Unmanned Aircraft Systems (UAS) 101
Overview

- Unmanned Aircraft Systems
- FAA Authority
- Hobby/Recreational Operations
- UAS Registration
- Small UAS Rule (Part 107)
  - Becoming a Pilot
  - Operating Rules
- Next Steps in Integration
  - Focus Area Pathfinders & Extended Operations
  - Operations Over People Rulemaking
- Research, Security, & Enforcement
- Outreach Efforts
What is a UAS?

- **A UAS is a system:**
  1. Unmanned Aircraft
  2. Ground Control Station
  3. Command & Control Link(s)

- **Also known as:**
  - Unmanned Aerial Vehicle (UAV)
  - Remotely Piloted Aircraft System (RPAS)
  - RC Model Aircraft
  - Drone
Why Use a UAS?

• UAS operations are particularly effective for missions that are dangerous or dull
  – Humans are not put at risk
  – Continuous operations are possible

• Operations with UAS often cost less than using manned aircraft
What is the FAA’s Authority?

• **U.S. airspace is public space**
  – 49 U.S.C. §40103(a)(1)

• **UAS are aircraft subject to regulation**
  – 49 U.S.C. §40102(a)(6); 14 CFR 1.1; PL 112-95 §331, §336
  – An aircraft is any device used, or intended to be used, for flight

• **UAS must comply with FAA regulations**
## Types of UAS Operations

<table>
<thead>
<tr>
<th></th>
<th>Recreational Only Operations</th>
<th>Commercial and Other Operations</th>
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<tbody>
<tr>
<td><strong>Pilot Requirements</strong></td>
<td>• No FAA pilot requirements</td>
<td>• Must have Remote Pilot Airman Certification</td>
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<td>• Must be 16 years or older</td>
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<td>• Must pass TSA vetting</td>
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<tr>
<td><strong>Aircraft Requirements</strong></td>
<td>• Must be registered if over 0.55 pounds</td>
<td>• Must be less than 55 pounds</td>
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<td></td>
<td>• Must be less than 55 pounds</td>
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<td>• Must undergo pre-flight checklist</td>
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<td><strong>Location Requirements</strong></td>
<td>• Must notify all airports and air traffic control (if applicable) within five miles of</td>
<td>• Class G airspace without ATC permission</td>
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<td></td>
<td>proposed area of operations</td>
<td>• Class B, C, D, and E require ATC permission</td>
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<tr>
<td><strong>Operating Rules</strong></td>
<td>• Must ALWAYS yield right of way to manned aircraft</td>
<td>• Must keep aircraft in visual line-of-sight</td>
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<td></td>
<td>• Must keep aircraft in visual line-of-sight</td>
<td>• Must fly under 400 feet</td>
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<td>• Must follow community-based safety guidelines</td>
<td>• Must fly only during daylight hours</td>
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<td>• Must fly at or below 100 mph</td>
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<tr>
<td></td>
<td></td>
<td>• Must yield right of way to manned aircraft</td>
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<td>• Must NOT fly over people</td>
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<td>• Must NOT fly from a moving vehicle</td>
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<tr>
<td><strong>Definitions</strong></td>
<td>• Education or recreational flying only</td>
<td>• Flying for commercial use</td>
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<tr>
<td></td>
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<td>• Flying incidental to a business</td>
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<td>• Flying public aircraft operations</td>
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*These requirements are subject to waiver.
Hobby/Recreational Aircraft

• Generally, hobby/recreational operators do not need FAA authorization to fly, but they must fly safely at all times:
  – Avoid manned aircraft
  – Maintain visual line-of-sight
  – Fly only for hobby/recreation

• They must register and mark their UAS before flying outdoors
  – UAS between 0.55 pounds and 55 pounds may register online
Interpretive Rule

- FAA published guidance in June 2014 for hobby or recreational use of UAS
- This guidance clarifies that:
  1. Model aircraft must satisfy the criteria in the Act to qualify as model aircraft and to be exempt from future FAA rulemaking action
  2. Consistent with the Act, if a model aircraft operator endangers the safety of the NAS, the FAA has the authority to take enforcement action against those operators for safety violations
- **Status:** FAA evaluating comments to determine where clarification is needed

Online UAS Registration

- Applies to small UAS 0.55-55 lbs. flown outside
- Owner must provide name, address, email
  - Non-recreational owners must provide make, model, and serial number (if available) of each sUAS
The Small UAS Rule (Part 107)

• First rules for routine operation of small UAS (<55 pounds)
• Took effect August 29, 2016
• Recreational operators may fly under Part 107 or Public Law 112-95 Section 336/Part 101
Part 107 Basics

• UAS operators must obtain a Remote Pilot Certificate
• Visual line-of-sight, daylight operations
• 400’ AGL ceiling, unless within 400’ of a structure
• No airspace authorization required for Class G and non-surface area Class E; all other airspace requires authorization
• UAS must weigh less than 55 lbs. and be registered
Becoming a Pilot under Part 107

- Must be 16 years old or older
- Must read, write, speak English
- Must pass an aeronautical knowledge exam at an FAA-approved Knowledge Testing Center
  - Part 61 certificate holders can take online training at faasafety.gov instead of the knowledge exam
- Must undergo TSA background security screening
Operating Rules

• Visual line-of-sight only
• Daylight or civil twilight only
• No operations over people
• Must yield right-of-way to manned aircraft
• One UAS per operator
• Max groundspeed of 100 mph
• External load operation only permitted if the load does not affect flight operations or control
Part 107 Airspace Requirements

- Operations in Class G without ATC authorization
- Operations in Class B, C, D & Class E surface areas require ATC authorization
- Phased approach to airspace authorizations
- Online portal available at [www.faa.gov/uas/request_waiver/](http://www.faa.gov/uas/request_waiver/)
Focus Area Pathfinders – Expanding Operations

• 3 Focus Area Pathfinder Partners:

1. CNN
   • Exploring visual line-of-sight operations over people

2. Precision Hawk
   • Exploring extended visual line-of-sight operations in rural areas

3. BNSF Railways
   • Exploring beyond visual line-of-sight operations in rural areas
UAS Detection Initiative

• Growing concerns about potentially unsafe small UAS operations
• The FAA co-leads an interagency group with DHS to research UAS detection technology
• In October 2015, the FAA signed a CRDA with CACI International to test its detection technology
• In May 2016, the FAA signed additional CRDAs with Gryphon Sensors, LitEye, and Sensofusion
UAS Test Sites

- Provide an avenue for the UAS industry to conduct more advanced UAS research and concept validation

- 7 UAS Test Sites with nationwide COAs:
  - University of Alaska – Fairbanks
  - State of Nevada
  - New York Griffiss International Airport
  - North Dakota Department of Commerce
  - Texas A&M University – Corpus Christi
  - Virginia Polytechnic Institute and State University (Virginia Tech)
  - New Mexico State University
Reporting Unsafe UAS Activity

- **While flying or at the airport:**
  - Report the sighting to Air Traffic Control
    - Note the location, altitude, and characteristics of the aircraft

- **Anywhere else:**
  - Call local law enforcement
    - The FAA has published guidance for law enforcement to help them respond to unsafe UAS activity

- **Be as detailed & specific as possible**
  - Location, altitude, direction, pictures, videos, etc.
UAS Outreach and Education

I FLY SAFE

All drones are aircraft—even the ones at the toy store. So when I fly a drone I am a pilot. Before I fly I always go through my pre-flight check list. I regularly check the safety guidelines at faa.gov/uas

FLY SMART, FLY SAFE, AND HAVE FUN!
knowbeforeyoufly.org
faa.gov/uas

PRE-FLIGHT CHECKLIST

- I fly below 400 feet
- I always fly within visual line of sight
- I'm aware of FAA airspace requirements: faa.gov/go/uastfr
- I never fly over groups of people
- I never fly over stadiums and sports events
- I never fly within 5 miles of an airport without first contacting air traffic control and airport authorities
- I never fly near emergency response efforts such as fires
- I never fly near other aircraft
- I never fly under the influence
Questions?

www.faa.gov/uas
Backup Slides
Waivable Provisions of Part 107

• Operation from a moving vehicle or aircraft (§ 107.25)
• Daylight operation (§ 107.29)
• Visual line of sight aircraft operation (§ 107.31)
• Visual observer (§ 107.33)
• Operation of multiple small UAS (§ 107.35)
• Yielding the right of way (§ 107.37(a))
• Operation over people (§ 107.39)
• Operation in certain airspace (§ 107.41)
• Operating limitations for small UAS (§ 107.51)

Online portal available at www.faa.gov/uas/request_waiver/
Aeronautical Knowledge Exam
Topics

- Applicable regulations relating to small unmanned aircraft system rating privileges, limitations, and flight operation
- Airspace classification and operating requirements, and flight restrictions affecting small unmanned aircraft operation
- Aviation weather sources and effects of weather on small unmanned aircraft performance
- Small unmanned aircraft loading and performance
- Emergency procedures
- Crew resource management
- Radio communication procedures
- Determining the performance of small unmanned aircraft
- Physiological effects of drugs and alcohol
- Aeronautical decision-making and judgment
- Airport operations
- Maintenance and preflight inspection procedures