Intro to Small Unmanned Aircraft Systems & Recreational Drones

FAA Rules for sUAS

The Federal Aviation Administration (FAA) of the United States is a national authority with powers to regulate all aspects of civil aviation. These include the construction and operation of airports, air traffic management, the certification of personnel and aircraft, and the protection of US assets during the launch or re-entry of commercial space vehicles.

Drone Rules & Regulations

Prior to 2012, sUAS, drones and model aircraft were unregulated.

R/C model aircraft operated under an FAA Advisory Circular AC 91-57 dated June 9, 1981

Drone Rules & Regulations

FAA Regulatory Notice dated February 13, 2007

Clarified the FAA's policy concerning operations of unmanned aircraft in the National Airspace System. AC 91-57 only applies to modelers, and thus specifically excludes its use by persons or companies for business purposes.

Essentially means there is no legal way to fly drones commercially.

FAA Rules for small Unmanned Aircraft Systems (sUAS)

"FAA Reauthorization Act of 2012"

- Authorized the FAA to regulate commercial drones in the National Airspace (NAS)
- **"Special Rule for Model Aircraft"** excluded Recreational model aircraft from FAA oversight
- FAA introduced a regulation requiring all sUAS pilots, including recreational pilots, to register with the FAA

FAA Rules for sUAS

“FAA Reauthorization Act of 2012”

- Lawsuit appealed the FAA authority to require recreational pilots to register – and won!
- “If toy airplane operators are required to register with the FAA, shouldn’t toy train operators be required to register with the National Transportation Safety Board?”

FAA Rules for sUAS

"FAA Reauthorization Act of 2015"

- In September 2015, Congress passed new laws regulating recreational and commercial drone pilots

- FAA was given the authority to register all sUAS pilots including recreational pilots

FAA Rules for sUAS

"FAA Reauthorization Act of 2015"

- Created the FAA Remote Pilot Certificate (Part 107)
- Must be at least 16 years of age for Part 107 Certificate
- Special Rule excluding model aircraft was unchanged
- Pilot Registration is required
- Labeling of all unmanned aircraft is required

FAA Rules for sUAS

“FAA Reauthorization Act of 2018”

- On October 5, 2018, the Act became law with new conditions for recreational and commercial drone pilots.
- The Act funds the FAA for 5 years (until 2024).

FAA Reauthorization Act of 2018

Gives the FAA authority to regulate recreational and commercial sUAS

"Special Rule for Model Aircraft" was repealed and replaced with…

"Exception for limited recreational operations of unmanned aircraft" (Part 101e – Section 349)

College and University programs are included in the definition of recreational flying

FAA Reauthorization Act of 2018

Agents from the Department of Homeland Security (DHS) or the Department of Justice (DOJ) can take control of, shoot down, or confiscate without a warrant any drone operating in restricted airspace that is thought to be a threat.

The Federal Aviation Administration declares a “No Drone Zone” during Super Bowl games. Violators face a fine of up to $30,000 and criminal prosecution, not to mention confiscation of their drone. A temporary flight restriction covers anywhere within 34.5 miles (30 nautical miles) and up to an altitude of 18,000 feet.

FAA Reauthorization Act of 2024

- Grade School & High School aviation programs are added to the definition of recreational flying.
- FAA to establish standards for Beyond Visual Line of Sight (BVLOS) operations by remote pilots.
- The Act funds the FAA for 5 years (until 2029).

Categories

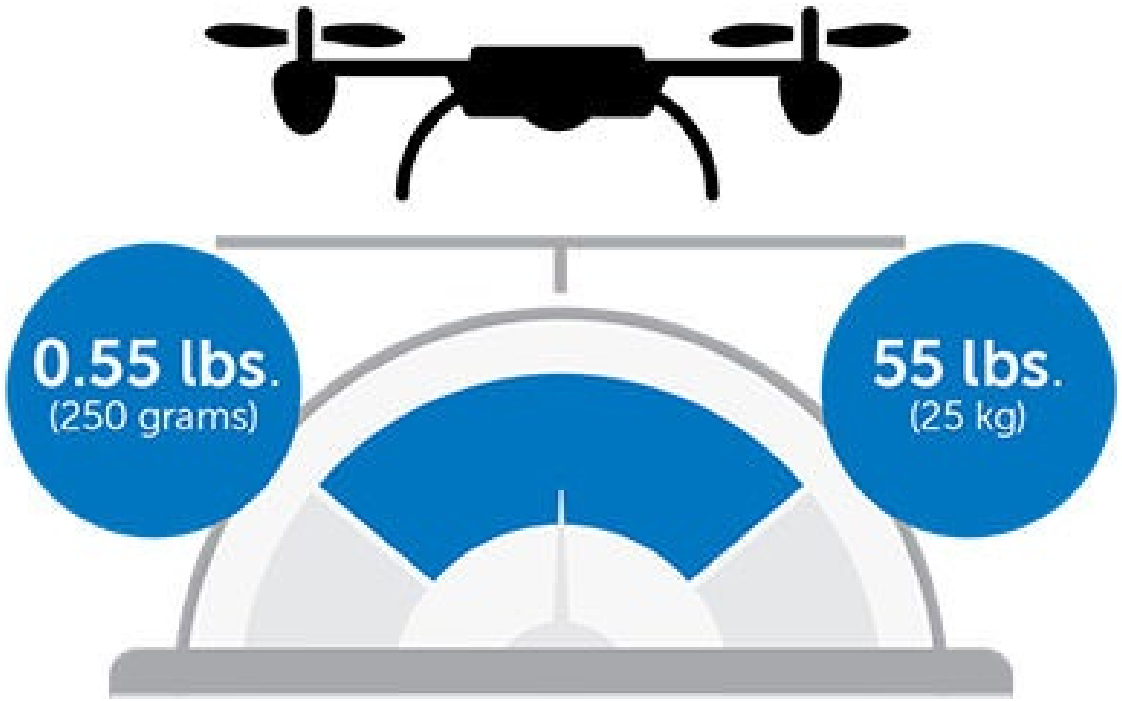
Drone Categories

- Micro
- sUAS
- UAS

Pilot Categories

- Unlicensed (under 250 grams)
- Recreational License
- Commercial License (Part 107)
- Certificate of Authorization (COA)

Three Categories based on Drone Weight



1. Micro Drones – less than 0.55 lbs. (250 grams)
2. sUAS – 0.55 lbs. or more and less than 55 lbs.
3. UAS – 55 lbs. or more

Drone Pilot Types

Which type of drone flyer are you?

- Recreational Flyer or participant in an educational or college aviation program
- Commercial or Non-Profit Organization (Part 107)
- Certificate of Authorization (COA) for Public Safety or Governmental Organization

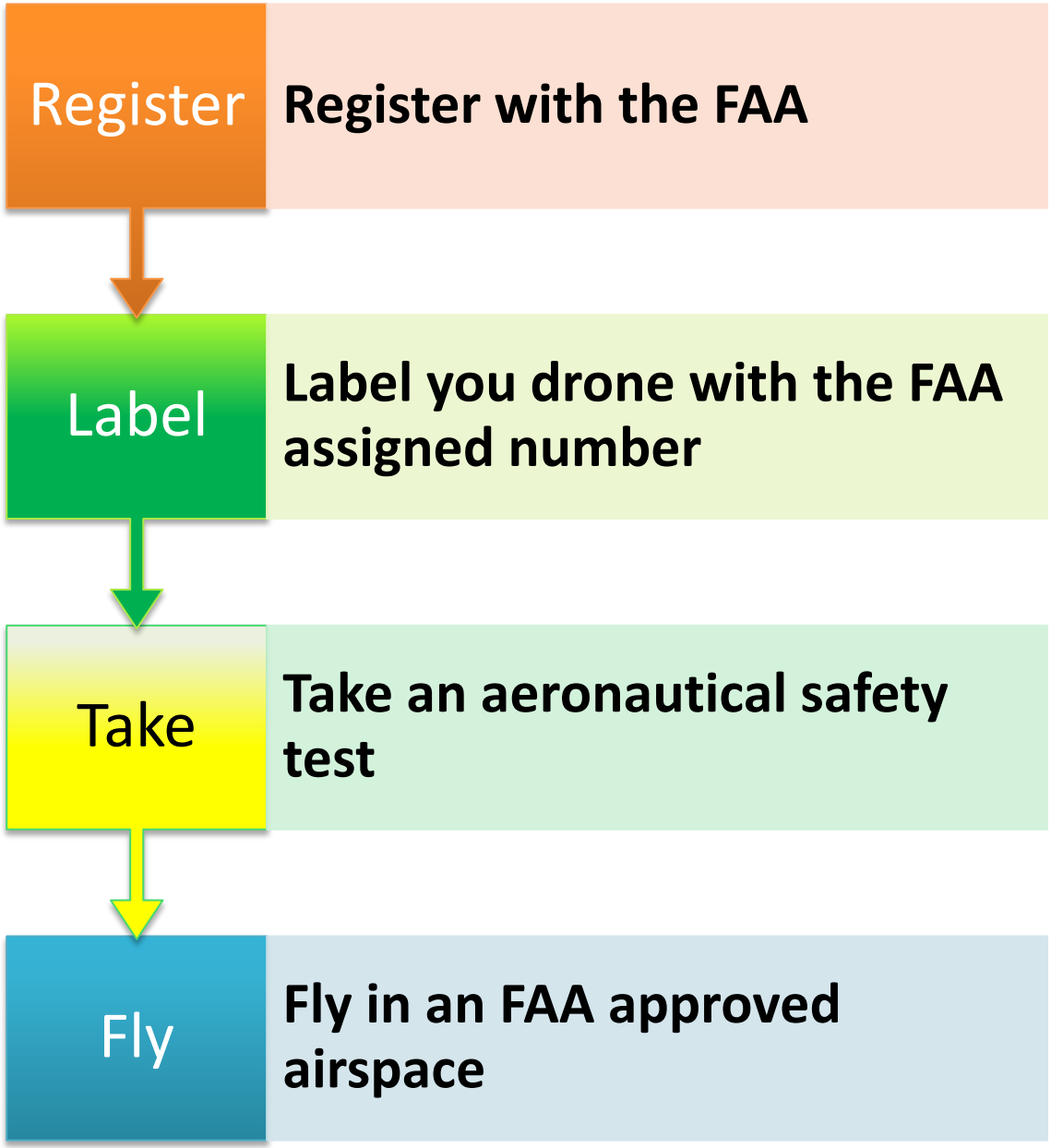
Public Safety & Government Users

Government Entities may apply for an FAA Certificate of Authorization (COA)

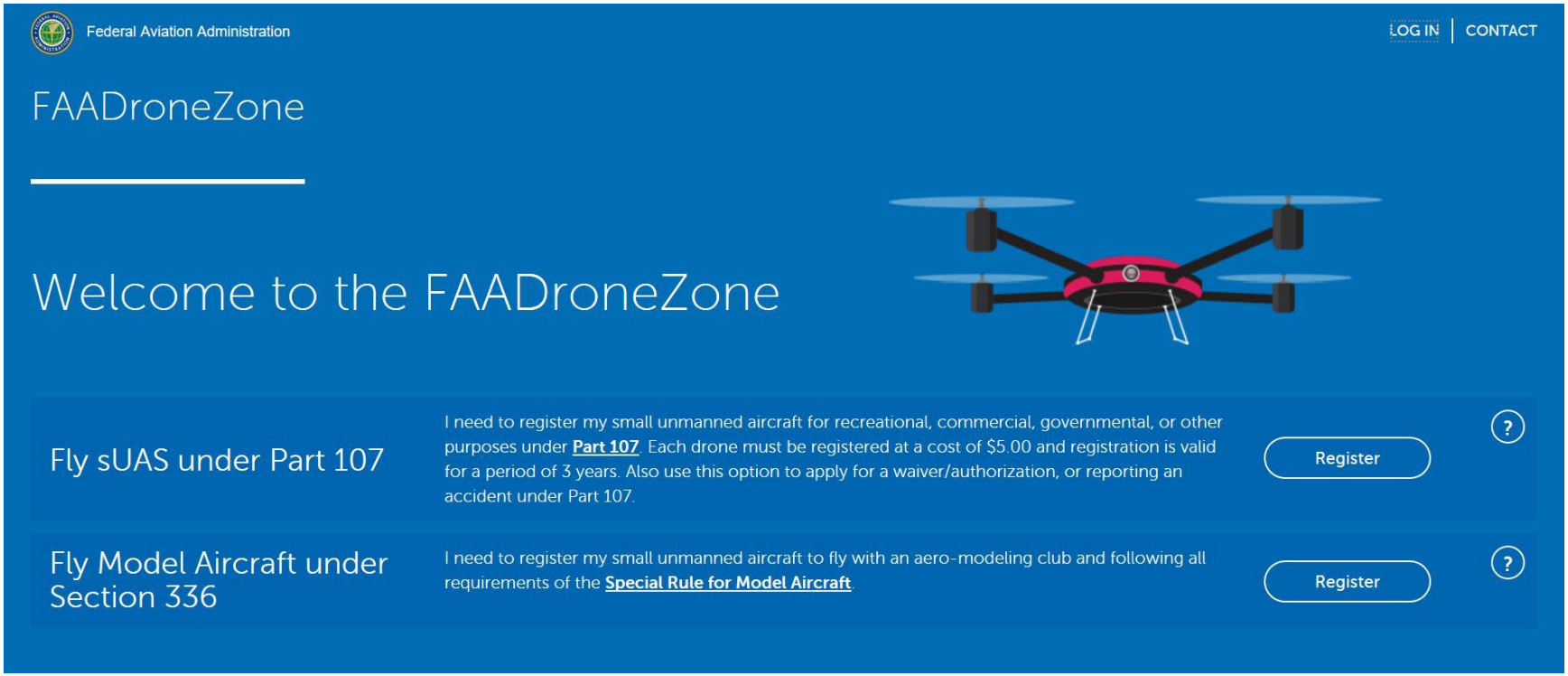
A Certificate of Authorization permits:

- Flights in Class G airspace at or below 400 feet,
- Self-certification of the UAS pilot by the agency, and
- Option to obtain emergency COAs (e-COAs) under special circumstances.

FAA Recreational Drone Pilots Requirements



FAA Registration



faadronezone.faa.gov/

Register with the FAA

Federal Aviation Administration

Small UAS Certificate of Registration

REGISTERED OWNER: **Robert Leeper**

REGISTRATION NUMBER: **FA3PFNXHPE**

ISSUED: **01/19/2016** EXPIRES: **12/12/2026**

This Small UAS Certificate of Registration ***is not an authorization to conduct flight operations*** *with an unmanned aircraft. Operators of unmanned aircraft must ensure they comply with the appropriate safety authority from the FAA. To operate as a recreational flyer, a person must meet all of the statutory conditions of the exception for limited recreational operations of unmanned aircraft (49 U.S.C. 44809). Persons who do not meet all of the statutory conditions may not operate under the statutory exception for limited recreational operations of unmanned aircraft.*

For U.S. citizens, permanent residents, and certain non-citizen U.S. corporations, this document constitutes a Certificate of Registration. For all others, this document represents a recognition of ownership.

To fly under the exception for recreational flyers you must:

- *Have a current registration*
- *Fly only for recreational purposes*
- *Follow the safety guidelines of a community based organization*
- *Keep your drone within your visual line of sight*
- *Give Way and do not interfere with any manned aircraft*
- *Fly at or below 400′ in controlled airspace and only with prior authorization*
- *Fly at or below 400′ in uncontrolled airspace*
- *Comply with all airspace restrictions*
- *Pass The Recreational UAS Safety Test*

The FAA Registration # is to be permanently attached on the outside of each drone you fly.

Failure to Register

If you're tempted to fly without registering — think again!

There can be serious consequences for those who fail to register with the FAA. Civil penalties can reach as much as $30,000 per offense.

Using a drone in connection with unlawful activity can result in even harsher consequences including fines and/or incarceration.

How to Label
Your sUAS

Find your registration number
In the FAA confirmation email or Account page.

Registration Number: FA-000-001

Mark all aircraft
with your registration number before flight.

You can use:

- **PERMANENT LABEL**
- **ENGRAVING**

Number must be visible on the aircraft exterior

Recreational Pilot Rules

The Recreational UAS Safety Test (TRUST)

The FAA began online testing of recreational R/C and drone pilots on June 1, 2021. There's no charge for the test and you cannot fail. The Academy of Model Aeronautics (AMA) is authorized to administer the test.

Upon completion of the test, you should print or save a digital copy of the certificate and keep it on your person when you fly. Neither the FAA nor the AMA keep copies of your certificate. Certificates cannot be reissued if lost. Should you lose your certificate, you will need to retake TRUST and obtain a new certificate.

The Recreational UAS Safety Test (TRUST) Completion Certificate

Name:
Neal Leeper

Authentication Token:
IAMA88264498649

Issued by:
Academy of Model Aeronautics on 10/3/2021

Recreational Pilot Rules

- Fly only for fun or recreation
- Follow the safety guidelines and fly within the programming of a model aircraft community-based organization (CBO) such as the Academy of Model Aeronautics (AMA)
- Fly at or below 400 feet when in uncontrolled airspace (Class G) and obtain permission before flying in controlled airspace

Recreational Pilot Rules

- Fly within **visual line-of-sight** (VLOS), meaning you always keep your drone or model aircraft in sight with your own eyes with contacts or glasses, but without binoculars.

Recreational Pilot Rules

- Never fly near manned aircraft
- Never fly in “Restricted Airspace”
- Never fly over groups of people, public events or stadiums full of people
- Never fly near or over emergency response efforts such as forest fires or accidents where a Lifeline helicopter may be responding

Recreational Pilot Rules

- No minimum age for to fly as a Recreational drone pilots but a parent must register for pilots under age 13 and parental supervision is required when flying.

FAA Remote ID Rule (RID)

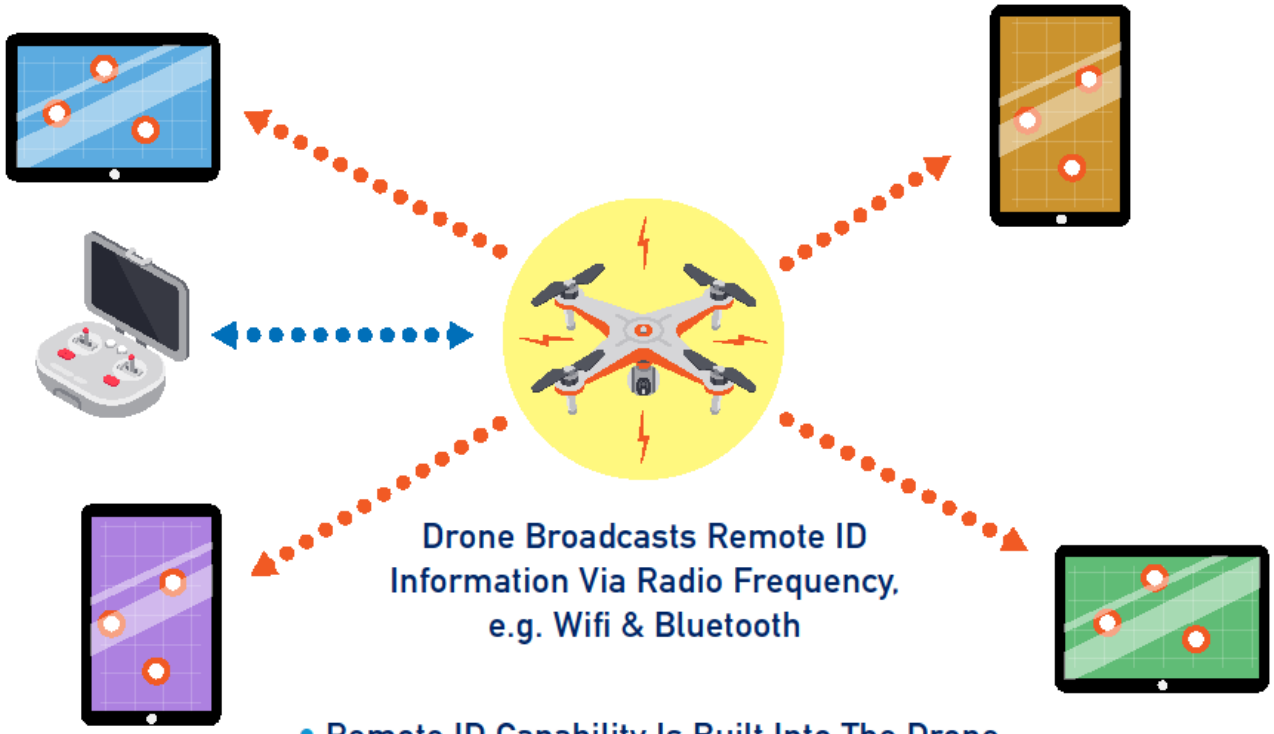
On September 16, 2023, the FAA implemented the **Remote ID (RID) Rule** that requires all sUAS aircraft operating in the US to broadcast location and altitude data over Wi-Fi or Bluetooth.

3 Ways Drone Pilots can meet Remote ID (RID) Requirements

1) **Integrated Remote ID**
2) **Remote ID Broadcast Module**
3) **Operate without remote ID equipment at FAA-recognized identification areas** (FRIAs) sponsored by community-based organizations (CBO) such as the AMA or certain educational institutions. FRIAs are the only locations unmanned aircraft (drones and radio-controlled airplanes) may operate without broadcasting remote ID message elements.

DRONE REMOTE IDENTIFICATION

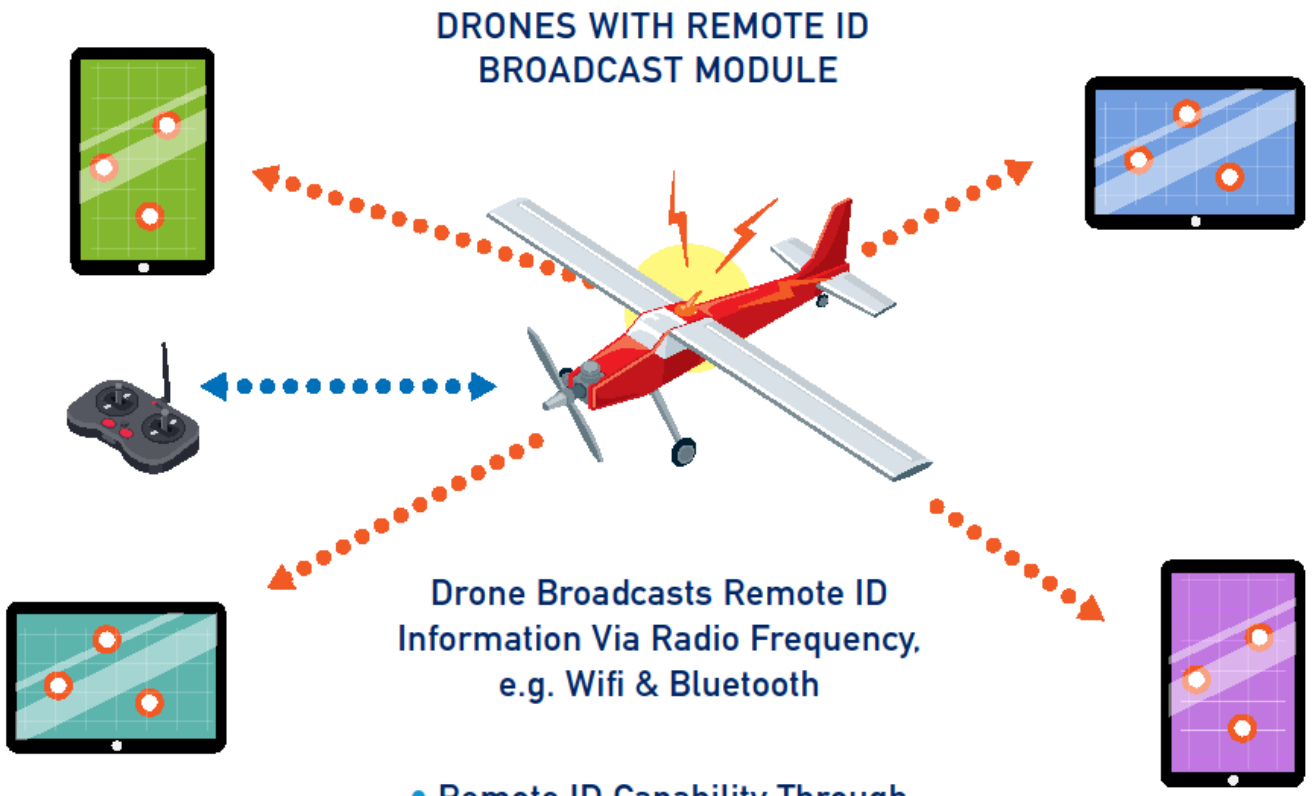
STANDARD REMOTE ID DRONES



Drone Broadcasts Remote ID Information Via Radio Frequency, e.g. Wifi & Bluetooth

- Remote ID Capability Is Built Into The Drone
- From Takeoff To Shutdown, Drone Broadcasts:
  - Drone ID
  - Drone Location and Altitude
  - Drone Velocity
  - Control Station Location and Elevation
  - Time Mark
  - Emergency Status

DRONE REMOTE IDENTIFICATION



- Remote ID Capability Through Module Attached To Drone
- Limited To Visual Line Of Sight Operations
- From Takeoff To Shutdown, Drone Broadcasts:
  - Drone ID
  - Drone Location and Altitude
  - Drone Velocity
  - Takeoff Location and Elevation
  - Time Mark

FAA-RECOGNIZED IDENTIFICATION AREA [FRIA]

DRONES WITHOUT REMOTE ID

- Drones Without Remote ID Can Operate Without Broadcasting
- Drones Without Remote ID Must Operate Within Visual Line Of Sight and Within the FRIA
- Anyone Can Fly There, but FRIAs Can Only be Requested by Community-Based Organizations and Educational Institutions

FAA approved Remote ID Drones and Modules are labeled compliant

Certified Remote ID equipment will include the notation

ASTM F3411-22a-RID-B

on the regulatory label.

Remote ID (RID) Broadcast Modules

The FAA has approved several Remote ID broadcast modules:

- Flite Test **FT EZ ID** - $70 plus $4 for a case

- Spektrum **SkyID** - $70
- **Ruko** (Hong Kong) - $25

- **Holy Stone** (Taiwan) - $25

List of Remote ID Compliant Devices

Search the list below to ensure your unmanned aircraft is in compliance with regulations for: **Remote ID (RID)** modules and drones and **Operations Over People (OOP) -- Part 107 only**

“FAA UAS Declaration of Compliance”

You can search by device serial number or manufacturer name and model

Remote ID Monitor APPS

Drone Scanner by Dronetag in Czech Republic (Android & iPhone)

AirSentinel – Alaska (Android only)

Test Question

Which of the following is not one of the minimum message elements that must be broadcast by a standard Remote ID unmanned aircraft according to § 89.305?

a) The altitude of the control station.

b) The battery level of the unmanned aircraft.

c) The latitude and longitude of the unmanned aircraft.

Test Question

Which of the following is not one of the minimum message elements that must be broadcast by a standard Remote ID unmanned aircraft according to § 89.305?

a) The altitude of the control station.

b) The battery level of the unmanned aircraft.

c) The latitude and longitude of the unmanned aircraft.

FAA Recognized Identification Area (FRIA)

Only available for national community-based organizations (CBO) such as an AMA chartered club flying sites or certain educational institutions

You may fly to the upper limit of Class G airspace (700’ or 1200’ depending on location) and with proper notification

Remote ID not required

Aircraft must be flown in Visible Line-of-Sight (VLOS), but no specified distance. Large model aircraft are visible at ½ mile or more.

FAA Recognized Identification Area (FRIA)

A list of all approved FRIA sites is available on the FAA UAS Data Delivery Service (UDDS) website

https://udds-faa.opendata.arcgis.com/

FAA Community Based Organization

- ✓ Described in section 501(c)(3) of the Internal Revenue Code of 1986;
- ✓ Exempt from tax under section 501(a) of the Internal Revenue Code of 1986;
- ✓ Mission of which is demonstrably the furtherance of model aviation;
- ✓ Provide a comprehensive set of safety guidelines for all aspects of model aviation;
- ✓ Provide programming and support for any local charter organizations, affiliates, or clubs; and
- ✓ Provide assistance and support in the development and operation of locally designated model aircraft flying sites

FAA Community Based Organization

1) Academy of Model Aeronautics (AMA)
2) First Person View Freedom Coalition (FPVFC)
3) Flite Test Community Association (FTCA)
4) STEM+C

Academy of Model Aeronautics

Founded in 1936

Headquarters in Muncie, IN

Over 2500 Clubs and 200,000 members

Over 2000 registered FRIA sites

AMA Membership

Online Registration at:

www.modelaircraft.org/

Adults = $85, Seniors (65 or older) = $75, Park Pilot = $48, Youth = $15

Benefits – monthly magazine, $2,500,000 liability insurance, $25,000 medical coverage & $1000 fire, theft and vandalism insurance

AMA®
ACADEMY OF MODEL AERONAUTICS

Black Hawk R/C Pilots

Adults - $100 ($50 first year), Youth - $24

Club owns a 10-acre flying field near New Hartford and is an FAA approved FRIA site

Monthly meetings and activities

AMA membership required

BLACK HAWK R/C PILOTS

AMA Chartered Club #792
Cedar Falls, IA

Adult Membership is $40/year
Youth Membership is $20/year
Founded in 2019
450 members – Online Meetings
Insurance not available
46 FRIA sites

Flight Test Community Association

Founded in 2019 in Malvern OH

Flight Crew Membership is $24/year

Annual “Flight Fest” event

Insurance not available

50+ FRIA sites

Mission is to provide the most fun, hands-on learning to students of all ages interested in Science Technology Engineering and Mathematics (STEM) through a Creative thought process. Our focus is in the areas of Aviation, Aeronautics, Aerospace, Software and Robotics. We passionately promote model aviation through hands on learning.

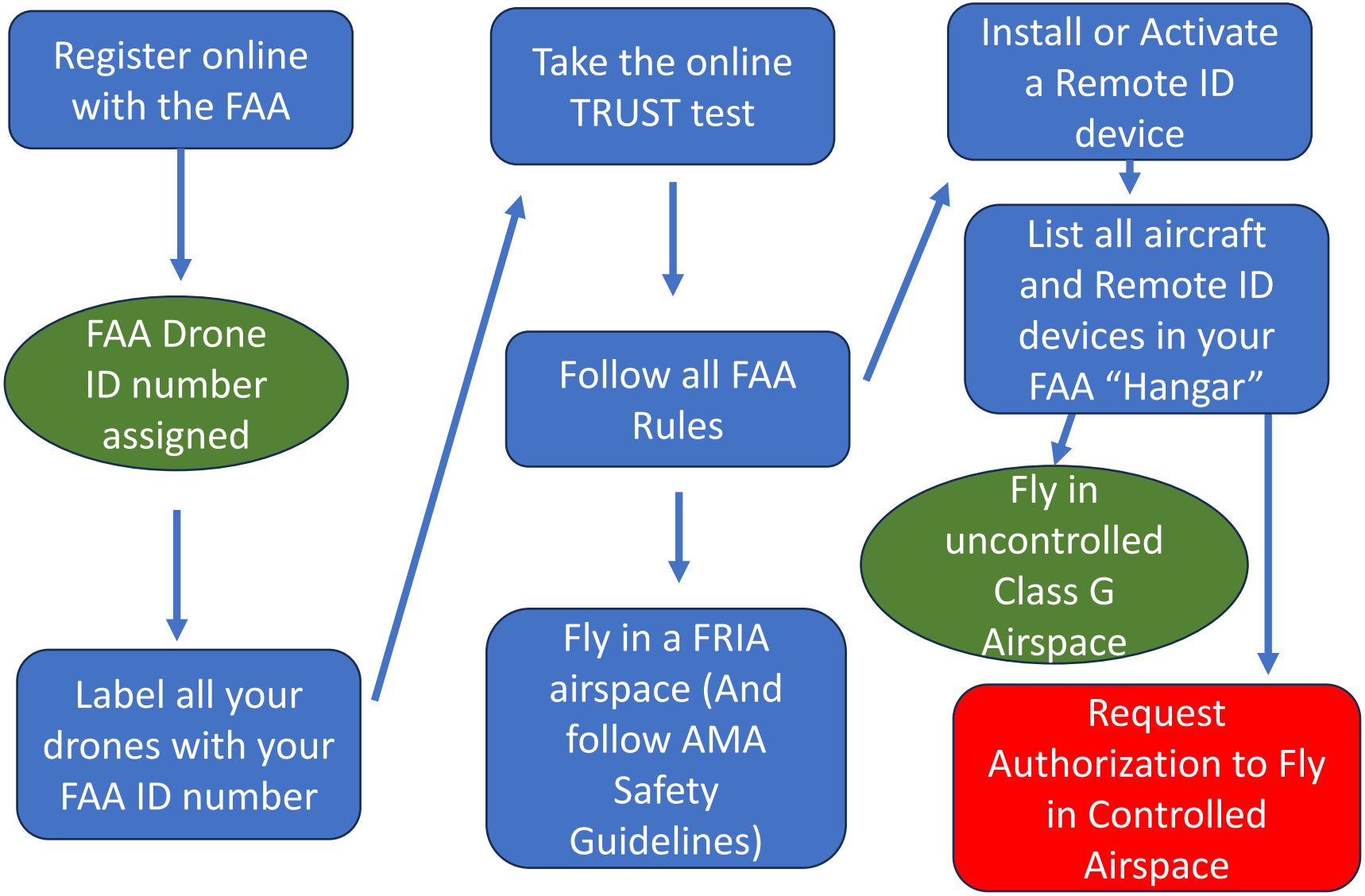
- **Dues are $100/year per organization**
- **27 FRIA locations**

FAA Exemptions

The following are exemptions to the FAA's sUAS rules:

1. **Aircraft flown indoors are exempt.**
2. **Recreational Pilots** flying **Micro Drones** that weigh less than 0.55 pounds (250 grams or 8.8 ounces) takeoff weight are not required to register with the FAA. **However, Micro Drone pilots are required to follow all other FAA rules and requirements.**

FAA Recreational Drone Pilots



Recreational Drone Pilot as defined by the FAA

The FAA Modernization and Reform Act defines "hobby" and "recreation" as:

- **Hobby –** a pursuit outside one's regular occupation engaged in especially for recreation.
- **Recreation –** a refreshment of strength and spirits after work, a means of refreshment or diversion.

What is Recreational use of an sUAS?

The recreational use of sUAS is the operation of an unmanned aircraft for personal interests and enjoyment. For example, using a sUAS to take photographs for your own personal use would be considered recreational; using the same device to take photographs or videos for compensation or sale to another individual would be considered a commercial operation.

What is Recreational use of an sUAS?

The Federal Aviation Administration considers any sUAS flight that promotes a business in any way to be a commercial drone flight.

What is Recreational use of an sUAS?

Can I take aerial photographs at a friend's wedding or party? Yes, but only if you are not compensated for the photographs.

Can I take aerial photos for my boss at work? (He's not paying me to do this.) No, this is still part of your work and is commercial photography.

Can I take a picture of my house for a real estate listing? No, publishing photographs to sell your house is considered commercial use.

What is Recreational use of an sUAS?

Can I post aerial video on Social Media?
Maybe. If your posting is just for "friends" on Facebook, YouTube, Instagram, Snapchat or other social media, it's probably OK. But if you are posting to a large audience or receive any compensation, then it's commercial photography.

What is Commercial use of an sUAS?

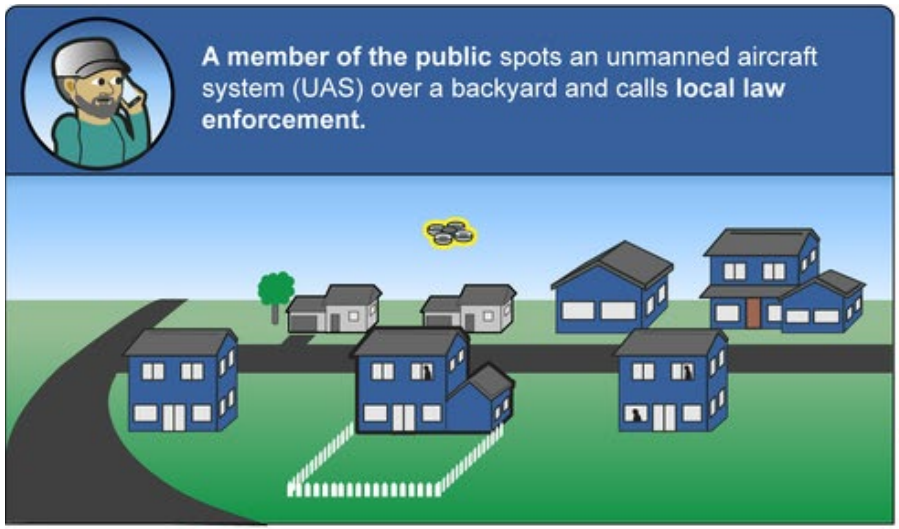
- **Selling** photos or videos taken from a drone for Real Estate listings, wedding photography, photography for a professional film or television production
- Using a drone to provide a **service**, such as equipment or factory inspections, mapping or land surveys
- Using drone to provide **professional services**, such as security or telecommunications
- Using a drone to monitor the progress of work **a company you work for** is performing
- Taking photos for a **school website or yearbook**

Cecil the Lion – $55,000 fine

Since Cecil the Lion

The FAA has now added volunteer work for a non-profit as Commercial Use.

200 FAA sUAS Compliance & Enforcement Actions each year



Source: GAO. | GAO-20-29

Airline Travel with Drones

effective March 11, 2019

FAA Airline Travel Rules for Drones

The FAA restricts the transport of lithium batteries on all passenger aircraft.

Lithium batteries intended for resale cannot be carried on passenger aircraft.

Lithium batteries for personal use must be carried in the cabin. They cannot be carried as baggage on any aircraft.

A reasonable number of batteries rated less than 100 Watt-hours (Wh) per battery can be carried onboard.

No more than two 101-300 Watt-hour lithium batteries are allowed – **May require airline approval!**

Newer Lithium batteries list Watt-hours on the battery label.

How to Pack Lithium Batteries for Airline Travel

Discharge	Discharge batteries to 1/3 capacity
Pack	Protect against short circuit by taping or insulating battery terminals
Protect	Pack in protective wrap such as bubble wrap or original packaging
Put	Put each battery in a separate Ziplock bag
Do Not Carry	Do not carry a damaged lithium battery onto an airplane


Any
Questions