

1. Regulations

1.2 - *Operating Rules*



Structure & Formatting Reminder

This presentation is provided as a reference to help you prepare for the your exam. It seeks to go beyond memorization and provide explanation and rationale.

While this reference considers many of the points covered in the exam, given the breadth it is in no way exhaustive. It is suggested to consult a variety of resources when preparing for the exam.

Text that is marked in **YELLOW** has a high probability of being referenced directly in one of the exam's nearly 400 possible questions.

Take the quiz at the end to gauge your understanding.



1.2a - Remote Pilot Certificate with sUAS Rating Requirements

All sUAS pilots flying for either **commercial or government** purposes must obtain a **Remote Pilot Certificate with sUAS rating** by passing the FAA Part 107 exam.

- The exam costs **\$175**
- Certification is **valid for 2 years** and can be renewed through a recertification exam.
- The exam covers material found in the [Aeronautical Information Manual \(AIM\)](#)
- When taking the test you are provided with a reference copy of the **Airman Knowledge Testing Supplement** and can also get paper, pencil, and a magnifying glass.



When is the next time you will need to renew after you pass your exam at the end of this class?



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When is the next time you will need to renew after you pass your exam at the end of this class?

2 years – 24 months – 730 days (you pick)



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1.2a - Remote Pilot Certificate with sUAS Rating Requirements

A pilot certificate lists both the **level** that defines the privileges and limitations and the **category** for which the pilot is qualified.

You are studying for the “remote pilot small unmanned aircraft” certification.



FAA



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Remote Pilot Certificate with sUAS Rating Requirements

In a “Remote Pilot Small Unmanned Aircraft” certification:

“**Remote Pilot**” refers to the **certification level**.

Other example of certification levels include:

- Private Pilot
- Flight Instructor
- Airline Transport Pilot



FAA



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1.2a - Remote Pilot Certificate with sUAS Rating Requirements

In a “remote pilot small unmanned aircraft” certification:

“**Small Unmanned Aircraft**” refers to the **category rating**.

Other example of ratings include:

- Airplane
- Rotorcraft
- Glider



Are you allowed to fly an airplane after earning your Part 107 rating?



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Are you allowed to fly an airplane after earning your Part 107 rating?

Nope. Drones Operator ≠ Airplane Pilot



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Remote Pilot Certificate with sUAS Rating Requirements

In aviation:

License = Certificate



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1.2a - Remote Pilot Certificate with sUAS Rating Requirements

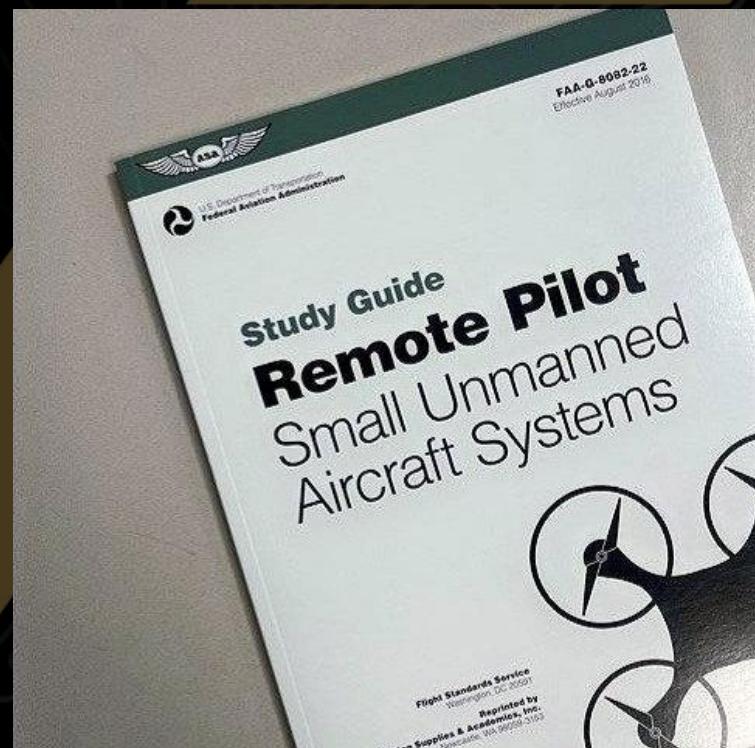
Someone with an sUAS rating who is manipulating the controls, or is responsible for another, is referred to as the “**Remote Pilot in Command**” or “**R-PIC**”



1.2a - Remote Pilot Certificate with sUAS Rating Requirements

To apply for a Part 107 certification the following conditions must be met:

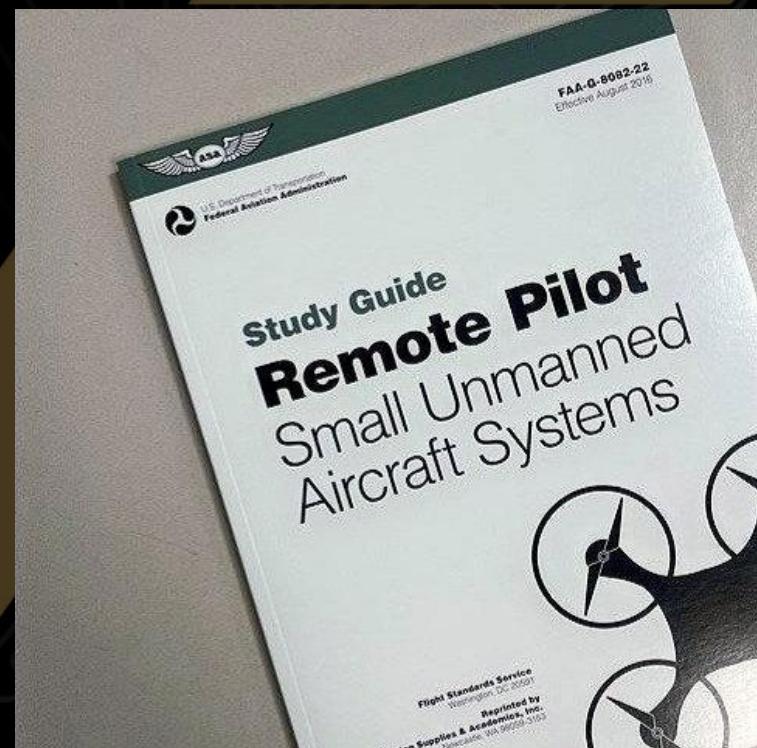
- At least **16 years of age**
- Be able to **read, speak, write, and understand English**
- Be in a **physical and mental condition** that doesn't interfere with safe operation.
- **Fulfill training and testing requirements** (pass the exam)



1.2a - Remote Pilot Certificate with sUAS Rating Requirements

After you pass the FAA Part 107 Exam
you need to:

1. Submit application through the Integrated Airman Certificate and/or Rating Application (**IACRA**)
2. Pass a **TSA Background Check**
3. Have a **designated Pilot Examiner process** your application (automated with sUAS).



If you have had legal trouble including drug convictions are you eligible for a Part 107 certificate?



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When is the next time you will need to renew after you pass your exam at the end of this class?

It depends on the nature, timing and circumstances. A convictions don't automatically disqualify you but certain actions, especially those involving drug or alcohol convictions can make it much more difficult.



1.2b - Registration Requirements for sUAS

- Any sUAS (over 0.55lbs or 250g) including recreational needs to be registered with the FAA and receive its own ID number.
- Registration costs \$5 and is renewed every 3 years.
- You must be 13 to register a UAV for recreational purposes.

.55lbs+ | 13 years old | \$5



1.2b - Registration Requirements for sUAS

- The UAV must be **labeled** in accordance with Part 47 “Registration and Marking Requirements for Small Unmanned Aircraft”
- Registration Marking must be:
 - A unique ID (**FAA-assigned Registration Number**)
 - **Legible**
 - **Durable** (engraving, permanent marker, adhesive label)
 - **Visible** (on external surface)



Why does the FAA require putting registration numbers on UAVs?



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Why does the FAA require putting registration numbers on UAVs?

Similar to a license plate on a car, the registration number helps identify the aircraft and its registered owner thereby allowing the FAA and/or law enforcement to trace a drone involved in an incident or a violation.



1.2b - Registration requirements for sUAS

Foreign Aircraft Permit

- Needed if using a UAV meets the following:
 - It is registered in another country
 - Owned by someone who is not a US Citizen or Permanent resident



The Atlantic



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1.2b - Registration Requirements for sUAS

Remote Identification (Remote ID)

- Remote ID provides identification and location information via radio frequency that can be received by parties such as the FAA, law enforcement, and federal agencies.
- Safety is the goal.
- Remote ID is required of all drones operating in US airspace as of September 2023.



1.2b - Registration Requirements for sUAS

- Newer UAVs have integrated Remote ID.
- A Remote ID module can be added to older or home made drones
(note that operations are restricted to Visual Line of Sight–VLOS)



1.2b - Registration Requirements for sUAS

- Remote ID information includes:
 - A unique identifier
 - The latitude, longitude, geometric altitude, and velocity of the drone.
 - The latitude, longitude, and geometric altitude of the control station.
 - A time stamp
 - Emergency status



Why has the FAA mandated the use of Remote ID?



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Why has the FAA mandated the use of Remote ID?

Remote ID enables drones to be identified remotely and tracked. It helps with situational awareness and finding pilots when the drone is flying in an unsafe manner.



1.2b - Registration Requirements for sUAS

- If operating in a FAA-recognized identification area (FRIA) remote ID is not required (other requirements apply). It is not an area without rules.
- FRIs can be established by schools and community-based organizations.



FAA



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1.2c - Safe Operation Requirement

To ensure **safe operation** the **RPIC** must do the following:

- **Environmental** assessment (weather, airspace, restrictions, people & property, ground hazards)
- **Crew** member briefings (operational requirements, roles & responsibilities), conditions, emergency procedures, contingency plans)
- **Equipment inspection** (control link established, battery, secure payload, unique ID visible.
- **Documentation** (Pilot certificate, registration, Certificates of Waiver (CoW)



1.2d - Interference of Medical Conditions

If you can't guarantee that a medical or mental concern won't interfere with safe operation than you shouldn't fly.

- This rule applies to everyone involved (Remote PIC, person manipulating the controls, Visual Observers, and any other direct participant)



1.2d - Interference of Medical Conditions

Examples of physical or mental incapacitations may include:

- Temporary or permanent loss of dexterity.
- Blurred or other difficulties with vision.
- Loss of focus from illness or medication.
- Debilitating physical conditions
- Hearing or speaking impairments



1.2e - Remote PIC Responsibilities

The RPIC is directly responsible for and is the final authority as to the operation of the sUAS conducted under Part 107. They must:

- Be designated before each flight (can change during the flight)
- Ensure operation poses no undue hazards to people or property
- Operate the sUAS to ensure compliance with all applicable provisions and regulations.



1.2e - Remote PIC Responsibilities

- During a flight operation a RPIC can oversee someone operating the controls and/or visual observers.
- They must remain in direct contact with all involved parties.



RPIC: V2D Member Probe Thompson
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1.2e - Remote PIC Responsibilities

- While working under a RPIC a person manipulating the controls or a visual observer does not need to be FAA Part 107 certified but they must maintain the same safety requirements.
- The RPIC is required to both be able to intervene with operation and maintain visual line of sight (VLOS) with the sUAS.
- In the case of autonomous flight the RPIC needs to be able to override the controls.



Who is in charge of a UAV flight mission?



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Who is in charge of a UAV flight mission?

RPIC (Remote Pilot in Command)



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1.2f - In-flight Emergencies

In the case of an inflight **emergency** you are **allowed** to deviate from FAA Part 107 requirements but only **to avoid injury**.

If **no damage or injuries** occur, you only need to **report** situation if requested by the FAA.

If **injury** (loss of consciousness or sutures) or **property damage** (over \$500) occur than the **incident must be reported** to the FAA.



Cooper Standard



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1.2g - Hazardous Operations

- Under FAA Part 107 regulations drones are not permitted to:
 - Operate in a careless or reckless manner that endangers life or property
 - Allow an object to be drop that creates an undue hazard



1.2h - Operating From a Moving Vehicle

Operation from a moving land or water-borne vehicle is permitted over sparsely populated areas.

Operation from a moving aircraft is not.



Adobe Stock



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Can you fly a drone from a moving vehicle without Part 107?



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Why does the FAA require putting registration numbers on UAVs?

Similar to a license plate on a car, the registration number helps identify the aircraft and its registered owner thereby allowing the FAA and/or law enforcement to trace a drone involved in an incident or a violation.



1.2h - Operating From a Moving Vehicle

- Operation from a **moving vehicle** are subject to the **same** restrictions as other Part 107 sUAS operations.
- Visual line of sight (**VLOS**) must be maintained
- The remote PIC and any visual observers (VOs) must **remain** in communication
- **No reckless operation** is permitted.



- State and local traffic laws apply

YouTube: TheActionLab



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1.2i - Alcohol or Drug Use

Under Part 107 you are prohibited from operating or being a crew member while impaired by drugs or alcohol

The following conditions are not permitted:

- Consumed any alcoholic beverage with the preceding 8 hours (bottle to throttle)
- Is under the influence of alcohol
- Has a blood alcohol concentration of .04% or greater
- Is using illegal drugs.
- Is taking prescription or OTC medication that impacts judgment or causes drowsiness.



Amazon



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1.2i - Alcohol or Drug Use

- Section 107.57 - Offenses - any **convictions** for drug or alcohol and **prohibit you from applying** for a certificate. Convictions can also result in a **revocation**.



How does the Blood Alcohol Level requirement for drone flights differ from operating a motor vehicle.



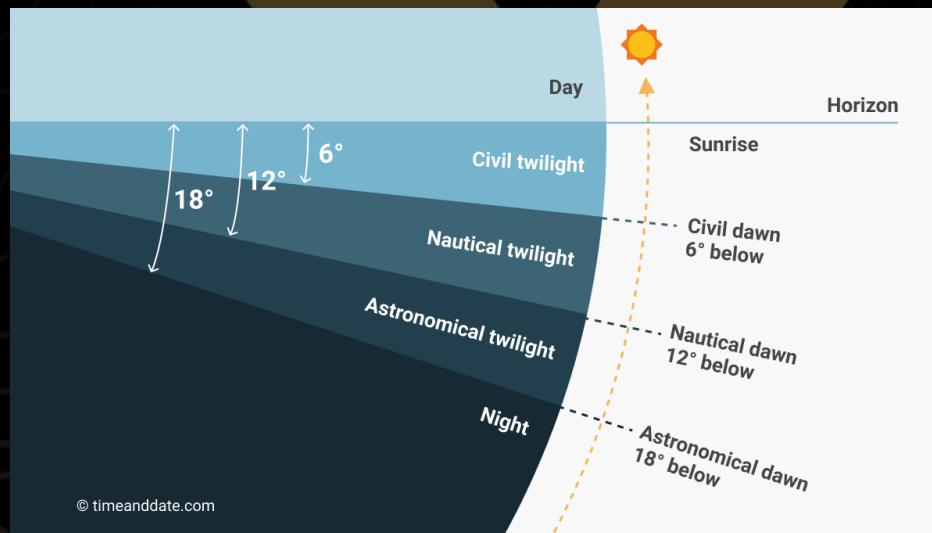
How does the Blood Alcohol Level requirement for drone flights differ from operating a motor vehicle.

BAC in most states for a motor vehicle is 0.08%. The FAA prohibits flight with a BAC above 0.04% AND no consumption within 8 hours.



1.2j - Night Operations

- **Civil Twilight** is defined as the period of time **before sunrise and after sunset** when the sun is not more than 6 degrees below the horizon.
- **Night** is the time **between** the end of **evening civil twilight** and the beginning of **morning civil twilight**.



1.2j - Daylight/Night Operation

- Any **operations** during civil twilight or night require **anti-collision lights** capable of being visible for at least 3SM.
- The intensity of the **lights may be dimmed** if they interfere with safety.
- A **white strobe** is required because green/red will appear as an aircraft in the distance.



Lumincube



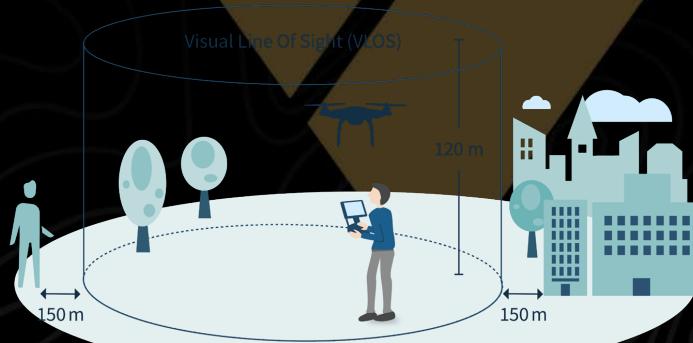
Lumincube



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1.2k - Visual Line of Sight (VLOS) Operations.

- The UAV must remain within VLOS of flight crewmembers.
- Use of binoculars or spotting scopes are only permitted to be used momentarily to enhance situational awareness.
- Operations might necessitate that VLOS is lost for brief periods of time but it must be regained as soon as possible (the remote PIC is still responsible for the duration of operation)



1.2I - Using a Visual Observer

- A visual observer (VO) is responsible for alerting the crew about potential hazards.
- Use of a VO is optional but one or more people may act as a VO in an operation.
- The RPIC is required to ensure that VOs are positioned where they can see the sUAS continuously and possess a means to effectively communicate with sUAS position and the position of hazards.



DJI



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Does having a VO mean that you don't need to keep an active VLOS?



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Does having a VO mean that you don't need to keep an active VLOS?

No, a VO does not mean that an opreration can stop maintaining Visual Line of Sight (VLOS). The aircraft must remain in sight and constant communication must be established.



1.2m - Operating Multiple sUAS

Operating multiple sUAS is not permitted.

A single RPIC may not oversee the operation of multiple sUAS simultaneously.

Some exceptions exist with waivers.



UAS Magazine



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1.2n - Hazardous Materials

UAVs may not carry any hazardous material.

Examples of hazardous materials include:

- Hazardous chemicals, hazardous waste, marine pollutants, and elevated temperature materials.



Note: Lithium batteries installed for operation are not considered hazardous material.

1.2o - Hazardous Materials

Under FAA regulations a UAV may not be weaponized.



PetaPixel



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1.2p - Other Aircraft & Right-of-Way Rules.

Crewed aircraft have the right of way 100% of the time.

- An sUAS pilot must remain clear and yield right-of-way to all other aircraft. This approach is considered “see-and-avoid”



1.2p - Other Aircraft & Right-of-Way Rules.

To satisfy the “see-and-avoid” requirement a remote PIC must:

- Know the **location and flight path** of their UAV
- **Be aware** of other aircraft, persons, and property
- Be able to **maneuver to avoid collision**
- **Avoid interfering** with other operations
- **Yield right-of-way** to all other aircraft.



What is the “see and avoid” principal?



What is the “see and avoid” principal?

An FAA safety rule that means pilots (including drone pilots) must always watch for other aircraft and take action to avoid collisions.



1.2q - Operating Around People

Do not conduct "sustained flight" over people who are not involved in operation

Do not fly over moving vehicles.



Unmanned Airspace

Note: Shooting at a drone registered with the FAA carries the same penalty as shooting at any other crewed aircraft. Expect federal charges.



1.2r - Prior Authorization for Operations

If flying in an area that has restrictions you may need to obtain a waiver.

It is important to submit your request early as they can take long as 90 days to process.

Many authorizations can be obtained via the Low Altitude Authorization and Notification Capability (LAANC)



FAA



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1.2s - Operating Near Airports

All controlled airspace (Classes A, B, C, D, E) are subject to limitations for UAV flight depending on the classification, proximity, and altitude.



1.2t - Operating in Prohibited or Restricted Areas

Flight over National Parks/Seashores/Wildlife Refuges/Monuments is not permitted. Flights in National Forests may be allowed.

Some states prohibit flight in State Parks. For example:

- In NC you are not allowed to fly in State Parks.
- In SC flying in state parks is allowed with permission.



Dronelife



Oregon Public Broadcasting

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Why do rules regarding drone use differ around the country?



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Why do rules regarding drone use differ around the country?

While the FAA controls the national airspace, states, cities, and counties can create their own rules about where drones can take off, land, or be used



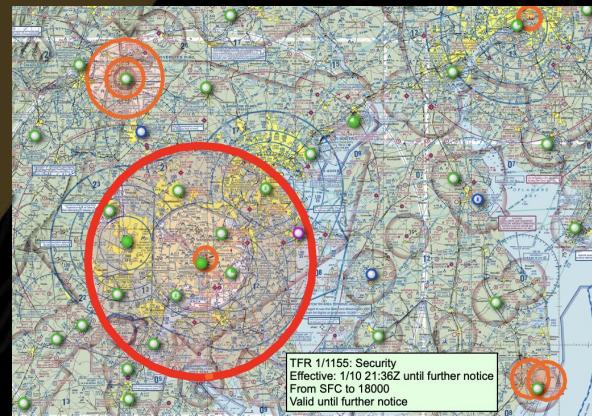
1.2u - Flight Restrictions & NOTAMs

NOTAMs

- **Notices to Air Missions**
(NOTAMs) are issued by the Flight Data Center (FDC) and provide current information regarding **time critical** information on airports and changes that affect the NAS.
- NOTAMs can identify temporary flight restrictions (TFR)
- NOTAMs should be **checked before each flight** (example: AirAware App)



Aloft



1.2u - Flight Restrictions & NOTAMs

NOTAMS (including TFRs) may be issued for the following reasons (and others):

- Presidential travel
- Air shows
- Sporting Events
- Forest Fires
- Natural Disasters



WLPG 10



CBS NEWS



Nature



SUPER BOWL

NFL



US Air Force
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1.2v - Preflight Inspections

General Rule: **Pilot in Command is Responsible for Everything**

- Operating conditions
- Contingency procedures
- Roles and responsibilities
- Potential hazards.
- Ensure all control links between ground station and UA are working properly.
- Ensure available power (battery charge) is sufficient for intended operation.
- Ensure payload does not adversely affect flight characteristics and control of UA.



1.2v - Preflight Inspections

- **Remote Pilot Checklist** (have one printed out and laminated to keep in your drone case and/or use an electronic version.)

Drone Pre-Flight Checklist

The drone pre-flight checklist allows you to conduct a full pre-flight check, including requirements for being within five miles of a US airport. Find the digital version of this form and more at <https://www.fulcrumapp.com/apps/drone-pre-flight-checklist>.

Location

Address (required) Street Address
 City, State, Zip

► Within 5 miles of a major airport? (Required under some circumstances.)
 Yes No

► If yes: Control tower permission?
 Yes No

Pre-Flight Checklist

► Drone firmware up to date? (required)
 Go No-Go

► Transmitter firmware up to date? (required)
 Go No-Go

► Free of visible defects? (required)
 Go No-Go

► Batteries fully charged? (required)
 Go No-Go

► Propellers properly tightened? (required)
 Go No-Go

► Camera mounted properly? (required)
 Go No-Go

 **Fulcrum** Get the digital version of this checklist and more at fulcrumapp.com/checklists.

1.2v - Preflight Inspections

Day Before the Assignment

- Charge and check all batteries - look for swelling
- Make sure all software is updated
- Check props for warming, nicks, or any damage.
- Check your IMU (inertial measurement unit) calibration (optional)
- Scout your flight location
 - Get LAANC Approval if Needed
 - Check for overhead obstacles and restrictions, powerlines
 - Set minimum height for return to home
 - Check flight areas foot traffic
 - Check wind speeds forecast for flight time



1.2v - Preflight Inspections

Day Of the Assignment

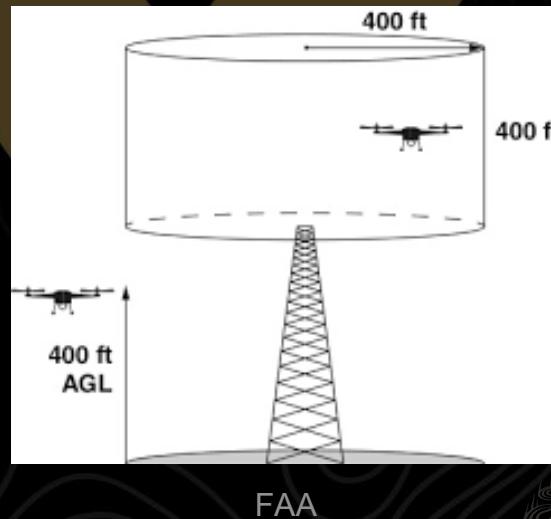
- Inspect props for damage.
- Visually inspect whole drone for damage (especially motors)
- Double check return to home point
- Make sure satellite lock (home point) is connected
- Make sure you are not in sport mode
- Calibrate your drone's compass.
- Make sure RC propellers are parallel
- Camera
 - Format SD card
 - Calibrate gimbal
 - Calibrate camera settings (ND Filter) Check Camera Frame Rate/ ISO
- 100/ Shutter 50/100, white balance



1.2w - Operating Limitations for sUAS

sUAS must be operated in accordance with the following **limitations**:

- Maximum Ground Speed of **100mph** (87 knots)
- Altitude limit of **400 feet Above Ground Level** (AGL)
- If flying over structure you are allowed to fly **400 feet above the uppermost limit.**



1.2w - Operating Limitations for sUAS

Minimum Visibility - 3 SM

Cloud Clearance Requirements - Stay at least **500 feet below** and **2,000 feet horizontally** away from clouds.

3 Statute Miles
Minimum



Why must a UAV operate at least 500 feet below and 2000 feet away from a cloud?



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Why must a UAV operate at least 500 feet below and 2000 feet away from a cloud?

To ensure safe separation from manned aircraft, especially those flying under Visual Flight Rules (VFR).



1.2x - Transponder Prohibition

Transponders are used by crewed aircraft to broadcast identification information that includes:

- GPS Location
- Altitude
- Ground Speed

Transponders are most important near busy airports.



Sarasota Avionics

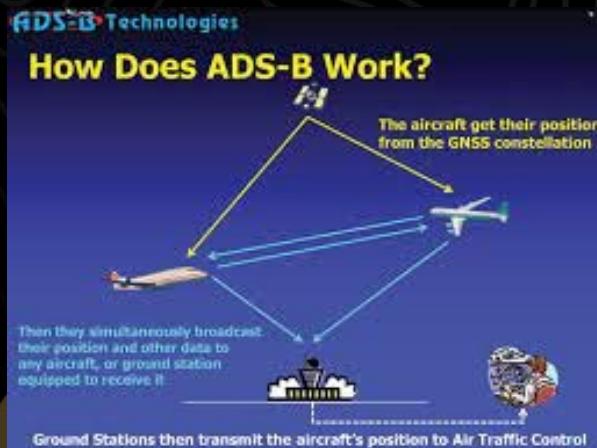


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1.2x - Transponder Prohibition

ADS-B Out is an Automatic Dependent Surveillance-Broadcast broadcasts once a second.

ADS-B is intended to increase information available to Air Traffic Controllers.



Why do you think the use of ADS-B transponders are banned with UAV use.



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Why do you think the use of ADS-B transponders are banned with UAV use.

They could overload the air traffic system and create safety and interference risks.



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1.2x - Transponder Prohibition

There are a **limited number of** ADS-B transponders **frequencies**. If all UAVs are broadcasting there might not be enough for crewed aircraft.

The **remote ID requirement** for drones will work in a **similar** way but uses different frequencies.



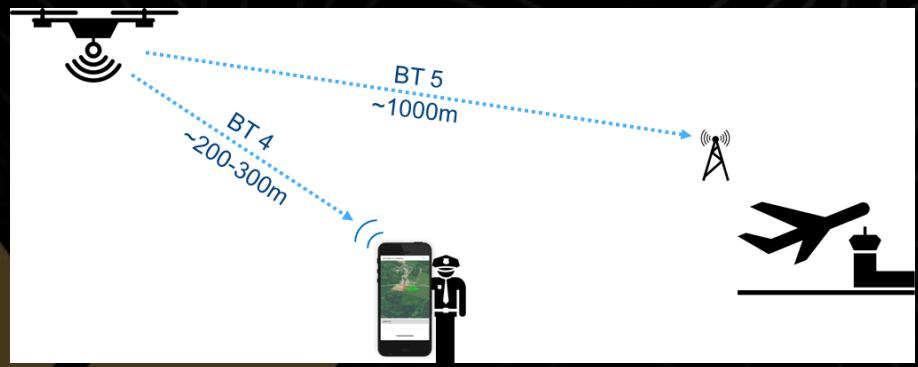
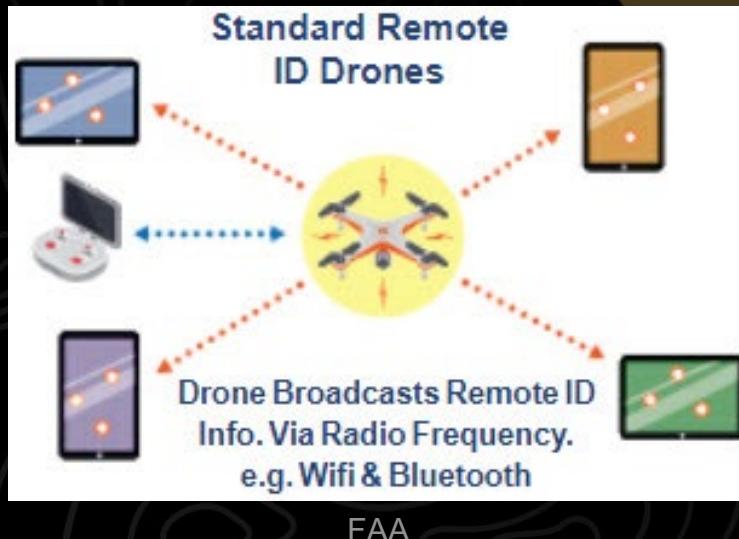
The Drone Girl



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1.2y - Remote Frequency ID Requirements

- Beginning in September 2023 **RFID** became required to fly all UAVs **needing registration.**



Does a UAS weighing less than 0.55 pounds required remote ID?



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Does a UAS weighing less than 0.55 pounds required remote ID?

No, presuming it is being flown for recreation. It does not need to be registered either.
If used for commercial purposes, it does need to be registered and broadcast remote ID.



1.2y - Remote Frequency ID Requirements

- Remote ID requirements can be met either by the **manufacturer's integrated module** or through attaching an **external module**.



DroneBeacon



DroneBeacon



Dronetag



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1.2y - Remote Frequency ID Requirements

- When registering your UAV with the FAA you will need to be able to supply your RemotID Identification number from either the aircraft or the module.
- Note: with some manufactures the serial number and remote ID are the same number.



FAA



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Why would the FAA require Remote Frequency ID?



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Why would the FAA require Remote Frequency ID?

Similar to a license plate on a car, the registration number helps identify the aircraft and its registered owner thereby allowing the FAA and/or law enforcement to trace a drone involved in an incident or a violation.



1.2z - FAA-Recognized Identification Areas (FRIA)

- A FRIA is an area where UAVs can operate **without** remote ID.
- VLOS (Visual Line of Sight) must still be maintained.
- All other FAA regulations apply.



Unit 1 Regulations – 1.2 Review Quiz

- 1.2 - Operating Rules - QUIZ
- This quiz contains 72 questions.
 - You may take it as many times as you like.
 - The order of questions are randomized each time.
 - The large majority of the questions are worded exactly as they appear on the exam.

