Adventures in UAS:
Experiences of a UAS Operator

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Chart a Course to Project Success
Outline

1. Why UAS?
2. Requirements for users of UAS
3. Obtaining FAA exemption via Section 333
4. FAA restrictions and requirements
5. Developing the technical capability
6. Reporting requirements
7. Lessons learned
8. Sample project: working with Esri and Icaros
9. Questions?
Why UAS?

• Who we are and what we do
• Inspections: essential for progress monitoring, Quality Control, public safety, put inspectors’ lives at risk
• Solution: unmanned aircraft systems (UAS) – commonly known as “drones”
Requirements for users of UAS

- Public/Government entities
  - Obtain Certificate of Waiver or Authorization (COA)

- Civil/Non-Government entities flying for fun
  - Think Radio Control Aircraft - Follow safety guidelines

- Civil/Non-Government entities flying for business or commercial profit
  - FAA exemption via Section 333
  - Register aircraft
  - FAA COA
Obtaining FAA exemption via Section 333

- Review 14 CFR
- Identify sections that cannot be met due to the nature of the UAS
- Prepare and file petition seeking exemption from identified sections
- Then wait...
  - FAA received 1,125 petitions in 2014 and about 2,600 petitions to date in 2015
  - Less than 725 petitions granted as of June 30, 2015
Surprise!!!! Exemption and COA are very restrictive!!!

- UAS’ weight < 55 lbs
- Licensed pilot and Visual Observer (VO)
- Only daytime flights
- Maintain Visual Line of Sight (VLOS) at all times during flight
- max. altitude: 400 ft; 200 ft with “standard” COA
- No flying within 5 NM of airports with Control towers (less for other airports)
- No flying in NOTAM restricted areas
More restrictions and requirements...

- Obtain permission from property owner and owner(s) of adjacent property within 500 ft of flight path
- Permission of participants
- Initiate avoidance maneuvers
- Stop flight if there are safety risks
- No flying over persons
- not be operated less than 500 ft below or less than 2,000 feet horizontally from a cloud
- Visual and unassisted verbal communication between PIC and VO
Exemption and COA are **very** restrictive!!!

- Northern VA - 2015
- Restrictions in Arcmap
- You can only fly in the green space!
Area around Oatlands, VA
Requirement for pilot and operator/observer
Developing the technical capability

- Select and purchase UAS and components
- Obtain liability insurance
- Learn to fly and to operate the camera
- Develop processes, procedures, forms, agreements, waivers, checklists
- Train pilot, visual observer, camera operator
- Process aerial images
- Develop project report
Reporting requirements

• Log all flights:
  Date, pilot, location (city/name, longitude, latitude), type of activity, start/end times, damage, equipment malfunction, lost link events

• File NOTAM for all flights

• File monthly report with FAA, even if there were no flights

• Report any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area of the COA to the FAA's UAS Integration Office within 24 hours.

• Report accidents to the National Transportation Safety Board (NTSB)
Lessons Learned

• Understand customer’s expected outcomes

• Challenge: meet project objectives within FAA restrictions and UAS limitations, within time and cost constraints

• Big administrative process!!!

• UAS is not a toy, but a serious engineering tool
Sample Project: working with Esri and Icaros

- Objective: develop GIS model and software tools
- Location: Oatlands Historic Plantation, Leesburg, VA
- Flights: multiple flights some with camera at nadir, others at oblique
- Outcome: Orthographically correct photo mosaic with accurate GIS data and 3-D model of mansion
- Plus: Great stills and video
Sample Data: 3cm GSD ortho mosaic
Questions?
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