CURRENT AND NEAR TERM COMMERCIAL UAS OPERATIONS

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MY TASK AND MY DISCLAIMERS

• QUICKLY GET US THROUGH A THREE YEAR FUTURE VIEW

• ASSUME THAT NOT EVERYONE IS AN EXPERT

• DO THIS IN A NEUTRAL WAY (MY DISCLAIMERS)
• TODAY- Definitional issues mean that there is wide degree of confusion over what one means when they refer to a “drone” (this is changing)

• TODAY- Most of the domestic drones that are driving news headlines are sUAS under 55 pounds, and in fact most are under 5 pounds

- $15-30 million
- Pilot and camera operator
- At least 3 ground crew members
- Lengthy logistics tail

- $1,300-$40,000
- Enhanced RC helicopter
TODAY THROUGH 2018
WHY DRONES?

SAFETY
- Remotely piloted
- Can access hard to reach places
- Vantage points
- Insurance less complex
- Easier to operate

COST
- More accurate imagery and data than ground based sensors
- Results available same day as compared to satellites which may take weeks
- Increasingly capable flight endurance
- Actionable data reduces expenses
### 5 Most Popular Uses of Drones

<table>
<thead>
<tr>
<th>Use</th>
<th>Number of Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real estate</td>
<td>153</td>
</tr>
<tr>
<td>Aerial surveillance</td>
<td>128</td>
</tr>
<tr>
<td>Aerial photography</td>
<td>125</td>
</tr>
<tr>
<td>Agriculture</td>
<td>106</td>
</tr>
<tr>
<td>Aerial inspection</td>
<td>86</td>
</tr>
</tbody>
</table>

Source: Association for Unmanned Vehicle Systems International
George Petras, USA TODAY

TODAY
CAPABILITIES LARGELY FOCUSED ON GATHERING IMAGERY FROM ABOVE
TODAY CONSUMER/COMMERCIAL LINE IS NOT A CLEAR LINE
<table>
<thead>
<tr>
<th>Company</th>
<th>Model</th>
<th>Weight</th>
<th>Flight Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lockheed Martin</td>
<td>Indago</td>
<td>4.8 lbs</td>
<td>45 minutes</td>
</tr>
<tr>
<td>Draganfly</td>
<td>X6</td>
<td>2 kg</td>
<td>~20 minutes</td>
</tr>
<tr>
<td>Lehmann Aviation</td>
<td>LP960</td>
<td>1.25 kg</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Boeing Insitu</td>
<td>ScanEagle</td>
<td>22 kg</td>
<td>24-28 hours</td>
</tr>
</tbody>
</table>
TODAY WE ALREADY SEE AERIAL IMAGING CAPABILITIES IN USE
Instant Aerial Data for Agriculture

Get it on Play Store
Also on Desktop
WEED DETECTION

Another benefit of 3D data is the ability to see anomalies in the field commonly associated with weeds.
AND INSPECTING CAPABILITIES
Capability Timeline

- **Entertaining/Recording**
  - Toys
  - Hobbyists
  - Aerial Photography

- **Protecting/Inspecting**
  - Military
  - Public Safety
  - Wildlife
  - Oil Rigs/Wind Farms
  - Cell Towers
  - Agriculture
  - Mining
  - Bridges

- **Evaluating/Managing**
  - Situational Awareness
  - Operations Management
  - Asset Tracking
  - Employee Oversight
  - Modeling/Mapping
  - Environmental Monitoring

- **Delivering/Transporting**
  - Online Retail
  - Local Stores
  - Restaurants
  - Legal Papers
  - Medical

- **Timeline**
  - 2014
  - 2015/16
  - 2017/18
  - 2019...
DELIVERY?
AUTONOMOUS FLEETS?
LESSONS LEARNED FROM
FMRA SECTION 332 (ARCTIC OPERATIONS)
FMRA SECTION 333 (EXEMPTION PROCESS)
FMRA SECTION 336 (COMMUNITY BASED GUIDELINES)
• Near-term Goal – Enable initial low-altitude airspace and UAS operations with demonstrated safety as early as possible, within 5 years

• Long-term Goal – Accommodate increased UAS operations with highest safety, efficiency, and capacity as much autonomously as possible (10-15 years)