Launching Drone Services – Legal, Ethical and Technical Considerations*

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Search and Discovery Article #70248 (2017)**
Posted March 27, 2017

*Adapted from oral presentation given at AAPG Geoscience Technology Workshop, New Opportunities with Drones: New Needs, FAA Rule Changes, New Technologies, Houston, Texas, December 1-2, 2016

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Abstract

This presentation is geared toward the relative novice in drone knowledge and will present an overview for those interested in learning more about what it takes to launch a commercial drone services operation. We'll start with the FAA regulatory environment is discussed, including both the prior Section 333 Exemption process, and the current Part 107 path towards actually obtaining a Remote Pilot certificate, including recommendations for studying and passing the required Part 107 knowledge test.

The changing public perception of drones, from unawareness, through the stages of curiosity, technical wonder, and dangerous nuisance to their use as a viable business platform will be covered. A discussion of privacy considerations and laws, is followed by a lighthearted look at some of the common misperceptions surrounding drones, from a technology, piloting, and legal perspective.

We'll discuss the Business of Drones, including career opportunities, and a recommended method for getting started, including picking a market segment, choosing the right tools, obtaining the necessary training, and delivering to market. Also covered in obtaining the skills and knowledge are two ends of the spectrum, including "How We Learned" (self-taught, working through the maze of Guess, Buy, Fly, Crash, Fix – repeat as necessary) and "How We Teach" (a direct path towards picking the right tools and learning how to use them through enlisting the services of a drone consultant). In conclusion, a sample implementation of a UAS mapping strategy, both in initial stages and scaling up to a mature operation will be covered, followed by a Q&A session.

Launching Drone Services

Legal, Ethical, Technical & Business Considerations

Jeff Campbell

Managing Partner, Vertical Aspect

Agenda

1. Introduction
2. Regulatory / Legal Environment
3. Attitudes / Ethics / Perceptions
4. Potential Business Opportunities
5. Getting Started
6. Implementation Strategies

Vertical Aspect

- Specializing in Unmanned Aerial Vehicle (UAS) Mapping
  - Services
  - Consultation
  - Training (Face-to face and Remote)
- Offer related hardware / software
  - Robota Eclipse Fixed Wing – Texas Dealer
  - Pix4D Pro Mapping / Virtual Surveyor Software
  - V-Map Ground Control Targets
- FAA Certification, Insured

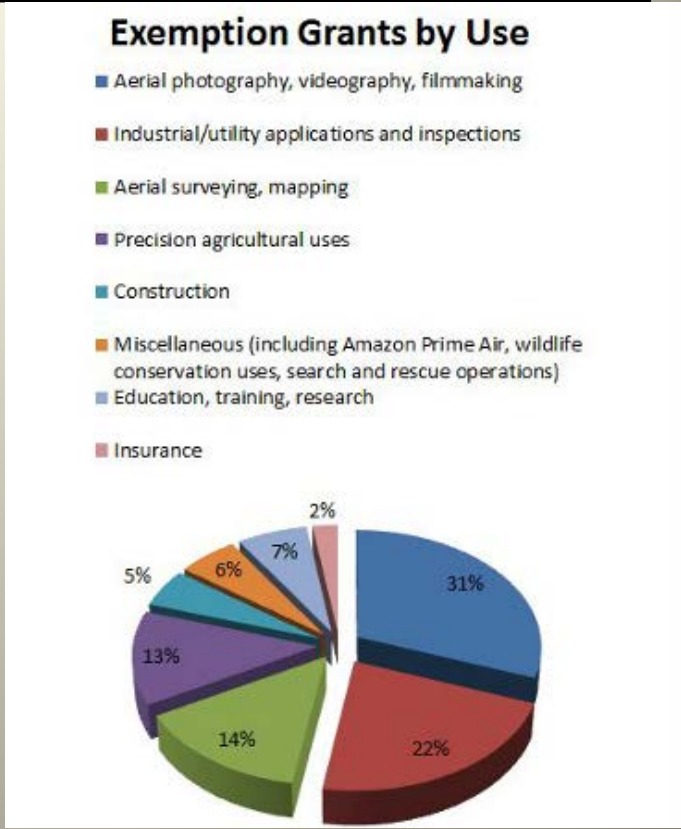
My Background

- Jeff Campbell
  - Rotary Wing Pilot (Capt., USN (ret))
  - Lockheed Martin Program Manager
  - Involved in UAS since 2012

Regulatory & Legal Environment

Commercial Drone Operations

- Lack of legal pathway
- FAA Sect 333 Exemption
  - First granted 25 Sept 2014
  - Onerous requirements
  - Long application Process
- Sect 333 Exemption petitions
  - Over 5,500 granted (Sept 2016)



Pilot Certification - 29 Aug 16

- Aircraft:
  - Registered, <55 lbs., <100mph
- Environment:
  - Max 400’ AGL, 3 mile Visibility
  - Daylight, Line of Sight, One aircraft
  - No overflight of non-associated persons
  - Uncontrolled airspace, single operator ok
- Operator:
  - ≥ 16 YO, English literate
  - Knowledge test, Self-certify medical, TSA check

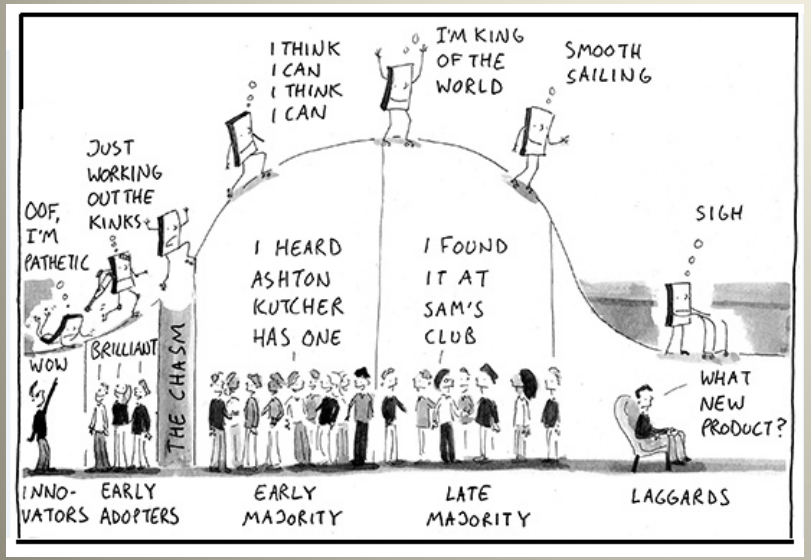
Part 107 Knowledge Test

- No cost from FAA
  - Study materials at FAA web site
- $150 testing fee (commercial test center)
- Recommended
  - 10-25 hours study time
  - Online or instructor led course ($99 - $300)

Impact of Part 107

- Better Control
- Saturating market at lower end
  - Less specialized Photography & Videography
- Corporations will keep the bar high
  - Sound operating processes,
  - Insurance
  - Demonstrated safety record
  - Outstanding customer service

Public Perception of Drones



Early:

- Self-built, hobbyists
- Curiosity, Interest

Technology Increases

- Less vested users,
- Proliferation - mass market

Notoriety: Poor choices / media "enhancement"

Commercialization: Viable commercial path for masses

Attitudes, Ethics & Perceptions

Privacy Considerations

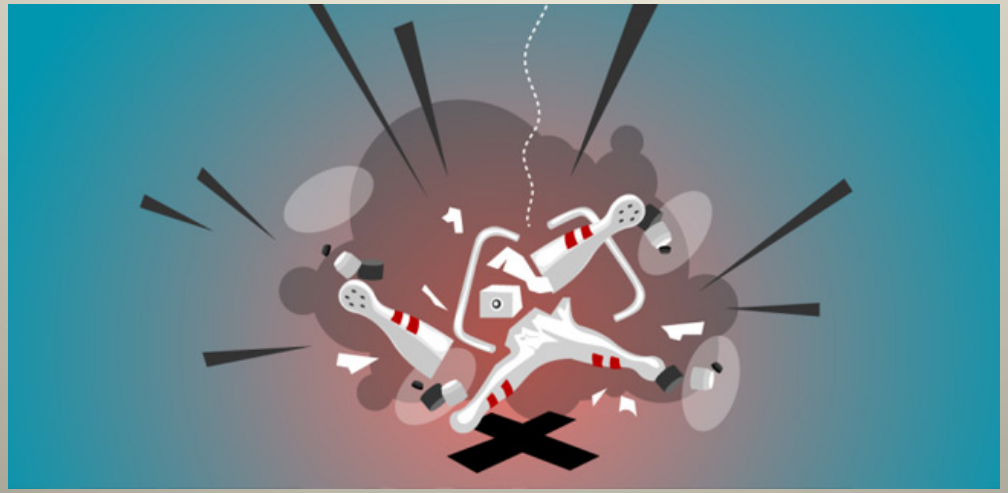
- Technology
- Existing laws
- Air of Uncertainty
- Common sense, courtesy and communications

Misperceptions

- They’re not really suited for spying on someone’s teenage daughter

Not so fast…

- Can’t just open, charge battery, fly



Not more than once anyways…

Jamming

- Jamming their guidance systems doesn't take them down

If a drone flies over your property, you're not legally allowed to shoot it down

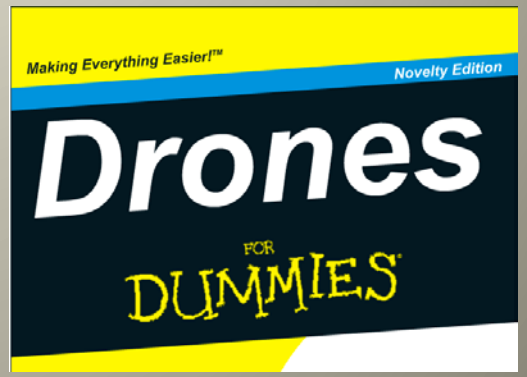
Drone Deliveries

…won’t be happening anytime real soon…

The Business of Drones

Career Opportunities

- Aerial Photography
- Videography
- Inspections
- Agriculture
- Mapping & Surveying



- Pick a market segment
- Choosing equipment
- Training
- Certification
- Marketing
- Product delivery
- Provide unique value added

How We Learned

- Self-Taught
  - Prior knowledge as springboard
  - Scour tutorials, forums, groups
- Trial & Error
  - Research, Guess, Purchase
    - Aircraft, software, accessories
  - Buy, Fly, Crash, Fix
    - Repeat….

How We Teach

- Determine client's goals / experience / budget
- Customized, individualized training
  - Face-to-Face
  - Best for initial systems, flight and software training
- Basics – One Day
  - Ground school, flight, image capture, post-processing
- Follow-up with remote screen sharing
- Assist in processing client's first projects
- Teach advanced processing / different output types / other software
- Follow-up with clients as technology improves

Implementation Strategies

Team Members Needed

- With the 29 August 2016 advent of the FAA Part 107 commercial drone pilot certification process, the legal entry into the commercial drone market will continue to expand exponentially. This lower barrier to entry will tend to saturate the lower end of the market (simple imagery and real estate videos). While many operators will be able to create aerial maps, only those which incorporate absolute accuracy (generally speaking, 1/10th of a foot) will find a market with surveyors, engineers and contractors. Both technical knowledge/experience and business acumen will be needed.

Skill Sets Needed

- Business Acumen
- Risk Management / Risk Taking
- Marketing & Sales
- Communications
- Web Development
- Technical- Mapping
- UAV Systems and Piloting
- Post-processing software knowledge
- General Office Skills

UAS Mapping Strategy– Initial

- Consult with expert
- Start small – Consumer or Prosumer Quadrotor / register with FAA
- Train one to two individuals
  - Learn systems / image capture / post processing
  - Obtain FAA Part 107 Drone certification
- Obtain Liability Insurance
  - Annual – around $800-$1,000 for $1M
  - On Demand (e.g. Verifly) - from $10/hr. for $1M
- Capture sample missions
  - Topographic, orthographic, volume measurement, 3D modeling, etc.
  - Work with Ground Control points (team up with surveyor at first)
- Learn end-to-end workflow
- Simple single battery missions – migrate to multi-battery missions
- Produce deliverables for projects <100 acres

UAS Mapping Strategy - Mature

- Add fixed wing platform
- Larger areas / datasets
- Learn additional software tools
  - Global Mapper / Virtual Surveyor
- Dedicated processing computer
- More complex deliverables (additional workflow)
- Add additional staff – separate image capture from back end processing

In-House or Outsource

- Questions to ask
  - Familiar with technology/ convinced of benefits?
  - How much UAS mapping work anticipated?
  - Staff available to train?
  - Ability to invest?
  - Desire to keep up with technology
  - Already in related business (natural progression of capabilities?)
  - Outsource at first prior to making decision

Emerging Technologies

- Increasing Accuracy
  - Proliferation of Real Time Kinematics (RTK)
    - Accurate measurements without GCP
- Obstacle Avoidance
- Transponders / Collision Avoidance
- Automation: Standoff / Vertical patterns / 3D modeling
- Airborne LIDAR
- Software Improvements
  - Post Processing
  - Flight control / Image capture
  - Terrain Awareness
- Increased battery capacity / flight times
- Camera improvements – zoom, thermal, multispectral

Lessons Learned

- Find an area of expertise based on your desires, background and budget.
- Make it your niche, and get into the market.
- Continue to hone your skills and become an expert in one main area rather than being mediocre in a number of them
  - There's no shortage of mediocre mappers, photographers, videographers in the market.
- Determine whether you're willing to endure the time, money and frustration in learning by trial and error (Guess, Buy, Fly, Crash, Fix & Repeat…) or to invest in professional guidance on purchasing decisions and training which will help eliminate many of the costly mistakes.
- If it was easy, anyone could do it…

QUESTIONS?

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