The “Ups and Downs" of using “Drones” in Industry - Applications and Risk Management

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Learning Objectives – What we will discuss…

• Definitions & terms
• Drone types, applications & limitations
• New FAA Part 107 rules for commercial use
  • How to fly - legally
  • FAA operating parameters
  • Should I subcontract this?
• Legal & potential liability issues
• Risk management & insurance strategies
• Hazard analysis & flight safety considerations
Unmanned Aircraft Systems (UAS) Definitions & Terms

**UAV** (Unmanned Aerial Vehicle)
- A “power driven aircraft, other than a model aircraft, that is designed to fly without a human operator on board.

**UAS** (Unmanned Aerial System)
- An unmanned aircraft and all of the associated support equipment, controls, payload, data link/telemetry, and navigation equipment
- Also known as sUAS (small)

AKA - a “Drone”
Definitions & Terms (Cont.)

- National Airspace System (NAS)
- FAA Section 333 and Certificate of Authority (COA)
- FAA 14 CFR Part 107 (New Rules)
- Remote Pilot Airman Certificate (RPAC)
- “Hobbyist’ vs. Commercial use
- Line of sight (LOS)
- Beyond VLOS (BVLOS)
Definitions & Terms (Cont.)

• First person or “camera” view (same)
• “Fly-away”
• “Geo-fence” – Software - Safety feature
• “Detect & avoid” technology - Safety feature
• FAA Air Traffic Control (ATC)
• UAS Traffic Management (UTM) system – The future. FAA/NASA/Industry partnership in development
UAS Unmanned Traffic Management System
UAS Categories

Fixed Wing = Endurance
• Fixed-wing UAS’s can stay aloft longer (1-35 hours)
• Specialized payloads onboard for remote sensing, mapping and survey that require longer flight times
• Battery, aviation or unleaded fuel, and/or solar
Vertical Take-off and Landing (VTOL) = Hover

- Short missions where it is helpful to get close to the target.
- 20-30 minutes battery life (currently) - LiPo batteries
- Most construction applications use VTOL
- # blades is relevant for payload
  Size, typically 4, 6, and 8 blades
Piloting options

Direct piloting (LOS)

BVLOS

Autonomous flight
Pre-Programmed
UAS – Programming Device

Credit: Questuav.com

Sirius Pro Surveying UAS
Credit: Topcon Positioning Systems
Benefits

• Significant time & cost reduction over traditional aerial surveys
• A recent aerial survey of mining stockpiles in PA was 200X more efficient than traditional survey methods
  
  Source: Integrated Technologies

• Great for **dirty, dull and dangerous** jobs
• Near immediate data available for processing via point cloud
Applications
Applications

• Digital photography & video documentation
• LiDAR and Line Scans - integration with BIM
• Inspect hard to reach & dangerous places e.g. bridges, high voltage, vertical structures (safety)
• Environmental and IH sampling in high risk areas
• Route mapping/survey for linear utilities
• Remote survey e.g. IR inspections of substations and large-scale solar PV farms in half the time
Applications (Cont.)

- Emergency response in remote areas (deliver AED)
- Marketing videos
- Wind turbine inspections
- Safety inspections
- Work in confined spaces
- EOD/Hazardous materials operations
- Crime Scene Investigation
- Wild land firefighting
- Search and Rescue
Examples

Dam Inspection
Credit: ENR

Bridge Inspection
Credit: axxessdata.com
Hobbyist vs. Commercial Use

• Hobbyist = no commercial use!
• Offering a professional service in connection with a business is commercial use
• Some companies are operating UAV’s by claiming their operators are hobbyists - Several legal cases have been brought by the FAA
New FAA UAS rules
14 CFR Part 107

Who can fly Commercially

• Anyone 16 years old and up
• Those who speak, write, and understand the English language
• Those in physical and mental condition that does not interfere with safe flight practices
• Those who have been vetted by the Transportation Security Administration
New FAA rules found in 14 CFR Part 107

What you can do:

- Operate sUAS that weigh less than 55 lbs. (including payloads) for commercial purposes, < 400 ft. AGL
- Fly without a visual observer
- Operate without an FAA airworthiness certification, pilot’s license, or Section 333 exemption/COA
- Save a significant amount of money and time compared to the Section 333 exemption process
- Users can file online waivers for FAA exemptions – e.g. BVLOS, night flights
New FAA rules - 14 CFR Part 107 (Cont.)

What you must do:

• Register your aircraft ($5.00) with the FAA and mark the aircraft appropriately with unique registration #
• Pass an aeronautical knowledge test at an FAA-approved knowledge testing center
• If you hold an FAA pilot’s license, pass an online course
• Apply for and receive a remote pilot airman certificate (RPAC) with an sUAS rating
• Pass a recurring knowledge test every two years
New FAA rules - 14 CFR Part 107 (Cont.)

What you must do:

• Conduct preflight checks to ensure that UAS are in safe operational condition – keep maintenance records
• Fly during daylight or civil twilight within visual line-of-sight (VLOS), under 100 mph, and under 400 feet
• Upon request, supply your sUAS to the FAA for inspection and testing
• Report to the FAA within 10 days of any incident resulting in serious injury or property damage exceeding $500 (not including damage to your aircraft)
New FAA rules - 14 CFR Part 107 (Cont.)

• UAS must weigh less than 55 lbs. (including payload) for commercial purposes
• Fly without a visual observer, unless UAS is out of sight
• Save money and time compared to the current FAA Section 333 exemption process
• You can file waivers for FAA exemptions to many of the requirements, e.g. night flying, BVLOS
FAA vs. State/Local Regulations
“Preemption”

- FAA is (so far) silent on state & local regulation of UAS.
- 40+ states have considered or adopted UAS legislation
- Industry groups like AGC want FAA rule that state & local governments cannot preempt federal law
- For now, companies should determine what the laws are in the states & cities where they operate
Operational Risks (Cont.)

- Unwanted-illegal surveillance & trespass
- Homeland security
- Bird strikes/attacks
- High winds – know your UAS limitations
- Cell tower/electromagnetic interference
- Lost wireless connection, problems with onboard GPS or compass
- Hacking (spoofing) UAS controls
- UAS flying in close proximity to manned aircraft
Operational Risk (Cont.) -
Interference with Aircraft
Operational Risk and Available/Future Technology

• Limited commercial airspace available in the U.S.
• Operators must avoid 3rd party structures & “non-participating” people
• “Geo-fence” technology is widely available
• “See and avoid” technology developing rapidly
• UAS Traffic Management (UTM) System coming…
Privacy Concerns

• Public places – 70% of those surveyed are somewhat concerned or very concerned about unwanted surveillance *in public*

• 72% Very concerned about monitoring our activities while *at home*

Source: U. of Nevada Center for Crime and Justice Policy, June 2014
Privacy & Unwanted Surveillance

• You have a reasonable expectation of privacy
• Unwanted photography is considered a violation of your right to privacy
• Ensure your UAS is gathering very specific data – Notify the adjoining property owners
Insurance, or “What Could go Wrong?”
Insurance/Risk Management Strategies

- **Embrace the risk** – Operate UAS in-house, get insurance or self-insure, hire FAA certified operators, have robust UAS safety & RM program

- **Transfer Risk** - Hire a specialty vendor/sub with FAA certified operators, bonded, insured, etc.) – Technology developing too quickly and requires a lot of work and expense!

- **Contracts** - If using a vendor, ensure that the drone operator accepts responsibility for accidental loss of the equipment as well as damage to any third-party property and physical injury – “Agreement for Drone Services”
Insurance Coverage

• First Person
• Third party liability - Personal injury of others
• Property, or “Hull” coverage of UAS
• Cyber – How secure is your data?
• Policy “dovetail” with existing policies?
Embrace Risk (in house)  
Insurance Options

FAA defines UAS as “aircraft”, excluded from most CGL policies, so insurance options include:

1. Aviation Policy – Provides coverage for:
   - Physical Damage (PD) and legal liability (AKA “Hull” coverage)
   - Aviation policies may also provide expanded coverage, e.g. third-party Bodily Injury
   - Several insurers now have sUAS policies
Embrace Risk (in house)  
Insurance Options

2. CGL Policy Endorsement

7 new ISO forms available specific to UAS:

• Cover 3\textsuperscript{rd} Party Bodily Injury (BI) and Physical Damage – not “hull” coverage

• The various ISO forms include/exclude aircraft (UAS) in Coverage A or B

• Carriers may also have “manuscript’ policies

• Consult with your broker and carrier
Transfer Risk (Subcontract) Insurance Considerations

• Experience/references?
• Ensure FAA requirements are met
• Verify adequate limits of insurance in place for the vendor, 3rd party BI/PD
• Typical liability limits between $1M-$5M
• Explore non-owned UAS insurance - Backstop
• Ensure indemnification/HH and risk mitigation language is in place in your contract
If Operating In-House, What info do underwriters want to insure UAS risk?

• Is UAS operation *incidental* or key to the insured’s overall business?

• Has company met the FAA requirements?
  • UAS types and payloads
  • Size/weight of devices
  • UAS degree of autonomy – BVLOS/Night flights?
  • Inherent fail-safe systems (“geo-fence”, return home, see & avoid features)?
Info underwriters may ask for to insure UAS Risk

- Operator(s) training and experience
- Available accident history?
- Launch, propulsion, recovery mechanisms
- Operating parameters and mission-specific dangers, e.g. Operating near buildings, power lines, high density development, over water, etc.
- Maintenance & flight logging
Flight Safety

• Use qualified, experienced UAS operators
• Take FAA test & Obtain RPAC
• Understand FAA UAS regulations & NAS
• Operator(s) should have documented experience & hours operating your UAS aircraft
• Trainee operators can work under direct supervision of FAA UAS RPAC Holder
• Spotter(s) required/trained if using FPV/BVLOS
Flight Safety

- Conduct risk assessments & develop flight plans (similar to JSA approach)
- Flight plan reviewed and approved internally
- Batteries charged (UAV, controller, camera, etc.)
- Compass/GPS properly calibrated
- Propellers clean and tight
- Take-off and landing area clear
- Wind gusts below 15 mph or by manufacturer recommendation
Flight Safety - FAA Sectional Map
Flight Narrative: From base, proceed to 150’ AGL to clear trees and building. Proceed to the west in visual range and maintain between 150’-200’ AGL. Circle target counter-clockwise avoiding the adjacent construction.
Flight Safety - Site Map

Add Details:
- Flight location
- Property Lines
- Fencing
- Overhead Power Lines
- Potential Hazards
Summary

- Rapidly evolving technology with many applications
- Significant $$ and time savings possible over traditional aircraft photogrammetry, video & other surveys
- Companies must balance the benefits & risks of buying UAS vs. subcontracting
- Final rules Part 107 take effect 29 August 2016
- Obtain insurance coverage and/or check vendor contracts & insurance with your broker & legal folks
- Robust risk management, hazard analysis & safety
Anti-Drone Tech

Drone Defenses

Increasing incidents of drones flying over sensitive facilities including nuclear reactors and near airports has spurred demand for systems to keep such unmanned aircraft at bay.

1. Radar is used to detect drone: The radar system scans a 360 deg. horizontal area with a range of up to 5 miles and can detect hundreds of objects per scan.

2. Camera used to identify drone: A high-definition vertical scanning camera is used to track and help the operator identify the drone to determine if it constitutes a threat.

3. Jammer disrupts drone's flight: The jammer operates on multiple frequencies to block the drone's GPS and communications link. Within seconds of applying the jammer, the drone is either forced to ground or returns to its home.

Source: AUDS Team

THE WALL STREET JOURNAL
This drone defense system from Airbus and Dedrone uses different sensors – cameras, radars, microphones and directional scanners – that, when combined, can secure the airspace from up to 10 kilometers away.
A dedicated team of industry experts focused on building long-term relationships with contractors to clearly understand their changing business needs — day-by-day, project-by-project — providing them with the innovative products and services to help protect profitability, maintain a competitive edge and keep employees safe.

XL Catlin Mission Statement

Strong Enough To Protect You… Agile Enough To Support You

Building The Future Together, One Relationship At A Time.

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