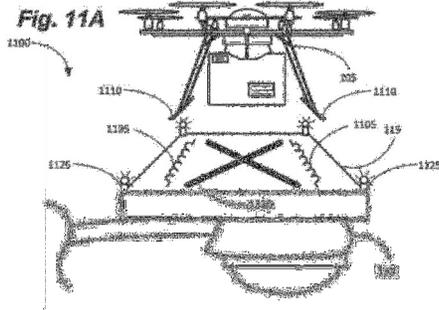
Privacy and other state law issues also impact ability of citizens to use drones to support citizen actions

More privacy issues to follow (*i.e.*, side-effect of delivery drones – ability to compile massive quantities of data, target marketing)

Security / Counter-UAS Technology

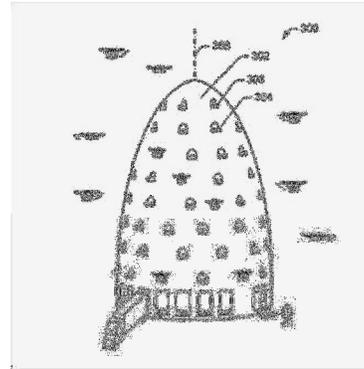
- Section 2209 of FAA Reauthorization Act directed FAA to establish a “critical infrastructure” designation presumably to preclude flights over facilities and/or add penalties for violations -- pending
- Advancements in defensive technology include UAS control override, communication interference, flight path diversion, UAS capture capability
 - Completely legal to buy and sell such technology
 - Completely illegal to operate such technology
- Passive surveillance is the only technology that currently is legal
- Regulation is too slow – FAA admits issue likely to be resolved in the Courts

Intellectual Property/Patents

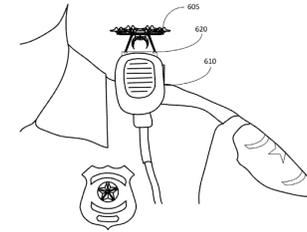


United States Patent and Trademark Office

Mail Drops On Streetlight Perch



Amazon envisions its drone delivery fulfillment centers as beehives.



Multi level fulfillment centre (item 100)

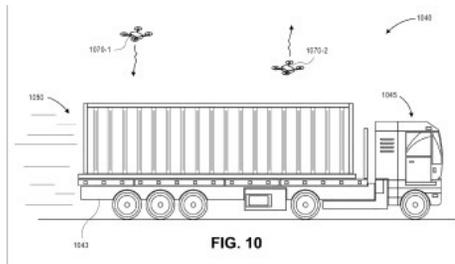
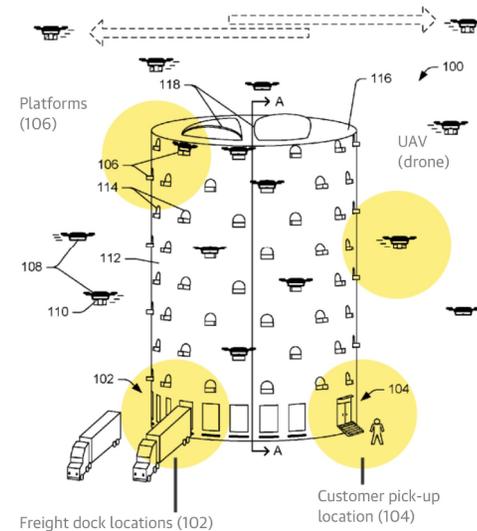
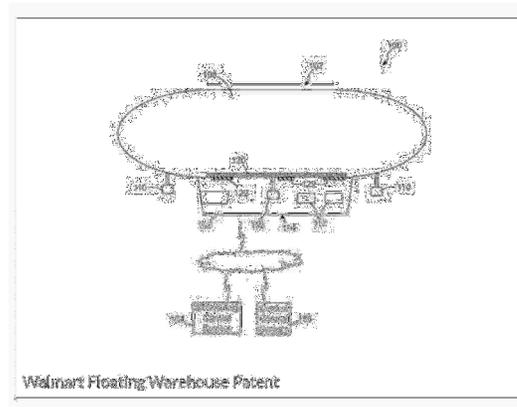


FIG. 10



Walmart Floating Warehouse Patent

Settlements: Misuses of Small UAS

- **First Enforcement Action** – Ralph Pirker (\$10,000)

- Operating an unregistered aircraft
- Operating in careless or reckless manner in close proximity to people and structures, including the flight path of UVA Medical School helipad

Result: Settled for \$1,100

- **Largest Civil Penalty-** SkyPan International (\$1.9 million)

- FAA alleges 65 unauthorized flights/260 violations in NYC and Chicago
- Operating an unregistered aircraft in a careless or reckless manner
- Operating 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)



Business/Legal Considerations

- **Establish a Cross Functional Team** (Legal, Insurance, IT, Security, Communications, Emerging Technology and Business units using drones...)
- **Quantify Costs/Investments in Business Terms**
- **Tailor Policies, Practices and Procedures** (Best Practices, Standard Operating Procedures, Aviation Use & Flight Safety Management Systems)
 - Establish Culture of Compliance / Identify Responsible UAS Coordinator
 - Consider Use of a Built-in Flight profile for same imagery each time
 - Provide Routine Training Programs to Ensure Culture of Compliance
- **Other Considerations:** Review local laws, Insurance, Data Retention, Notices, Waiver issues, Encryption Technology for Sensitive Information/Security and Establish Community Outreach/Education Program

Questions?



Thank you for the
Opportunity to Speak today!

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