

Unmanned Aircraft Systems (UAS) 101

Presented to:

By:

Date:



Federal Aviation
Administration



Overview

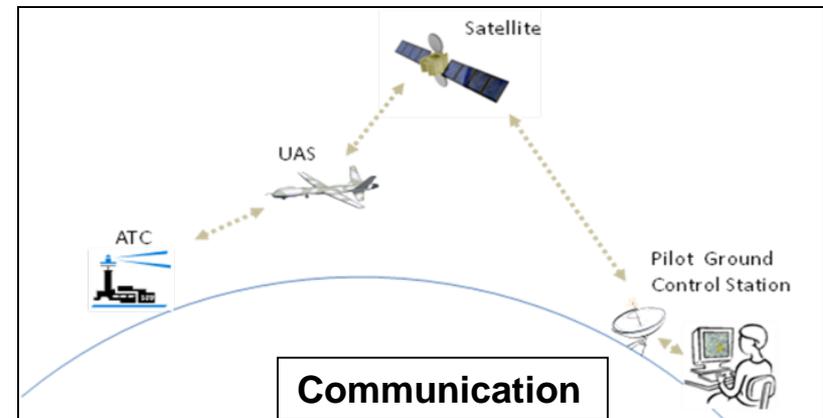
- Unmanned Aircraft Systems
- FAA Authority
- Hobby/Recreational Operations
- UAS Registration
- Small UAS Rule (Part 107)
 - Becoming a Pilot
 - Operating Rules
- Next Steps in Integration
 - Focus Area Pathfinders & Extended Operations
 - Operations Over People Rulemaking
- Research, Security, & Enforcement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

	Recreational Only Operations	Commercial and Other Operations
Pilot Requirements	<ul style="list-style-type: none"> No FAA pilot requirements 	<ul style="list-style-type: none"> Must have Remote Pilot Airman Certification Must be 16 years or older Must pass TSA vetting
Aircraft Requirements	<ul style="list-style-type: none"> Must be registered if over 0.55 pounds 	<ul style="list-style-type: none"> Must be less than 55 pounds Must be registered if over 0.55 pounds Must undergo pre-flight checklist
Location Requirements	<ul style="list-style-type: none"> Must notify all airports and air traffic control (if applicable) within five miles of proposed area of operations 	<ul style="list-style-type: none"> Class G airspace without ATC permission Class B, C, D, and E require ATC permission
Operating Rules	<ul style="list-style-type: none"> Must ALWAYS yield right of way to manned aircraft Must keep aircraft in visual line-of-sight Must follow community-based safety guidelines 	<ul style="list-style-type: none"> Must keep aircraft in visual line-of-sight* Must fly under 400 feet* Must fly only during daylight hours* Must fly at or below 100 mph* Must yield right of way to manned aircraft* Must NOT fly over people* Must NOT fly from a moving vehicle*
Definitions	<ul style="list-style-type: none"> Education or recreational flying only 	<ul style="list-style-type: none"> Flying for commercial use Flying incidental to a business Flying public aircraft operations

*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

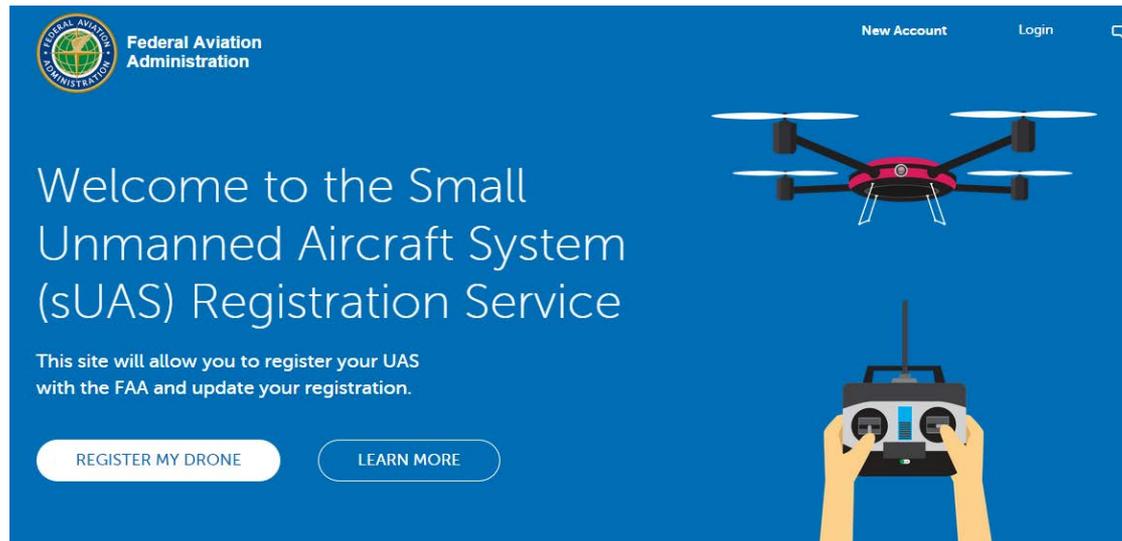
- **FAA published guidance in June 2014 for hobby or recreational use of UAS**
- **This guidance clarifies that:**
 1. Model aircraft must satisfy the criteria in the Act to qualify as model aircraft and to be exempt from future FAA rulemaking action
 2. Consistent with the Act, if a model aircraft operator 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**

<https://www.federalregister.gov/articles/2014/06/25/2014-14948/interpretation-of-the-special-rule-for-model-aircraft>



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**

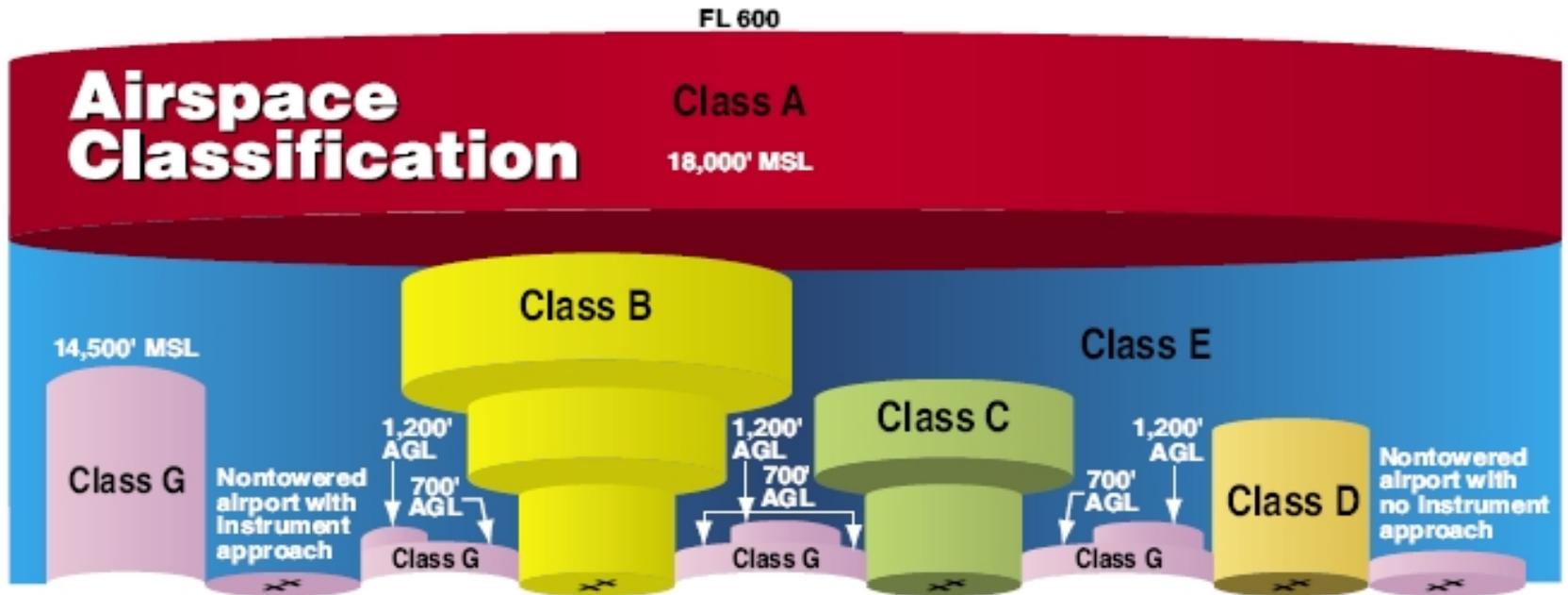


Operating Rules

- 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/



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



UAS Center of Excellence

The FAA's Center of Excellence for UAS Research



Alliance for System Safety of UAS through Research Excellence



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 - UNIVERSITY of ALABAMA in HUNTSVILLE
- Alaska
 - UNIVERSITY of ALASKA in FAIRBANKS
- Arizona
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- California
 - UNIVERSITY of CALIFORNIA DAVIS
- Florida
 - EMBRY RIDGLE AERONAUTICAL UNIVERSITY
- Kansas
 - KANSAS STATE UNIVERSITY
 - UNIVERSITY of KANSAS
 - WICHITA STATE UNIVERSITY
- Montana
 - MONTANA STATE UNIVERSITY
- New Mexico
 - NEW MEXICO STATE UNIVERSITY
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- North Dakota
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 - SINCLAIR COMMUNITY COLLEGE
- Canada
 - CONCORDIA UNIVERSITY
- United Kingdom
 - UNIVERSITY of SOUTHAMPTON

MISSISSIPPI STATE UNIVERSITY - LEAD 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/uas/fr
- 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

Federal Aviation Administration



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**

