The Use of UAV/UAS in Natural Resource Management at ODFW

(The 30,000ft View)

5th Field Technologies in Natural Resources and Fisheries Conference

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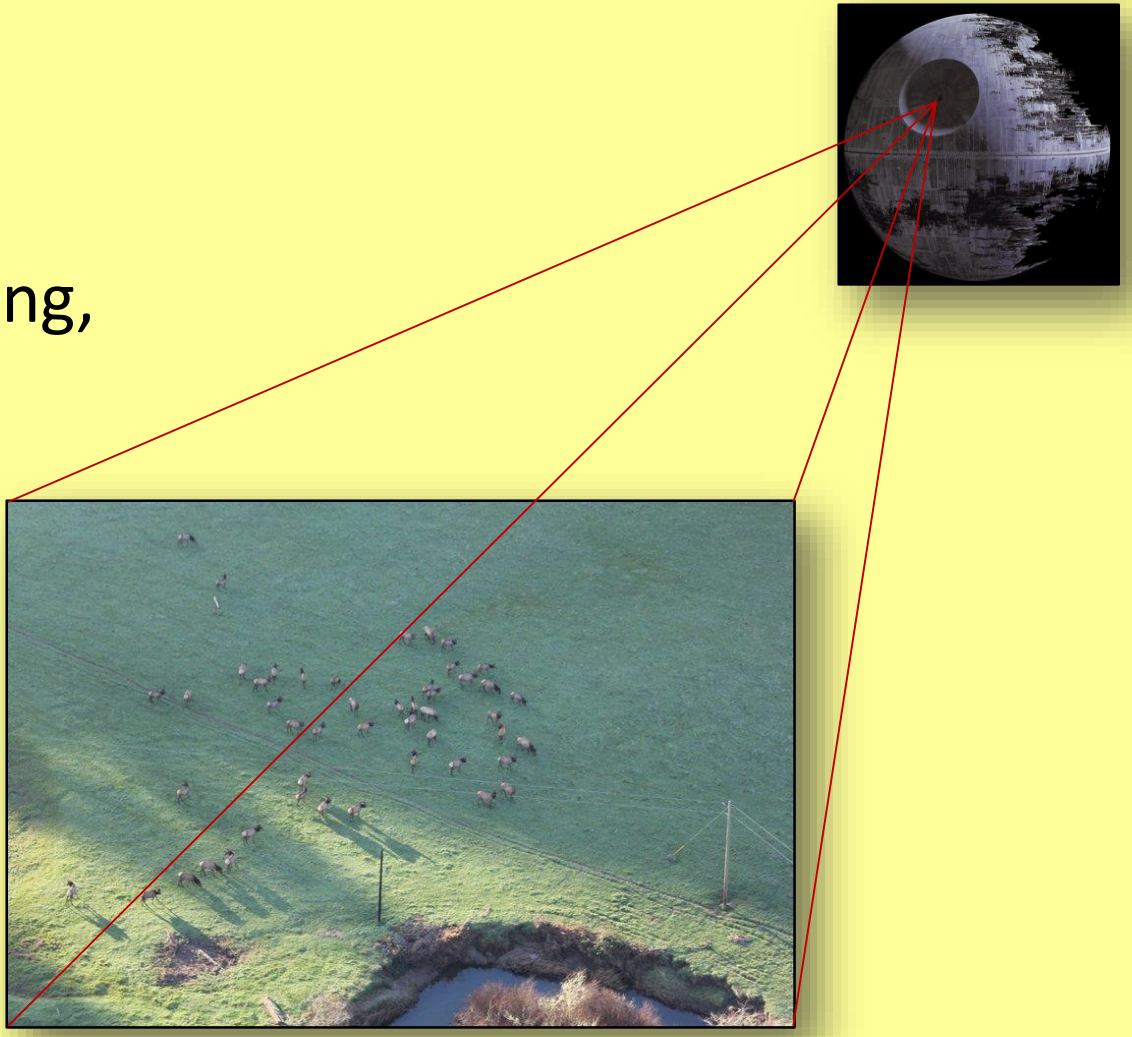
Dan Avery

Oregon Department of Fish and Wildlife

Outline

- Why use UAVs
- Regulatory Issues
- Counting, Measuring, Marketing
- Hardware
- Software
- Sensors
- Training
- Costs and Budget



Why use UAVs?

- Safety
- Additional tools – new sensors, different perspective, digital record of events
- More data – more frequent surveys
- Access – fish and wildlife can be widely distributed in hard to reach locations
- Cost – Manned aircraft

$600 – 1,400 / hour

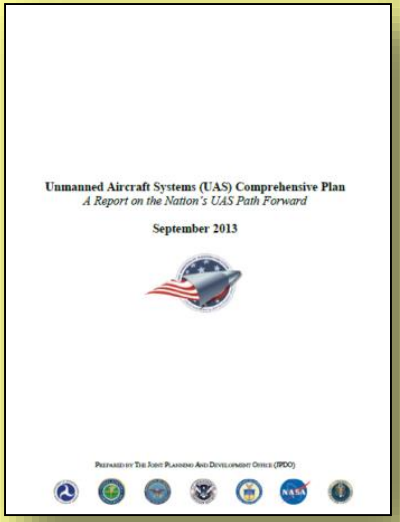
Regulatory Issues

Federal Aviation Administration (FAA) controls activities in the National Airspace System (NAS)

FAA has a long term 3 step plan to integrate

UAS into the NAS

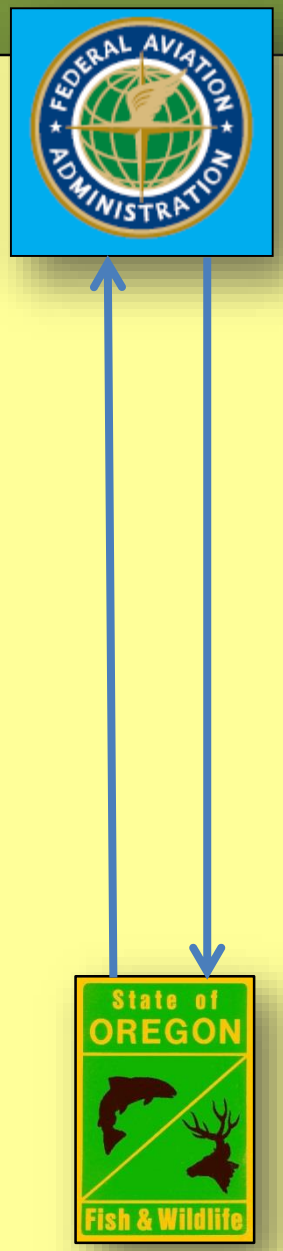
- Accommodation - next 5 years
- Integration - 5-10 years
- Evolution - 10 years and beyond



Regulatory Issues –Paths to Access the NAS with your UAV

- Public, Civil, or Hobbyist
- Public = Certificate of Waiver or Authorization (COA)
- Civil = Special Airworthiness Certificate
  or 333 exemption
- Hobbyist – Amateur = AC – 91-57
- Type of Airspace

Special Use Airspace (active-restricted and warning areas) – no COA , but MOA with controlling entity and spectrum approval



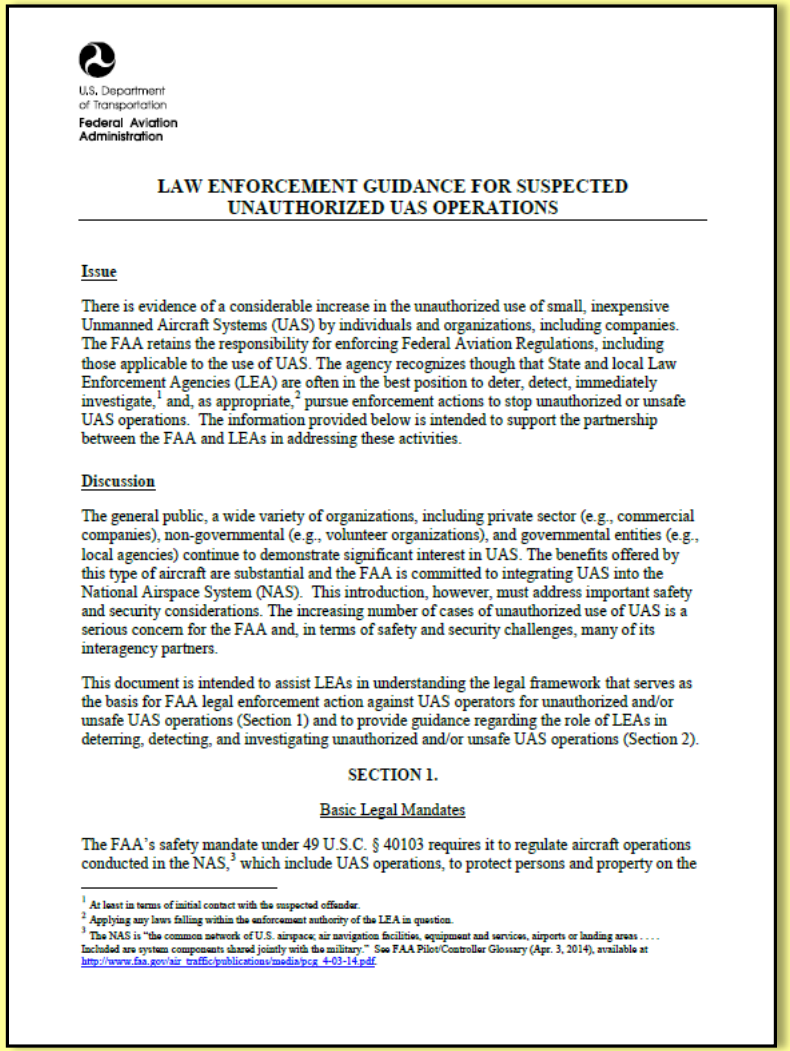
Regulatory Issues –key elements to get a COA

- Recognition of being a Public Agency
- Online Application
- Compliance with agency's own process, policies, and standards in the following areas (in most situations)
  - Pilot Certification
  - Crew certification
  - Recent pilot experience
  - Medical certificates
  - Airworthiness of public UAS
  - Spectrum Certification
  - Airframe Registration

"If no established public entity processes, policy or standards exist, it is highly recommended that the public agency/department apply the specifics outlined in this notice and comply with the provisions of 14 CFR applicable to civil UAS operation."

Regulatory Issues –Another reason to have a COA / 333

- **Press Release – FAA Proposes $1.9 Million Civil Penalty Against SkyPan International for Allegedly Unauthorized Unmanned Aircraft Operations**
- **For Immediate Release**
- October 6, 2015
  NEW YORK – The U.S. Department of Transportation's Federal Aviation Administration (FAA) today announces the largest civil penalty the FAA has proposed against a UAS operator for endangering the safety of our airspace.
- The FAA proposes a $1.9 million civil penalty against SkyPan International, Inc. of Chicago. Between March 21, 2012, and Dec. 15, 2014, SkyPan conducted 65 unauthorized operations in some of our most congested airspace and heavily populated cities, violating airspace regulations and various operating rules, the FAA alleges. These operations were illegal and not without risk.
- The FAA alleges that the company conducted 65 unauthorized commercial UAS flights over various locations in New York City and Chicago between March 21, 2012 and Dec. 15, 2014. The flights involved aerial photography. Of those, 43 flew in the highly restricted New York Class B airspace.



U.S. Department of Transportation
Federal Aviation Administration

LAW ENFORCEMENT GUIDANCE FOR SUSPECTED UNAUTHORIZED UAS OPERATIONS

Issue

There is evidence of a considerable increase in the unauthorized use of small, inexpensive Unmanned Aircraft Systems (UAS) by individuals and organizations, including companies. The FAA retains the responsibility for enforcing Federal Aviation Regulations, including those applicable to the use of UAS. The agency recognizes though that State and local Law Enforcement Agencies (LEA) are often in the best position to deter, detect, immediately investigate,[1] and, as appropriate,[2] pursue enforcement actions to stop unauthorized or unsafe UAS operations. The information provided below is intended to support the partnership between the FAA and LEAs in addressing these activities.

Discussion

The general public, a wide variety of organizations, including private sector (e.g., commercial companies), non-governmental (e.g., volunteer organizations), and governmental entities (e.g., local agencies) continue to demonstrate significant interest in UAS. The benefits offered by this type of aircraft are substantial and the FAA is committed to integrating UAS into the National Airspace System (NAS). This introduction, however, must address important safety and security considerations. The increasing number of cases of unauthorized use of UAS is a serious concern for the FAA and, in terms of safety and security challenges, many of its interagency partners.

This document is intended to assist LEAs in understanding the legal framework that serves as the basis for FAA legal enforcement action against UAS operators for unauthorized and/or unsafe UAS operations (Section 1) and to provide guidance regarding the role of LEAs in deterring, detecting, and investigating unauthorized and/or unsafe UAS operations (Section 2).

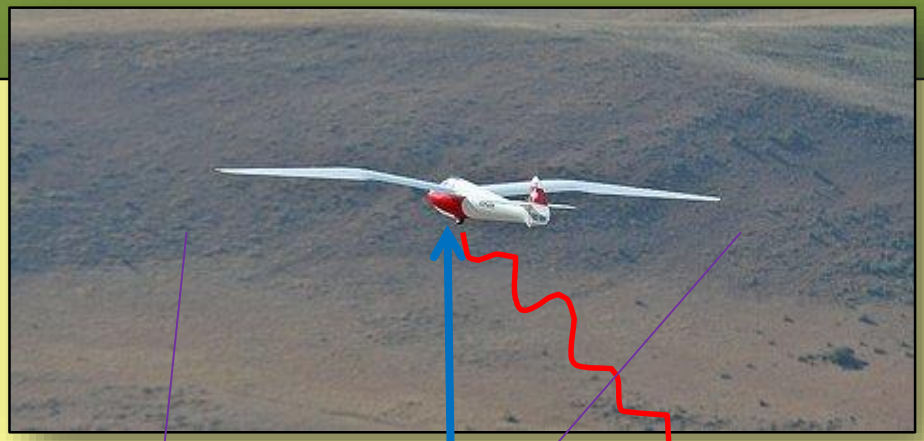
SECTION 1.

Basic Legal Mandates

The FAA's safety mandate under 49 U.S.C. § 40103 requires it to regulate aircraft operations conducted in the NAS,[3] which include UAS operations, to protect persons and property on the

[1] At least in terms of initial contact with the suspected offender.
[2] Applying any laws falling within the enforcement authority of the LEA in question.
[3] The NAS is "the common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas . . . . Included are system components shared jointly with the military." See FAA Pilot/Controller Glossary (Apr. 3, 2014), available at http://www.faa.gov/air_traffic/publications/media/pcg_4-03-14.pdf.

Typical COA Restrictions



- Lost link procedures
- Elevation limited to 400’ AGL
- Clear Weather
- Observer required
- Line of sight
- Max distance 1KM
- NOTAM
- Monthly reporting

400ft (121 meters)

Dang!

Please come back, oh, please….

Hardware - 3DRobotics Iris +

- $1,000 off the shelf
- Additional cost:
  - GoPro
- 15 minute flight time
- Weight: 5 lb
- Payload: 1 lb
- Wind limit ~30 mph
- Control: RC transmitter
- Ground Control Station

Hardware - 3DRobotics Solo

- $1,500 for a complete Ready-to-Fly unit
  - Extra batteries, propellers
  - Gimbal
  - GoPro HD camera
- 15 minute flight time
- Weight: 6 lb
- Payload: 1 lb
- Wind limited to ~30 mph
- Control: RC transmitter
- Ground Control Station

Hardware – Turbo Ace Matrix

- $5,000
- 35 minute flight time
- Weight: 3 lb
- Payload: 2 lb
- Sony 5100 camera
- Wind 30 mph

Hardware - Payload

- Go Pro
  - 0.3 lb
  - No zoom
  - 5-12 megapixels
  - $200 - $400

- Canon Powershot SX 260
  - 0.5 lb
  - 20x zoom
  - 12.1 megapixels
  - GPS
  - $145

- FLIR or ICI Thermal Cameras
- $2500 up

- Sony α5100 – NEX 7
  - 0.6 lb
  - 3x zoom
  - 24 megapixels
  - $500 - $3000

State of OREGON Fish & Wildlife

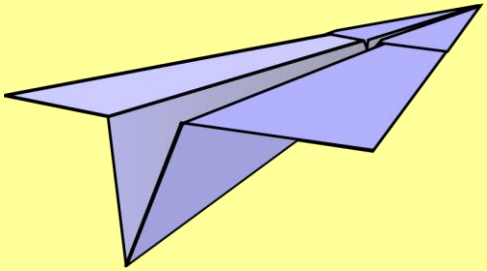
Software

- Flight controllers and their software (mission programmable, or not)
  - DJI and 3DR Pixhawk (APM /Ardupilot and Mission Planner)
- Image processing software
  - Pix4D
  - Agrisoft Photo Scan

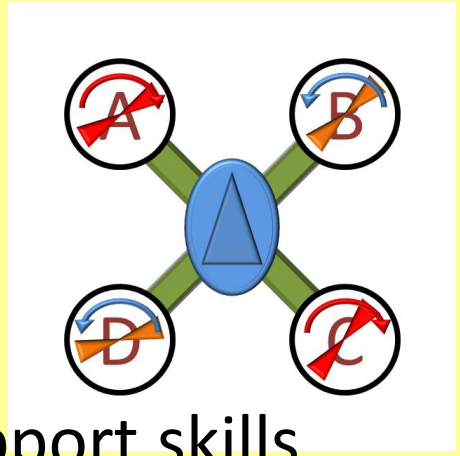
Data Management ?

Training – ODFW Requirements

- 40 hours flight time on survey UAV
- FAA Ground school Cert.
- Class 2 medical Cert.
- Current Private Pilot License (certain conditions)



- Ability to fly full manual (unstabilized)
- Hardware
- Technical support skills



Ground station software proficient.

Video / stills

UAV – Matrix stills / video

Turbo Ace Matrix 40 minute flight time,
PixHawk FC – open payload - $5K
Matrix Video

Traditional helicopter

Bell Jet Ranger Video – 2-3 hour flight time
Manned, “unlimited” payload - $1,400/hr
Bell Video

Video / stills

- Automated survey route – Cow Creek - 2015

[Iris + with GoPro]

Summary / Next Steps

Summary

- Need
- Regulatory Coordination
- Right tool for the job
- Training

Next Steps

- Complete Cost and Budget Analysis
- Standardized Survey Protocol
- Statistically Robust Survey Design
- Data Management Strategy

Contact Information

Dan Avery

ODFW

810 SW Alder St, suite C

Newport, OR 97365

Dan.j.avery@state.or.us

541-265-8306 x 235