Unmanned Aviation Systems and FAA Requirements

Richard Baker, PhD
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Drew Genneken
Director of Planning and Project Development, Indianapolis Airport Authority
Flying the crowded skies
Amazon proposes slicing U.S. airspace into different categories of unmanned aircraft

- 500 feet: No fly zone
- 400 feet: High-speed transit
- 200 feet: Localized traffic

Source: Amazon
Do you think the development of unmanned drones to deliver packages to customers’ doorsteps is a good or a bad idea?

%  

- **Good idea**  
- **Bad idea**  
- **Not sure**

<table>
<thead>
<tr>
<th></th>
<th>Dec 2 2013</th>
<th>Jan 1 2014</th>
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<tbody>
<tr>
<td>Good idea</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Bad idea</td>
<td>36</td>
<td>45</td>
</tr>
<tr>
<td>Not sure</td>
<td>41</td>
<td>32</td>
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</tbody>
</table>

Source: YouGov
UNMANNED AVIATION SYSTEMS AND FAA REQUIREMENTS

FAA PERSPECTIVE

Richard Baker, PhD
Chair, Department of Aviation Technology
Executive Director, Center for Unmanned Systems & Human Capital Development, Indiana State University
WHO CAN FLY THEM?

- Regulatory Environment

- FAA Modernization and Reformation Act of 2012
  - https://www.faa.gov/uas/regulations_policies/

- Major FAA Provisions of Proposed Rules for Small Drones (up to 55 lbs.) – Still in DRAFT
<table>
<thead>
<tr>
<th>Type</th>
<th>Public Operations</th>
<th>Civil Operations (including Section 333)</th>
<th>Hobby or Recreational</th>
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<tr>
<td></td>
<td>Governmental</td>
<td>Commercial/Compensation for Hire</td>
<td>Hobbyist</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
<td>Must be granted Exemption</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• AND Certificate of Waiver or Authorization (COA), or</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Special Airworthiness Certificate</td>
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<tr>
<td></td>
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<td>• Restricted Category</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Experimental</td>
<td></td>
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<tr>
<td>Rules</td>
<td>Detailed in COA</td>
<td>Detailed in COA; restrictions outlined in Exemption</td>
<td>Generally must operate in visual line-of-sight, under 400′, avoid manned aircraft, operate during daylight hours and fly according to community based safety guidelines</td>
</tr>
</tbody>
</table>
HOBBY OR RECREATIONAL

As Per Section 336 of the FAA Modernization and Reform Act of 2012

- Includes a “special rule” for model aircraft

- A model aircraft is defined as “an ‘unmanned aircraft’ that is:
  1. Capable of sustained flight in the atmosphere;
  2. Flown within visual line of sight of the person operating the aircraft; and
  3. Flown for **hobby or recreational purposes only**”
PUBLIC OPERATIONS

- Minimum requirements:
  - a Certificate of Waiver or Authorization (COA),
  - an aircraft registered with the FAA, and
  - a pilot with an FAA private pilot certificate (usually)

- Common public uses:
  - law enforcement
  - firefighting
  - border patrol
  - disaster relief
  - search and rescue
  - University research
CIVIL OR COMMERCIAL OPERATIONS

- As Per Section 336 of the FAA Modernization and Reform Act of 2012
  - Grant of exemption in accordance with Section 333
  - AND a civil Certificate of Waiver or Authorization (COA)
  - An aircraft registered with the FAA
  - A pilot with an FAA airman certificate
  - Operations in low-risk, controlled environments
PROPOSED SMALL UAS RULE

- Currently in DRAFT
  - Notice of Proposed Rulemaking (NPRM) Published to Federal Register on February 23, 2015
  - Public comment period concluded on April 24, 2015
- Small commercial UAS projected to be largest growth sector
CUMULATIVE TIMELINE OF EXEMPTIONS

Cumulative Timeline of Exemptions
UNMANNED AVIATION SYSTEMS AND FAA REQUIREMENTS

AN AIRPORT PERSPECTIVE

DREW GENNEKEN
Director of Planning and Project Development, Indianapolis Airport Authority
HOW DO AIRPORTS ADAPT AND REMAIN SAFE?
August 12- Pilot reports of unmanned aircraft have increased dramatically over the past year, from a total of 238 sightings in all of 2014, to more than 650 by August 9 of this year. The FAA wants to send out a clear message that operating drones around airplanes and helicopters is dangerous and illegal. This year, 138 pilots reported seeing drones at altitudes of up to 10,000 feet during the month of June, and another 137 in July.

A drone came within 5 meters (16 feet) of a potentially catastrophic collision with an Air France jet landing at Paris Charles de Gaulle airport in the closest encounter yet between one of the remotely operated devices and a civil airliner.

The report by Bard College's Center for the Study of the Drone, found that 327 incidents between December 2013 and September 2015 posed a "proximity danger" where an unmanned aircraft got within 500 feet of a plane, helicopter or other manned aircraft or when a pilot determined a drone was dangerously close.

...around 11:10 Florida time Wednesday morning, as the Boeing 737 from Chicago was about a mile from the end of the Miami runway.
Types of Authorized UAS Ops and Required Documentation:

**Model Aircraft**
- An unmanned aircraft that is (1) capable of sustained flight in the atmosphere, (2) flown within visual line of sight of the person operating the aircraft, and (3) flown by hobby or recreational purposes. Must be operated within the following parameters:
  1. Strictly for hobby or recreational use
  2. Must give way to manned aircraft
  3. Less than 55 pounds
  4. Operated in accordance with community-based safety guidelines
  5. If within 5 miles of airport, must notify airport operator and control tower (if tower)
  6. Registration and Markings

**Non-Model / Commercial**
- Any UAS operation conducted for non-hobby or commercial purposes requires FAA approval. The operator must possess all of the following documents:
  1. Section 333 Exemption or Aircraft Certification
  2. Certificate of Authorization
  3. Aircraft Registration and Markings
  4. Pilot certificate

**Public / Government**
- Public agencies or organizations that conduct UAS operations for a government function. The operator must possess all of the following documents:
  1. Certificate of Authorization
  2. Aircraft Registration and Markings

ALL UAS:
- Must have Registration and Markings (required for all UAS greater than 0.55 lbs)
- Must not endanger persons or property on the ground
- Must give way to and not interfere with manned aircraft
- Must comply with all flight restrictions and Temporary Flight Restrictions
- Are subject to legal enforcement for Careless or Reckless operation

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**What Can I Do With My Small UAS?**

**Hobby/Recreational Flying**

Having fun means flying safely! Hobby or recreational flying doesn’t require FAA approval but you must follow safety guidelines. Any other use requires FAA authorization.

- Avoid doing anything hazardous to other airplanes or people or property on the ground.

"Dos"
- Do register your aircraft if it weighs more than 0.55 lbs.
- Do fly a model aircraft/UAS at the local model aircraft club
- Do take lessons and learn to fly safely
- Do contact the airport or control tower when flying within 5 miles of the airport
- Do fly a model aircraft for personal enjoyment

"Donts"
- Don’t fly near manned aircraft
- Don’t fly beyond line of sight of the operator
- Don’t fly an aircraft weighing more than 55 lbs unless it’s certified by an aeromodeling community-based organization
- Don’t fly contrary to your aeromodeling community-based safety guidelines
- Don’t fly model aircraft for payment or commercial purposes
Federal Aviation Administration

Radio Controlled Model Aircraft Operation Utilizing “First Person View” Systems

1. DEFINITION OF TERMS:
Please refer to Page 5 section 1 which contains an alphabetical index of terms that are used in this document.

2. GENERAL:
FPV flying of radio control model aircraft by AMA members for recreational or non-commercial purposes as a hobby/leisure activity must be conducted in accordance with AMA's current rules. Additional rules specific to a flying location.

3. OPERATIONS - REQUIREMENTS - LIMITATIONS
a) FPV, novice pilots, or pilots who are unable to maintain operating visibility should be restricted to flying at low altitudes or within a designated area.

Acknowledgement of Receipt

*AMA Document #550

What Can I Do With My Small Unmanned Aircraft?
Hobby/Recreational Flying

Having fun means flying a safe and enjoyable hobby/leisure aircraft. However, operating an unmanned aircraft requires FAA approval. You must follow FAA guidelines. Any other use requires FAA authorization.

Avoid doing anything hazardous to other airplanes or people and property on the ground.

“Dos”
- Do hold your aircraft if weight more than 0.55 lbs.
- Do fly an aircraft at 50% of its maximum speed.
- Do keep a distance between you and your aircraft.
- Do contact the operator or control tower when flying within 5 miles of an airport.
- Do fly a model aircraft for personal enjoyment.

“Don’ts”
- Don’t fly near manned aircraft.
- Don’t fly beyond the line of sight of the operator.
- Don’t fly an aircraft weighing more than 0.55 lbs. unless it’s certified by a recognized community-based organization.
- Don’t fly contrary to your permitted community-based flying guidelines.
- Don’t fly in other aircraft for practice or commercial purposes.
Eagle Drone Police
✅ **DO** fly a model aircraft/UAS at the local model aircraft club

✅ **DO** take lessons and learn to fly safely

✅ **DO** contact the airport or control tower when flying within 5 miles of the airport

✅ **DO** fly a model aircraft for personal enjoyment

🚫 **DON'T** fly near manned aircraft

🚫 **DON'T** fly beyond line of sight of the operator

🚫 **DON'T** fly an aircraft weighing more than 55 lbs unless it's certified by an aeromodelling community-based organization

🚫 **DON'T** fly contrary to your aeromodelling community-based safety guidelines

🚫 **DON'T** fly model aircraft for payment or commercial purposes
Federal Law requires model aircraft operators to notify the airport operator and Air Traffic Control Facility (if one is present) when operating within 5 miles of an airport.

**5 Mile Airport Requirement**

### Status Details

- 5 mi from Airports?
  - ✔️
- Outside Restricted Airspaces?
  - ✔️
- Outside National Parks?
  - ✔️
- Upcoming Restrictions
  - ✔️

**App last updated:**

- Status: 5/4/15, 3:16 PM (1 minute ago)
- Data: 5/4/15, 3:16 PM (1 minute ago)

### Nearby Airports

- **CATON SOUTH** 4.48 mi
- **SEVEN GABLES** 4.50 mi
Sense and Avoid

Collaborative via vehicle-to-vehicle

Alert—operator takes action

Automated—autopilot takes action

Non-Collaborative via sensing; Automated

Good

Better

Best
PERIMETER SECURITY

3-D LASER MAPPING OF FACILITIES

UAV LiDAR solutions
I look forward to blaming a drone for losing a birthday present I never got you.

someecards
QUESTIONS ?