Intro to Small Unmanned Aircraft Systems & Recreational Drones

Airspace Authorizations Further Consideration Waivers

- Use **LAANC** for an Airspace Authorization in Controlled Airspace
- Use **LAANC + Further Consideration** to go beyond normal altitude limits in Controlled Airspace
- Use **FAA Drone Zone** to obtain a Waiver to deviate from Part 107 Rules
- Use **FAA Drone Zone** for a Waiver/Authorization to deviate from Part 107 Rules in Controlled Airspace

LAANC “Further Coordination”

- **LAANC** is normally used to request authorization for operations under 400 feet in controlled airspace around airports (available to Part 107 Pilots and Recreational Flyers).
- Part 107 pilots can submit a "**further coordination request**" if you need to **fly above the designated altitude ceiling in a UAS Facility Map, up to 400 feet**.
- You can apply up to 90 days in advance of a flight, and the approval is coordinated manually through the FAA. There’s a 72-hour minimum leadtime for requests.
- Facilities can provide additional guidance for denied Further Coordination requests, allowing drone pilots to adjust operations and resubmit their request.

Effective August 2024

Part 107 Operational Waivers

A waiver is an official document issued by the FAA which approves certain operations of aircraft outside the limitations of a regulation. You may request to fly specific drone operations not allowed under Part 107 by requesting an operational waiver. These waivers allow drone pilots to deviate from certain rules under Part 107 by demonstrating they can still fly safely using alternative methods.

What is the difference between an Authorization and a Waiver?

- An **Authorization** is associated with <u>controlled airspace</u>, and
- A **Waiver** is associated with <u>operations</u>

Waiver/Authorization

A **Waiver Authorization** is twofold. It's a request to deviate from the Operational Rules in a Controlled Airspace.

Waivers & Authorizations

1) Log into your account on **FAA DroneZone**
2) Input make/model information for your drone
3) Select **“Operational Waiver”** or **“Part 107 Waiver/Authorization”**

Airspace Waiver/Authorization

Operation in airspace beyond that granted by LAANC - § 107.41

A **Waiver/Authorization** is required for approval to fly in any controlled airspace that cannot be authorized using the online **LAANC** system or **Further Coordination**.

- Operation at higher-than-normally approved altitude in controlled airspace
- Operation in normally restricted airspace

Airspace Waiver/Authorization

§ 107.41 - Operation in airspace beyond that granted by LAANC is required to fly higher than the normal altitude limits in Class B, C or D airspace; or to fly in Class E airspace.

Part 107 Operational Waivers

You do not need a waiver to fly a drone when following Part 107 rules.

You do need a waiver when you want to operate a drone contrary to the rules in Part 107 under the waivable operations options.

Part 107 Operational Waivers

You can request **operational waivers** for nine Part 107 Rules

Operational Waivers

A certificate of waiver may authorize a deviation from the following regulations:

- § 107.25 – Operation from a moving vehicle
- § 107.29 – Operation at twilight or night
- § 107.31 – Visual line of sight aircraft operation.
- § 107.33 – Visual observer.
- § 107.35 – Operation of Multiple Small UAS
- § 107.37 – Operation near aircraft; right-of-way rules
- § 107.39 – Operation over people.
- § 107.51 – Operating limitations for small UAS.
- § 107.145 – Operations over moving vehicles

Part 107 – You need an Operational Waiver to….

Fly a small UAS from a moving aircraft or a vehicle in populated areas

§ 107.25 – Operation from a Moving Vehicle or Aircraft

§ 107.25 – **Operation from a Moving Vehicle or Aircraft**

A waiver is required for operation from a moving vehicle or boat in a populated area.

No person may operate a drone from a moving aircraft; or from a moving land or water-borne vehicle unless the small unmanned aircraft is flown over a sparsely populated area and is not transporting another person's property for compensation or hire.

§ 107.25 – **Operation from a Moving Aircraft**

Enhanced Detect-and-Avoid (DAA) Systems: The FAA places significant emphasis on "how will the RPIC 'see (detect) and avoid' other aircraft".

- For operations involving a moving aircraft (which is inherently less maneuverable than ground vehicles), technology like DAA systems, potentially using a combination of onboard sensors, radar, or integration with air traffic information systems (ADS-B In/Out), is critical to address collision avoidance risks.
- Applicants must describe in detail how they will use technology to maintain situational awareness beyond human visual line of sight, as the manned aircraft's speed makes losing sight of the drone likely.

Sample Test Question

A pilot may fly a drone from a moving vehicle or boat if the drone is:

1) Equipped with a transponder.
2) Equipped with visible anti-collision lights.
3) Operated over a sparsely-populated area

Sample Test Question

A pilot may fly a drone from a moving vehicle or boat if the drone is:

1) Equipped with a transponder.
2) Equipped with visible anti-collision lights.
3) **Operated over a sparsely-populated area**

Part 107 – You need an Operational Waiver to….

Fly a small UAS at night without anti-collision lighting

§ 107.29(a)(2) – Operation at night

Fly a small UAS during periods of civil twilight without anti-collision lighting

§ 107.29(b) – Operation at Night

§ 107.29 – Operation at Night

The small unmanned aircraft operated at night or during periods of civil twilight must have anti-collision lighting visible for at least **3 statute miles** with a flash rate sufficient to avoid a collision.

Note: The onboard colored status/directional drone lights are usually NOT suitable anti-collision lights.

Recreational pilots are now allowed to fly at night with proper lighting.

Part 107 – You need an Operational Waiver to….

Use a visual observer without following all visual observer requirements

§ 107.33 – Visual Observer

§ 107.33 Visual observer

If a visual observer is used during the aircraft operation, all of the following requirements must be met:

a) The remote pilot in command, the person manipulating the flight controls of the small unmanned aircraft system, and the visual observer must **maintain effective communication** with each other at all times.

b) The remote pilot in command must ensure that the visual observer is able to **see the unmanned aircraft**. (Glasses & contacts are allowed.)

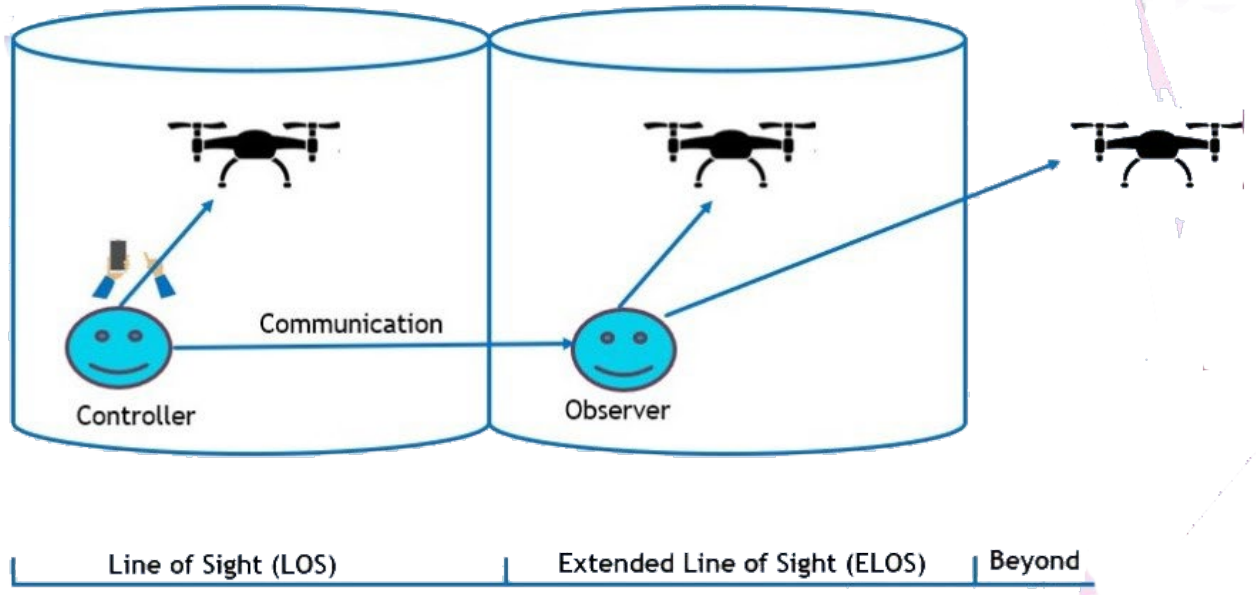
c) The remote pilot in command, the person manipulating the flight controls of the small unmanned aircraft system, and the visual observer must coordinate to do the following:

   1) **Scan the airspace** where the small unmanned aircraft is operating for any potential collision hazard; and

   2) Maintain **awareness of the position** of the small unmanned aircraft through direct visual observation.

§ 107.33 - Visual Observer (VO)

You need a waiver if your operation requires the use of multiple Visual Observers, not all of which will be able to maintain visual line of sight with your drone at the same time. An example of operations where this may apply is when using a daisy-chain of Visual Observers to maintain direct visual contact with the drone throughout the entire flight.



Part 107 – You need an Operational Waiver to….

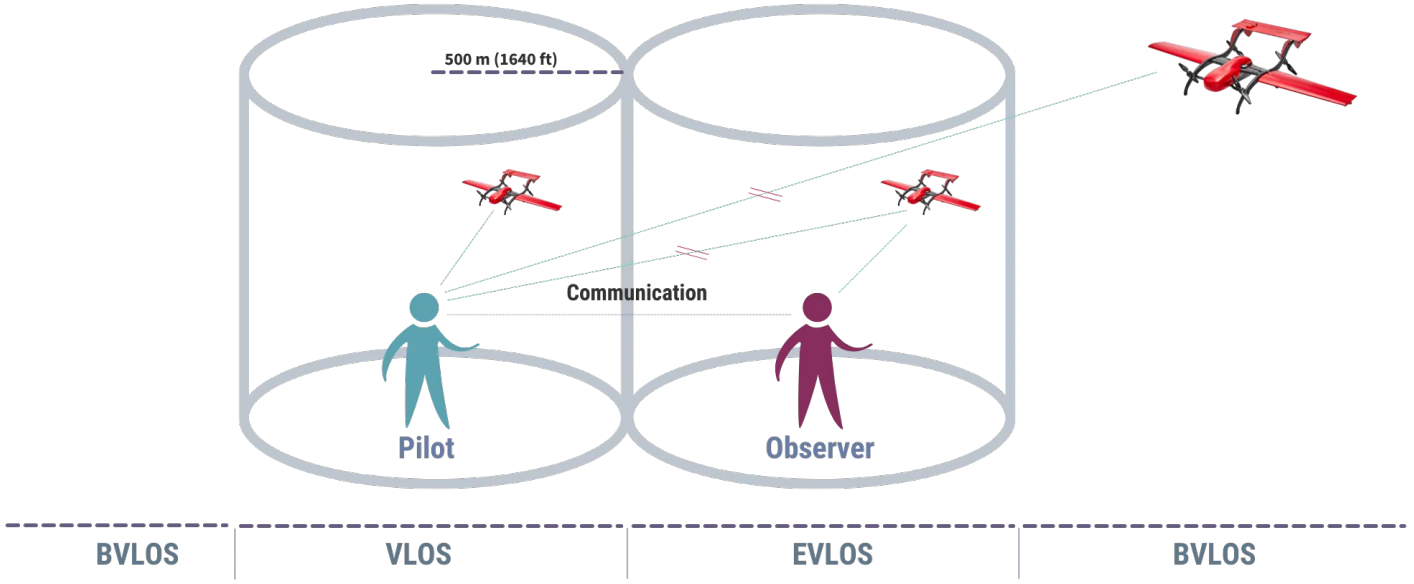
Fly a small UAS beyond your ability to clearly determine the position, altitude, attitude, and movement of the sUAS, with unaided vision.

§ 107.31 – Visual Line of Sight Aircraft Operation

§ 107.31 - Visual Line of Sight aircraft operation:

A waiver is required for

Beyond Visual Line of Sight (BVLOS).



No waiver will be issued to allow the carriage of property of another by aircraft for compensation or hire.

Beyond Visual Line of Sight (BVLOS)

The FAA has published a Notice of Proposed Rulemaking (NPRM) for a new regulation, tentatively referred to as Part 108, designed to create a standardized framework for routine BVLOS operations.

Operational Requirements: Operations would generally be below 400 feet above ground level, launching from designated, access-controlled locations.

New Roles: The rule introduces new operational roles, such as "Operations Supervisor" and "Flight Coordinator," who would require specific training provided by their organization.

Stay Informed: The public comment period for the proposed Part 108 rule has closed, and a final rule is expected in late 2026 or 2027. Continue to monitor official FAA UAS communications for the latest updates.

** Once the new Part 108 Rules are finalized, you will need to take a Recurrent Test to be able to fly BVLOS.*

Part 107 – You need an Operational Waiver to….

Fly multiple small UAS with only one remote pilot

§ 107.35 – Operation of Multiple Small UAS

§ 107.35 – **Operation of Multiple Small UAS**

A person may not operate more than one unmanned aircraft at the same time. This includes:

1) The person manipulating flight controls or;
2) The remote pilot in command or;
3) A visual observer.

All drone swarm operations require a waiver.

Part 107 – You need an Operational Waiver to….

(a) Small UAS must yield the right of way to all aircraft. Yielding the right of way means that the small UAS must give way to the aircraft and not pass over, under or ahead of it unless well clear.

(b) No person may operate a small unmanned aircraft so close to another aircraft as to create a collision hazard.

§ 107.37 - Operation near aircraft; right-of-way rules.

Sample Test Question

During a flight of your small UAS, you observe a hot air balloon entering the area. You should:

A) yield the right-of-way to the hot air balloon.

B) ensure the sUAS passes below, above or ahead of the balloon.

C) expect the hot air balloon to climb above your altitude.

Sample Test Question

During a flight of your small UAS, you observe a hot air balloon entering the area. You should:

A) **yield the right-of-way to the hot air balloon.**

B) ensure the sUAS passes below, above or ahead of the balloon.

C) expect the hot air balloon to climb above your altitude.

Part 107 – You need an Operational Waiver to….

Fly a small UAS:

- **Over 100 miles per hour groundspeed**
- **Over 400 feet above ground level (AGL)**
- **With less than 3 statute miles of visibility**
- **Within 500 feet vertically or 2000 feet horizontally from clouds**

§ 107.51 – Operating limitations for Small Unmanned Aircraft

§ 107.51 – **Operating limitations for Small Unmanned Aircraft**

Operating limitations for small unmanned aircraft. A waiver is required to deviate from the following:

- The minimum flight visibility, as observed from the location of the control station must be no less than **3 statute miles**.
- The minimum distance from clouds for small unmanned aircraft must be no less than:
  1) 500 feet below the cloud; and
  2) 2,000 feet horizontally from the cloud.

§ 107.51 – **Operating limitations for Small Unmanned Aircraft**

A waiver is required to deviate from the following:

- The groundspeed of the small unmanned aircraft may not exceed 87 knots (100 miles per hour).
- The altitude of the small unmanned aircraft cannot be higher than 400 feet above ground level, unless the small unmanned aircraft:

  (1) Is flown within a 400-foot radius of a structure; and

  (2) Does not fly higher than 400 feet above the structure's immediate uppermost limit.

  Note: Recreational flyers are not permitted to exceed the 400-foot limit except in a approved FRIA area.

Sample Test Question

The maximum speed a drone may fly without a waiver is:

1) 100 knots
2) 87 MPH
3) 100 MPH
4) Drones cannot fly very fast; there's no speed limit.

Sample Test Question

The maximum speed a drone may fly without a waiver is:

1) 100 knots
2) 87 MPH
3) **100 MPH (87 knots)**
4) Drones cannot fly very fast; there's no speed limit.

Sample Test Question

You've been hired to survey the water tower at the corner of Hudson & Greenhill Roads. It's 250 feet AGL.

a) I can fly 650 feet AGL 400 feet over the water tower.
b) I can fly 400 feet AGL, only 150 feet over the water tower.
c) I need LAANC authorization and can fly 650 feet over the water tower.
d) I need LAANC authorization and can only fly 400 feet AGL

Sample Test Question

You've been hired to survey the water tower at the corner of Hudson & Greenhill Roads. It's 250 feet AGL.

a) I can fly 650 feet AGL 400 feet over the water tower.

b) I can fly 400 feet AGL, only 150 feet over the water tower.

c) I need LAANC authorization and can fly 650 feet over the water tower.

d) I need LAANC authorization and can only fly 400 feet AGL

"LAANC altitude limits are absolute values above ground level which shall not be added to the height of any structures."

Sample Test Question

You are trying to inspect a structure that is 1500 feet tall in Class G airspace, but a layer of Class C airspace starts at 1200 feet AGL. How do you do the inspection?

A) I’m a Part 107 pilot, so I can fly 400 feet over a tower.

B) I need a Waiver to fly into Class C airspace.

C) The inspection will only take 15 minutes, so I will use a Visual Observer (VO) and do it when no aircraft are in the vicinity.

Sample Test Question

You are trying to inspect a structure that is 1500 feet tall in Class G airspace, but a layer of Class C airspace starts at 1200 feet AGL. How do you do the inspection?

A) I'm a Part 107 pilot, so I can fly 400 feet over a tower.

B) I need a Waiver to fly into Class C airspace.

C) The inspection will only take 15 minutes, so I will use a Visual Observer (VO) and do it when no aircraft are in the vicinity.

*You need **approval and a waiver** to fly above obstacles in Class B, C, or D controlled airspace. You can only fly 400 feet over a structure into Class E airspace.*

Part 107 – You need an Operational Waiver to….

Fly over a person or moving vehicle with a small UAS which does not meet conditions of operational categories 1, 2, 3 or 4

§ 107.39 – Operation over human beings

§ 107.145 - Operations over moving vehicles

Operations over People

Operations over people are prohibited except for:

- Any persons directly participating in the operation of the small unmanned aircraft;
- Any people located under a covered structure or inside a stationary vehicle that can provide reasonable protection from a falling drone;

Or the aircraft meets certain requirements….

Operations over People

There are four drone categories for Operations over People (OOP) –

Category 1, 2, 3 & 4

- All categories must have active Remote ID, and
- Categories 1 thru 3 must not contain any exposed rotating parts that would lacerate human skin upon impact with a human being (i.e., propeller guards).

Operations over People

Category 1 –

1) The Drone weighs 0.55 pounds (250 grams) or less on takeoff; and
2) Has Remote ID and propeller guards.

Operations over People

Category 2 –

1) Drone has an FAA-accepted **Declaration of Compliance** (DOC) and is certified by manufacturer to have kinetic energy upon impact of less than **11 foot-pounds / 15 joules**; and
2) Has Remote ID and propeller guards; and
3) Does not have safety defects; and
4) Weighs less than 55 pounds.

Operations over People

Category 3 –

1) Drone has an FAA-accepted **Declaration of Compliance** (DOC) and is certified by manufacturer to have kinetic energy upon impact of less than **25 foot-pounds / 34 joules**; and
2) Has Remote ID and propeller guards; and
3) Does not have safety defects; and
4) Weighs less than 55 pounds.

Operations over People

In Addition –

Category 1 & 2 may fly “sustained flight” over open-air assemblies of people.

Category 3 may fly within or over a closed- or restricted-access site and all people located within site **must be on notice** that a small unmanned aircraft may fly over them

Operations over People

- **Category 4 –**

1) Must have an **Airworthiness Certificate** under Part 21 and be approved for flights over people.
2) Be operated in accordance with the operating limitations specified in the approved Flight Manual or as otherwise specified by the Administrator.
3) Have maintenance, preventive maintenance, alterations or inspections performed as prescribed in this section

Operations over Moving Vehicles

For an operation under Category 1, 2 or 3, the small unmanned aircraft, throughout the operation –

1) Must remain within or over a closed- or restricted-access site, and all human beings located inside a moving vehicle in the site must be on notice that a small unmanned aircraft may fly over them; or
2) Must not maintain sustained flight over moving vehicles.

Definitions
Operations Over Human Beings:
What does “over” mean?

“Over” refers to the flight of the small unmanned aircraft directly over any part of a person. A flight where a small UAS flies over any part of any person, regardless of how long the flight is over the person, would be considered an operation over people.

A small UAS that hovers directly over a person's head, shoulders, or extended arms or legs would be an operation over people. Similarly, if a person is lying down at a beach, an operation over that person's torso or toes would also constitute an operation over people.

Definitions
Operations Over Human Beings (Open-Air Assemblies): What does “sustained flight” mean?

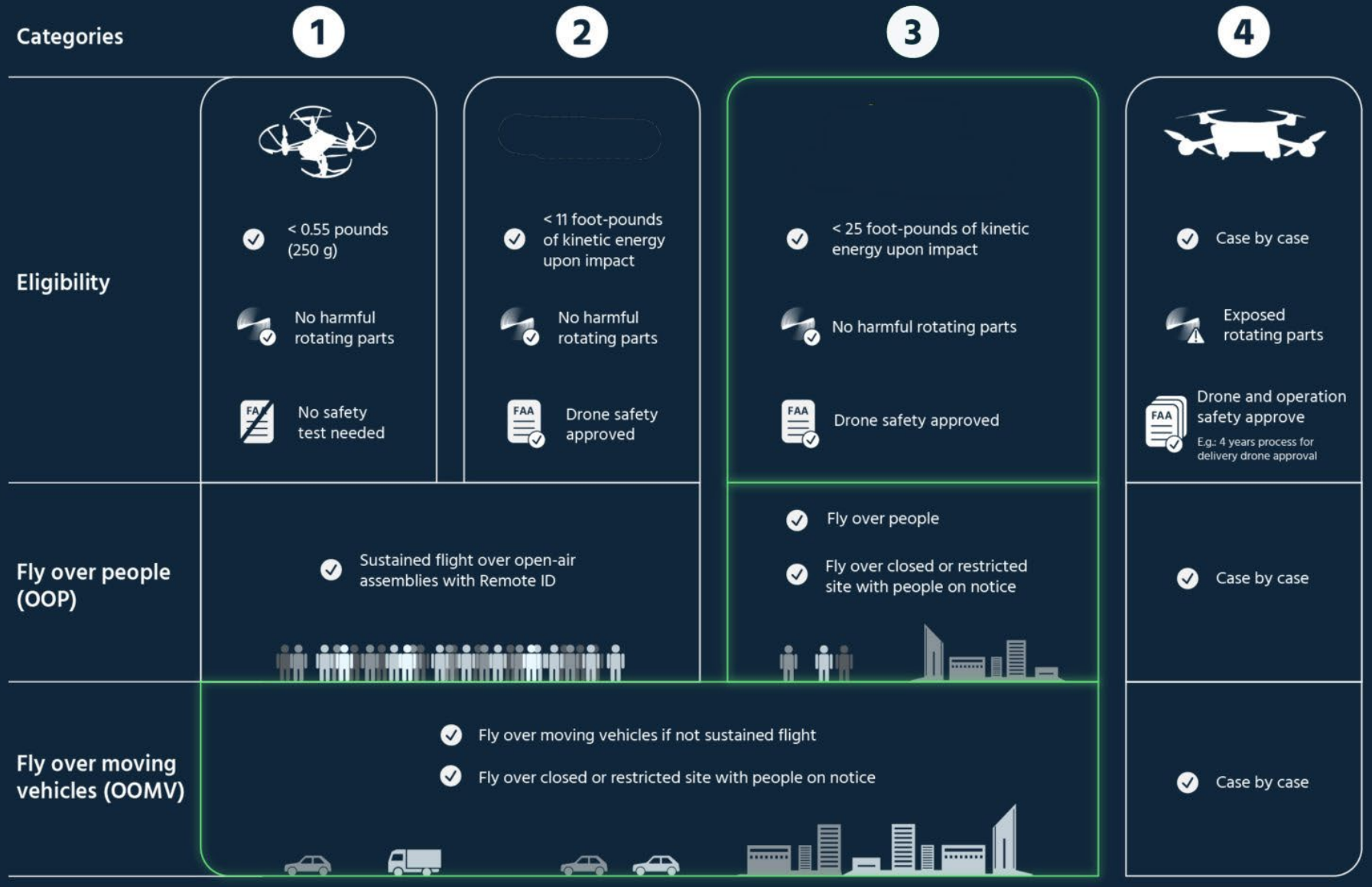
“Sustained flight” over an open-air assembly includes **hovering** above the heads of persons gathered in an open-air assembly, **flying back and forth** over an open-air assembly, or **circling** above the assembly in such a way that the small unmanned aircraft remains above some part the assembly.

Sustained flight over an open-air assembly of people does not include a **brief, one-time transiting** over a portion of the assembled gathering, where the flight is unrelated to the assembly.

Definitions
Operations Over Human Beings: What is an “open-air assembly?”

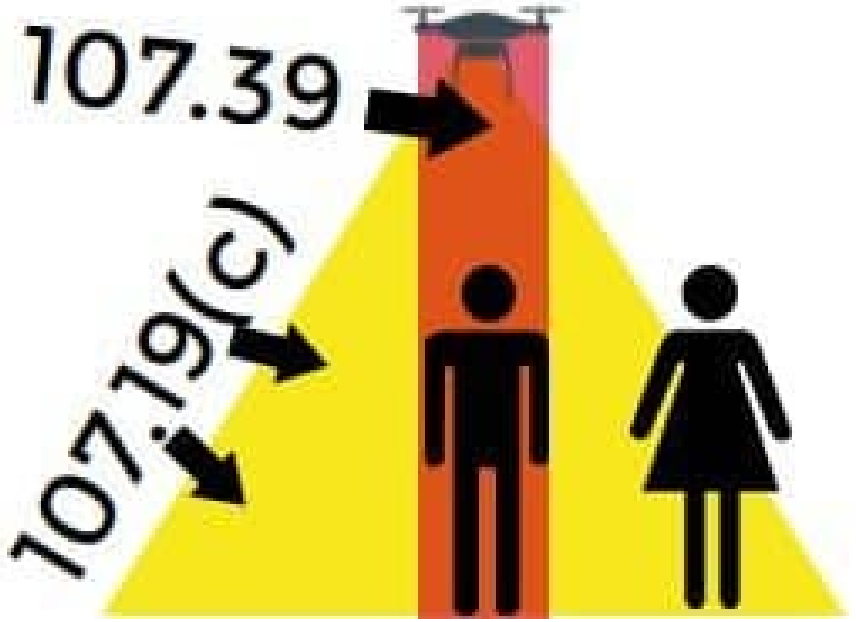
There is no specific definition of “open-air assembly”. The FAA uses a case-by-case approach in determining how to apply the term. Examples of open-air assemblies may include sporting events, concerts, parades, protests, political rallies, community festivals or parks and beaches during organized events. Some examples that might not be considered open-air assemblies include individuals exiting a shopping center, athletes participating in friendly sports in an open area without spectators, people relaxing in a park or on a beach, or individuals walking or riding on a bike path.

U.S. drone regulations



Section 107.19 (c)
Flying Over People

The remote pilot in command must ensure that the small unmanned aircraft will pose **no undue hazard** to other people, other aircraft, or other property in the event of a loss of control of the small unmanned aircraft **for any reason**.



Sample Test Question

Which category of unmanned aircraft must have an Airworthiness Certificate issued by the FAA?

1) Category 1
2) Category 2
3) Category 3
4) Category 4

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION

SPECIAL AIRWORTHINESS CERTIFICATE

A	CATEGORY/DESIGNATION	Special Flight Permit	
	PURPOSE	Production Flight Testing or Customer Demonstration	
B	MANU-FACTURER	NAME The Boeing Company	
		ADDRESS P.O. Box 767, Renton WA 13567	
C	FLIGHT	FROM N/A	
		TO N/A	
D	N- N/A		SERIAL NO. N/A
	BUILDER N/A		MODEL N/A
E	DATE OF ISSUANCE 01/31/2001		EXPIRY 01/31/2001
	OPERATING LIMITATIONS DATED 01/31/2001 ARE PART OF THIS CERTIFICATE		
	SIGNATURE OF FAA REPRESENTATIVE Sam T. Smith *Sam T. Smith*		DESIGNATION OR OFFICE NO. NM-XX

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding $1,000 or imprisonment not exceeding 3 years, o
both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERA
REGULATIONS (CFR).

FAA Form 8130-7 (07/04) *SEE REVERSE SIDE*

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Public Safety Shielded Operations Waiver

- Accessible to all public safety agencies, no matter their governmental classification.
- These waivers allow emergency response and law enforcement to conduct Beyond Visual Line of Sight (BVLOS) operations up to one mile from the operator.
- The approval process has been greatly expedited; it used to take as long as 10 months from application submission.

Airworthiness

The remote pilot-in-command is responsible for the determination of airworthiness before flight and discontinuing the flight when they know or has reason to know that the small unmanned aircraft system is no longer in a condition for safe operation.

Two main factors determine if an aircraft is airworthy:

- The aircraft conforms to its type certificate and authorized modifications; and
- The aircraft must be in condition for safe operation

Waiver Requests

Submit your application, including all supporting documents and attachments, through your **FAA DroneZone** account. Select the **"Operational Waiver"** option.

The FAA will do their best to review and approve or disapprove waiver requests within **90 days** of submission. Processing times will vary based on the complexity of your request and the completeness of your initial application.

	Beyond Visual Line of Sight (107.31) Waiver Trend Analysis			
Waiver Application Elements	**Command and Control (C2) Link and Emitters Performance Capabilities**	**Detect-and-Avoid (DAA) Methods**	**Weather Tracking and Operational Limitations**	**Training Requirements for Pilots and Other Participating Persons**
Sufficient Information -- Characteristics of the Beyond Visual Line of Sight (BVLOS) applications approved after requests for additional information	-States and demonstrates max range and envelope that C2 can operate in, taking into account geographic area, environment, and terrain -Provides a complete description of each emitter, including the Federal Communications Commission (FCC) grant of authorization and FCC ID number for each transmitter/emitter on the sUA and ground control station	-Detailed descriptions and procedures for risk mitigations to avoid collisions with aircraft (ex. Visual Observers, and technology)	-Details when weather reports will be gathered, what will be gathered, and where they will be taken from. -States weather limitations, such as small unmanned aircraft system (sUAS) manufacturer's limitations or wind speed	-Details and provides means for validating effectiveness of employee training and testing program. Example: -Lists out courses/subjects covered -Tests corrected to 100% and stored for easy retrieval later
Insufficient Information -- Characteristics of the Beyond Visual Line of Sight (BVLOS) applications after requests for additional information	-C2 operational capabilities not evident -Not demonstrating C2 can operate at stated max range or stating the envelope. i.e. lacking data -Application did not include FCC grant of authorization or FCC identification number for each emitter on the small unmanned aircraft system (sUAs) and ground control station	-Detailed methods or procedures to see and avoid or detect and avoid participating or non-participating aircraft and non-participating persons/moving vehicles are not evident or adequately described Examples: -If used, a video feed alone may not be sufficient, because detection would be limited to the direction the camera is pointing (i.e. not 360 degree detection) and does not address avoidance. -If used, Automatic dependent surveillance - broadcast (ADS-B) In alone may not be sufficient because ADS-B In only provides data for cooperative traffic and does not address avoidance.	-Providing general, or no statements Examples: -'We only fly on clear days' -'Weather is to be of Visual Flight Rules in nature' - Multiple applications not addressing weather requirements	-Provision of a method of assuring all required persons participating in operation have knowledge in all aspects of BVLOS not evident -Not stating who will have the training, what the training will consist of, or a method of assuring all required persons have been successfully trained


Any
Questions