Unmanned Aircraft Systems (UAS) 101

Federal Aviation Administration

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By: *Federal Aviation Administration*
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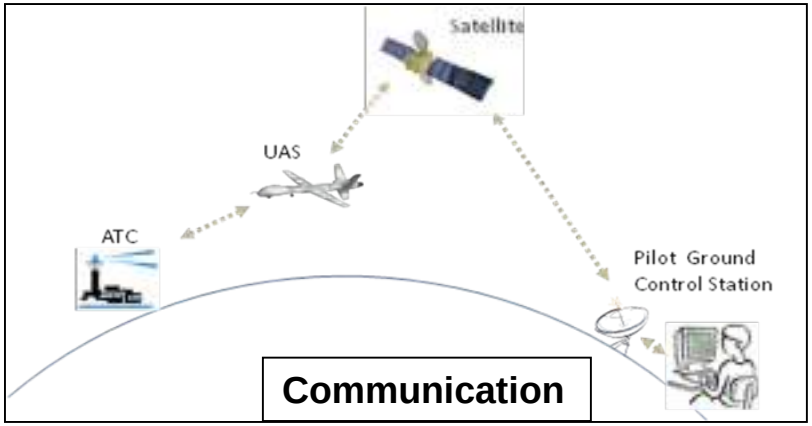
Overview

- Unmanned Aircraft Systems
- FAA Authority
- Hobby/Recreational Operations
- UAS Registration
- Small UAS Rule (Part 107)
- FAA DroneZone
- Access to Airspace
- Next Steps in Integration
- 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. government has exclusive sovereignty of airspace**
- **UAS are aircraft subject to regulation**
  - 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 (Part 107)
Pilot Requirements	• No FAA pilot requirements	• Must have Remote Pilot Airman Certification • Must be 16 years or older • Must pass TSA vetting
Aircraft Requirements	• Must be registered if over 0.55 pounds • UAS over 55 pounds must be certified through a design, construction, inspection, flight test, and operational safety program administered by a community-based organization	• Must be less than 55 pounds • Must be registered if over 0.55 pounds • Must undergo pre-flight checklist
Location Requirements	• Must notify all airports and air traffic control (if applicable) within five miles of proposed area of operations	• Class G airspace without ATC permission • Class B, C, D, and E require ATC permission

*These requirements are subject to waiver.

Types of UAS Operations

	Recreational Only Operations	Commercial and Other Operations (Part 107)
Operating Rules	• Must ALWAYS yield right of way to manned aircraft • Must keep aircraft in visual line-of-sight • Must follow community-based safety guidelines	• 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	• Education or recreational flying only	• Flying for commercial use • Flying incidental to a business • Flying public aircraft operations

*These requirements are subject to waiver.

Special Rule for Model Aircraft

- **If operating under P.L. 112-95 Section 336, hobby and recreational operators must follow all of its requirements, including:**
  - Fly only for hobby/recreation
  - Follow community-based set of safety guidelines and within the programming of a nationwide community-based organization
  - Never fly near other aircraft
  - Maintain visual line-of-sight
  - Notify all airports (including heliports) within a 5 mile radius of the operation
- **All UAS over 0.55 pounds must be registered with the FAA**

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 law to be exempt from future FAA rulemaking action
  2. If a model aircraft operator endangers the safety of the NAS, the FAA has the authority to take enforcement action
- **<u>Status</u>: 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 all small UAS over 0.55 and weighing less than 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
- **Register through FAA Drone Zone**

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 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**
- **Must undergo TSA background security screening**

Operating Rules

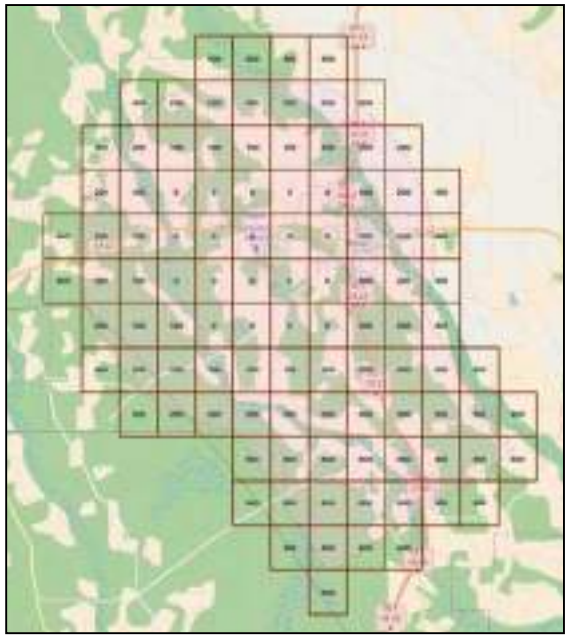
- Visual line-of-sight only
- Daylight or civil twilight only
- No operations over people
- Must yield right-of-way to manned aircraft
- One UAS per operator
- Max groundspeed of 100 mph
- External load operation only permitted if the load does not affect flight operations or control

Part 107 Airspace Requirements

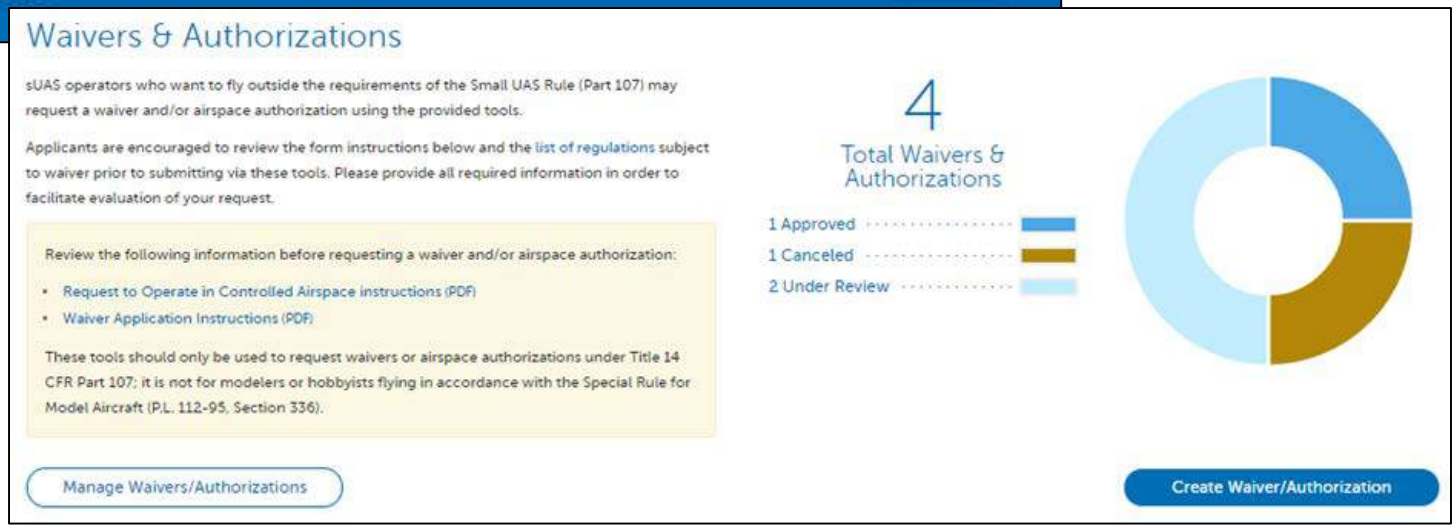
- **Operations in Class G without ATC authorization**
- **Operations in Class B, C, D & Class E surface areas require ATC authorization**
- **Online portal available at the FAA DroneZone.**

UAS Facility Maps

- **Depict maximum altitudes that FAA may grant controlled airspace access for Part 107 operations without additional safety analysis**
- **Maps do not authorize operations**
  - Job aid for airspace authorization requests
  - Assists the FAA in streamlining authorization process
- **All maps are available on FAA website**



FAA DroneZone

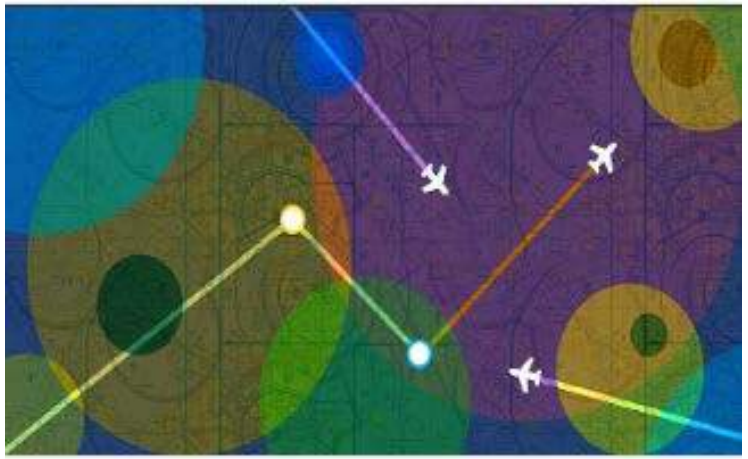


One-stop-shop for small UAS needs

- Registration
- Airspace Authorizations & Waivers
- Operational Waivers
- Accident Reporting

UAS Security Sensitive Restrictions

- 400+ restrictions over sensitive facilities, including military sites, national landmarks, and other sites



- Must contact facility, and if in controlled airspace, the FAA, to operate over sites
- Interactive map and a list of facilities are available here: https://uas-faa.opendata.arcgis.com/
- Existing restricted airspace remains in effect

Focus Area Pathfinders – Expanding Operations

- **3 Focus Area Pathfinder Partners:**

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

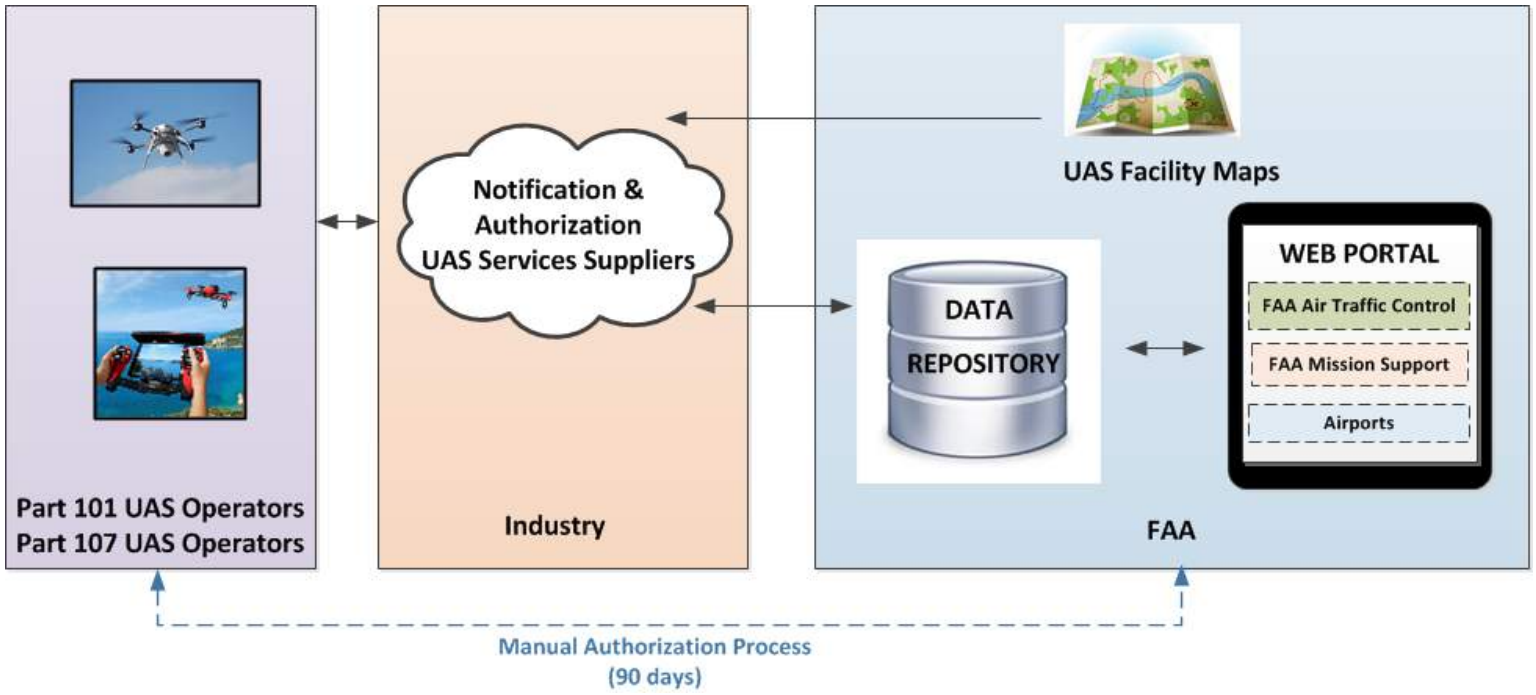
2. Precision Hawk
   - Exploring extended visual line-of-sight operations in rural areas

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**

Low Altitude Authorization and Notification Capability (LAANC)



Goals

- Enable efficient notification and authorization services to small UAS operators
- Provide the data exchange framework for UAS traffic management (UTM)

UAS Integration Pilot Program

- Develop and test innovative UAS concepts
- Inform future guidelines and regulations
- Evaluate involvement of state, local, tribal governments

Program Highlights

- Create a **partnership framework** for private sector and state / local / tribal governments to achieve broader national policy
- Foster **technological innovation** that will create high-paying **jobs**
- Advance the UAS industry by informing development of enabling regulations that permit more **complex**, **demand-driven** operations
- **Push the boundaries** of UAS use by expanding what is routinely authorized under the small UAS rule

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

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

Questions?

www.faa.gov/uas

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 FAA DroneZone

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