Damon Lercel, Ph.D.
President

Drones – Providing Business Intelligence from Above
Civil commercial UAS operations primarily approved by FAA Section 333 Exemption
To date over 5,300 exemptions granted.
Includes over 1,200 different UAS models

**333 Exemptions by Use**

- Aerial Photography/Filmaking: 34%
- Industrial/Utility Applications: 20%
- Aerial Surveying: 17%
- Precision Agriculture: 10%
- Education/Training/Research: 8%
- Construction: 5%
- Misc. (Amazon, wildlife, search/rescue, Insurance): 1%
- Other: 5%
### Effective August 29: Small UAS Rule

<table>
<thead>
<tr>
<th></th>
<th>Fly for Fun</th>
<th>Fly for Work</th>
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<tbody>
<tr>
<td><strong>Pilot Requirements</strong></td>
<td>• No pilot requirements</td>
<td>• Remote Pilot Airman Certificate</td>
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<tr>
<td></td>
<td>• At least 16 years old</td>
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<td></td>
<td>• Pass TSA vetting</td>
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<tr>
<td><strong>Aircraft Requirements</strong></td>
<td>• Registered if over 0.55 lbs.</td>
<td>• Less than 55 lbs.</td>
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<tr>
<td></td>
<td>• Pre-flight check to ensure UAS is in condition</td>
<td>• Pre-flight check to ensure UAS is in condition for safe</td>
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<td></td>
<td>for safe operation</td>
<td>operation</td>
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<tr>
<td><strong>Location Requirements</strong></td>
<td>• 5 miles from airports without prior notification</td>
<td>• Class G airspace*</td>
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<tr>
<td></td>
<td>to airport and air traffic control</td>
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<tr>
<td><strong>Operating Rules</strong></td>
<td>• ALWAYS yield right of way to manned aircraft.</td>
<td>• Keep the aircraft within visual line-of-sight*</td>
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<tr>
<td></td>
<td>• Keep the aircraft within visual line-of-sight</td>
<td>• Fly under 400 feet*</td>
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<td></td>
<td>• UAS must be under 55 lbs.</td>
<td>• Fly during the day*</td>
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<tr>
<td></td>
<td>• Follow community-based safety guidelines</td>
<td>• Fly at or below 100 mph*</td>
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<tr>
<td></td>
<td>• Notify airport and tower before flying within</td>
<td>• Yield right of way to manned aircraft*</td>
</tr>
<tr>
<td></td>
<td>5 miles of an airport</td>
<td>• NOT fly over people*</td>
</tr>
<tr>
<td></td>
<td>• Keep the aircraft within visual line-of-sight*</td>
<td>• NOT fly from a moving vehicle*</td>
</tr>
</tbody>
</table>
Effective August 29: Small UAS Rule

• Waiver Process:
  • FAA may grant a waiver to certain rules if they find the operation safe.
  • The NO AMAZON provision: no waiver will be issued to allow the carriage of property of another by aircraft for compensation or hire.

• 333 Exemption:
  • Needed to fly a UAS that weighs 55 lbs. or more.

• Government Entities (2 options):
  1. Fly under the small UAS rule – including aircraft and pilot requirements.
  2. Obtain a blanket public Certificate of Waiver or Authorization (COA) – permits nationwide flights in Class G airspace at or below 400 feet, self-certification of the UAS pilot, and the option to obtain emergency COAs (e-COAs) under special circumstances.
Examples of Drone Applications in Engineering

- Civil Engineering
  - Surveying/Mapping
  - Construction Management
  - Infrastructure Inspection
  - Mining

- Bio/Agricultural Engineering
  - Crop Health
  - Forage Plots
  - Water Quality Assessment
  - Irrigation

- Aerospace Engineering
  - Fuselage Inspection
AERIAL DATA MANAGEMENT

Plan, Capture, and Process

Store Imagery and Data in Dashboard

Hosts drone imagery across all your jobsites, collected with any drone system. Now you can access data across all your operations.
Visual Intelligence @ 2 cm resolution
PROJECT SAVINGS

85% FASTER SURVEYS
Replace legacy surveys with highly accurate, more responsive and less expensive aerial imaging

6 Days PER PERSON/YEAR
Shave hours off project managers’ days with remote logistics coordination

$50K PER CLAIM
Average conflict insurance claims + litigation costs for delays and project overruns

$10K
Average insurance claims + litigation for workers’ compensation
• **Ground Visibility**
Average global cloud cover is 68%, which means more than half of the earth’s surface cannot be imaged by manned aviation or satellites when the client wants it.

• **Timing**
Customers have very little choice in when their site is imaged because satellites can be tilted, but not easily maneuvered into a different orbit. Set orbits overfly customer sites at the same time of day for a given location -- this lack of flexibility is problematic with persistent seasonal cloud cover. Manned aviation is restricted by population centers and air traffic control.

• **Resolution**
Satellite maximum Ground Sample Distance (GSD) for legal commercial application is 25 cm - this means that the smallest size object that can be differentiated in a satellite image is 25 cm. Drones capture and delivers images at 4 cm GSD, more than six times the resolution of the best commercial grade satellite imagery.

• **Safety**
Reduce human exposure to dangerous and dirty work
Daily Coordination

Team Management

• Start every day with the entire team planning around the daily site map

• Eliminate confusion

• Get everyone doing the right thing at the right time
Stop guessing: verify volumes daily
Monitor changes over time
Permit Applications

- Accelerate approvals
Enviro Compliance

- SWPPP - Silt screen monitoring
- Grade compliance
- Wildlife monitoring
Our current projects

EZY INNOVATION

Aircraft Structural Inspection:
> Reducing use of GSE.
> Hangar and ramp.

3D Surface Mapping:
> 21st tech to replaced old fashion tech.

Damage Classification by Sensor:
> Assisted damage identification.

https://youtu.be/89yMcatPEbQ
What’s Next!!!

- Beyond Line of Sight Operations
- Flight over People
- Operations above 400ft. AGL
  - Aviation rule making committees are in work
  - Higher level of operator qualification
  - Higher level of vehicle certification

- Current rules inherently promote rotorcraft.
  - Broader operations will open up fixed wing market
What’s Next!!!

- It's all about the apps....

https://youtu.be/wdD-XJWLHPg
Thank You!

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