
Part 107 — Operating Rules

Goals of This Lecture

According to the FAA's UAS Airman Certification Standards, a Remote PIC should be able to demonstrate knowledge of:

- Registration requirements for sUAS.
- The requirement for the sUAS to be in a condition for safe operation.
- Medical condition(s) that would interfere with safe operation of an sUAS.
- Responsibility and authority of the remote pilot in command.
- Allowing a person other than the remote PIC to manipulate the flight controls.
- Regulatory deviation and reporting requirements of in-flight emergencies.
- Hazardous operations, such as careless or reckless behavior or allowing an object to be dropped.
- Operating from a moving aircraft or moving land- or water-borne vehicle.
- Alcohol or drugs and the provisions on prohibition of use.
- Offenses involving alcohol or drugs.
- The consequences of refusing to submit to a drug or alcohol test or to furnish test results.
- Daylight operation.
- Visual line of sight (VLOS) aircraft operations.
- The requirements when a visual observer is used.
- The prohibition of operating multiple sUAS.
- The prohibition of carrying hazardous material.
- Staying safely away from other aircraft and right-of-way rules.
 - See and avoid other aircraft and other potential hazard considerations of the remote pilot in command.
- Operations over human beings.
- Prior authorization required for operation in certain airspace.
- Operation in the vicinity of airports.



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- Operation in prohibited or restricted areas.
 - Flight restrictions in the proximity of certain areas designated by notice to airmen (NOTAM).
 - Preflight familiarization, inspection, and actions for aircraft operations.
 - Operating limitations for small unmanned aircraft.
 - Maximum ground speed.
 - Altitude limitations.
 - Minimum visibility.
 - Cloud clearance requirements.
 - Flights defined as public aircraft operations.
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Lecture Text & Additional Notes

In this lecture, we'll go over the operating limitations of sUAS and the responsibilities of the remote pilot in command (PIC), the person manipulating the controls, the visual observer (VO), and anyone else that may be directly participating in the sUAS operation.

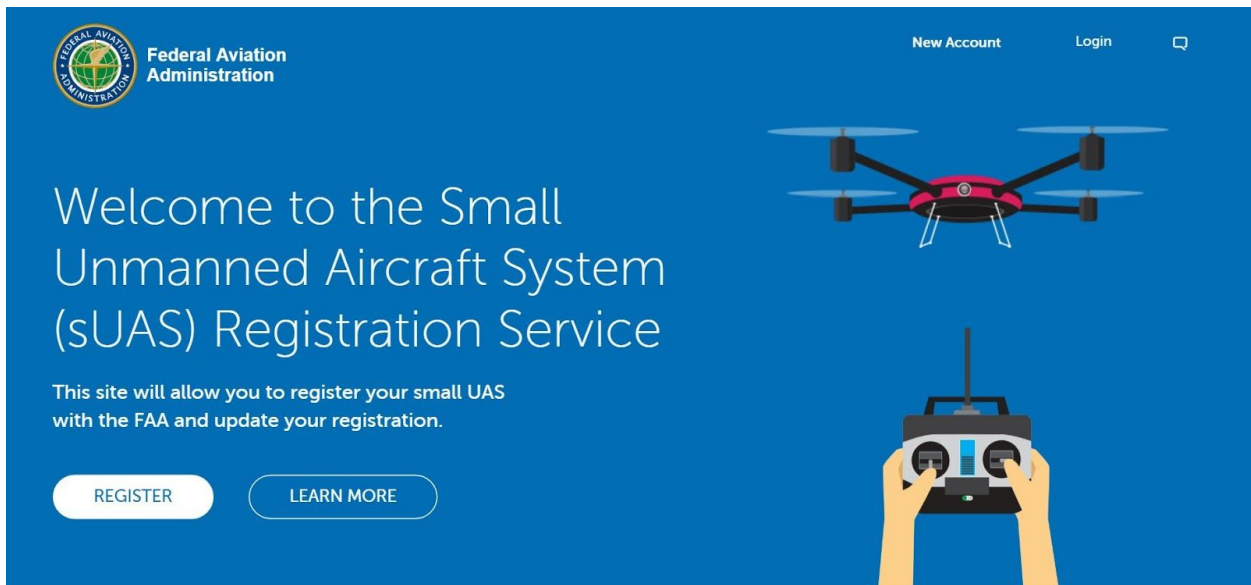
There's a lot that we'll be covering here, so we broke up the content into smaller chunks that you can digest more easily. Let's start with the Part 107 registration requirements.

Registration Requirements

A small UA must be registered prior to operating under Part 107. While you can register under Part 47 (something that pilots have been doing with their manned aircraft for quite a while now), it's recommended that you register online under Part 48.

Let's leave Part 47 to the manned aircraft pilots. But you should know that 14 CFR Part 48 specifically is titled "Registration And Marking Requirements For Small Unmanned Aircraft".

If you haven't already registered, you can do so here: <http://registermyuas.faa.gov>

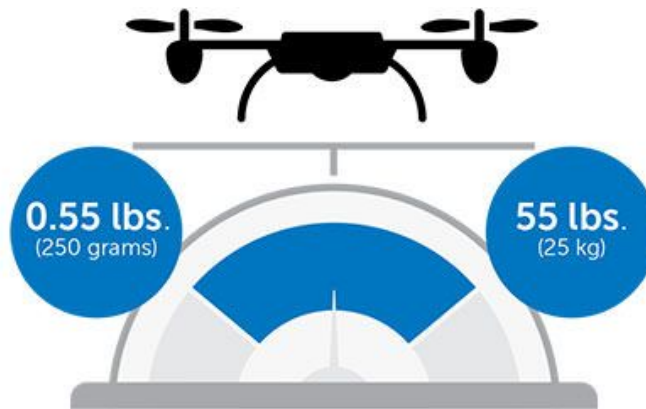


Some important notes about your unmanned aircraft registration:

- An sUAS operation requires a Foreign Aircraft Permit if it involves a civil aircraft that is:
 - Registered in a foreign country, or
 - Owned, controlled, or operated by someone who is not a U.S. citizen or permanent resident.

If either criteria is met, the Remote PIC should obtain a Foreign Aircraft Permit before conducting any operations.

- sUAS must be registered if the total aircraft weight is greater than 0.55 lbs and less than 55 lbs. Not 55 lbs or less. Less than 55 lbs. This is true for both commercial AND recreational sUAS.



Source: <http://registermyuas.faa.gov>

- If the owner is less than 13 years of age, then the UA must be registered by a person who is at least 13 years of age.
- Before operation, mark the sUAS with your registration number to identify that it is registered with the FAA. The registration marking must be:
 - **A unique identifier number.** This is typically the FAA-issued registration number or the serial number, if authorized during registration.
 - **Legible and durable.** Sample methods include engraving, permanent marker, or self-adhesive label.
 - **Visible or accessible.** The number may be enclosed in a compartment only if you can access the compartment without tools.
- If your UAS is destroyed or is sold, lost, or transferred, you should cancel your registration through the FAA's online registration system.

Medical Condition(s)

Being able to safely operate the sUAS relies on, among other things, the physical and mental capabilities of the remote PIC and anyone else involved in the operation.

Even though the person manipulating the controls of an sUAS and the visual observers (VO) are not required to obtain an airman medical certificate, they may not participate in the operation of an sUAS if they know or have reason to know that they have a physical or mental condition that could interfere with the safe operation of the sUAS.

Responsibility and Authority of the Remote PIC

Let's talk about the remote pilot-in-command.

While he or she must be designated before each flight, the remote PIC can change during flight from one remote PIC to another, as long as both are maintaining visual line-of-sight and control of the UA.

There's a lot on the remote PIC's plate. The remote PIC is directly responsible for and is the final authority on the operation of the sUAS conducted under Part 107. Let's run through the responsibilities of the remote PIC leading up to a flight operation:

The remote PIC must:

- Conduct an assessment of the operating environment. The assessment must include at least the following:
 - Local weather conditions,
 - Local airspace and any flight restrictions,
 - The location of persons and property on the surface, and
 - Other ground hazards.
- Ensure that all persons directly participating in the small UA operation are informed about the following:
 - Operating conditions,
 - Emergency procedures,
 - Contingency procedures,
 - Roles and responsibilities of each person involved in the operation, and
 - Potential hazards.
- Ensure that all control links between your Control Station and the small UA are working properly.
- Ensure there is sufficient power to continue controlled flight operations to a normal landing. One of the ways that this could be done is by following the sUAS manufacturer's operating manual power consumption tables. Another method would be to include a system on the sUAS that detects power levels and alerts the remote

pilot when remaining aircraft power is diminishing to a level that is inadequate for continued flight operation.

- Ensure that any object attached or carried by the small UA is secure and does not adversely affect the flight characteristics or controllability of the aircraft.
- Ensure that all necessary documentation is available for inspection, including the remote PIC's remote pilot certificate, aircraft registration (if required), and Certificate of Waiver (CoW) (if applicable).

For what it's worth, we strongly recommend building checklists for everything. Checklists for crew member communication, for gear packing, for client service delivery. Checklists are a remote pilot's (and a business owner's) best friend. Creating documentation will help you if there is ever a legal or regulatory issue with your flight.

Person Manipulating the Controls

Let's say you don't hold a remote pilot certificate or you're a remote pilot but you haven't met the recurrent testing/training requirements of Part 107. You can still operate the sUAS as long as two conditions are met:

- You are being directly supervised by a remote PIC who has met the recurrent testing/training requirement; and
- The remote PIC has the ability to immediately take direct control of the sUAS.

The ability for the remote PIC to immediately take over the flight controls may be achieved by using a number of different methods:

- Stand close enough to physically take over the control station
- Use a "buddy box" system with two control stations:
 - One for the person manipulating the flight controls
 - One that allows the remote PIC to immediately override the other control station
- Use a pre-programmed safe-mode system with "home" or "hover" functions

Visual Observer

The role of a visual observer (VO) is to alert the rest of the crew about potential hazards during sUAS operations. The use of VOs is optional. However, the remote PIC may use one

or more VOs to supplement situational awareness and visual-line-of-sight responsibilities while the remote PIC is conducting other mission-critical duties (such as checking displays).

The remote PIC must make certain that all VOs:

- Are positioned in a location where they are able to see the sUAS continuously and sufficiently to maintain visual line-of-sight; and
- Possess a means to effectively communicate the sUAS position and the position of other aircraft to the remote PIC and person manipulating the controls

Regulatory Deviation and Reporting Requirements of In-Flight Emergencies

In case of an in-flight emergency, the remote PIC is permitted to deviate from any rule of Part 107 to the extent necessary to respond to that emergency. A remote PIC who exercises this emergency power to deviate from the rules of Part 107 is required, upon FAA request, to send a written report to the FAA explaining the deviation. It goes without saying that emergency action should be taken in such a way as to minimize injury or damage to property.

Hazardous Operations

No person may operate an sUAS in a careless or reckless manner so as to endanger another person's life or property. This has been the primary principle cited by the FAA in many of its investigations and enforcement actions.

At the end of the day, you have to fly safe. That is the ultimate goal of the FAA.

Examples of hazardous operation include, but are not limited to:

- Operations that interfere with manned aircraft operations
- Operating an sUAS over persons not directly participating in the operation
- Loading the sUAS beyond its capabilities to the point of losing control
- Failure to consider weather conditions near structures, trees, or rolling terrain when operating in a densely populated area
- Flying near emergency responders, firefighters or police during a crisis

Operating From a Moving Vehicle

Part 107 permits operation of an sUAS from a moving land or water-borne vehicle but only if the area is sparsely populated. That said, operation from a moving aircraft is prohibited.

Alcohol or Drugs

Part 107 prohibits a person from serving as a remote PIC, person manipulating the controls, VO, or other crewmember if he or she:

- Consumed any alcoholic beverage within the preceding 8 hours;
- Is under the influence of alcohol;
- Has a blood alcohol concentration of .04 percent or greater; and/or
- Is using a drug that affects the person's mental or physical capabilities.

The FAA takes alcohol and drug offenses very seriously. Similar to what you'd expect with a commercial driver's license, if you are convicted of any federal or state alcohol or drug violation, you will lose your remote pilot certificate and probably your sUAS job.

If you've been convicted of growing, processing, manufacturing, selling, disposition, possession, transportation, or importation of narcotic drugs, marijuana, or depressant or stimulant drugs or substances, your Remote Pilot Certificate can be suspended for up to a year.

If you refuse to submit to a blood alcohol test when requested by a law enforcement officer, that is grounds for:

- Denial of an application for a remote pilot certificate with a small UAS rating for a period of up to 1 year after the date of that refusal; or
- Suspension or revocation of a remote pilot certificate with a small UAS rating.

Daylight Operation

Part 107 prohibits operation of an sUAS at night, which is defined as the time between the end of evening civil twilight and the beginning of morning civil twilight, as published in The Air Almanac, converted to local time.

In the continental United States (CONUS), evening civil twilight is the period of sunset until 30 minutes after sunset and morning civil twilight is the period of 30 minutes prior to sunrise until sunrise. In Alaska, the definition of civil twilight differs and is described in The Air Almanac. The Air Almanac provides tables which are used to determine sunrise and sunset at various latitudes. These tables can be downloaded from the Naval Observatory at <http://aa.usno.navy.mil/publications/docs/aira.php>.

If you're flying in that 30-minute civil twilight period, your aircraft must be equipped with special anti-collision lights that are capable of being visible for at least 3 miles in all directions.

If it's 40 minutes until official sunrise, how long must you wait to operate your unmanned aircraft?

If you have anti-collision lights on your aircraft, then you only need to wait for 10 minutes, since you'd be operating during civil twilight. But if you don't have anti-collision lights, then you have to wait the full 40 minutes. Generally speaking, not too many sUAS operators go through the trouble of installing anti-collision lights on their aircraft to be able to operate during this civil twilight period.

Visual Line-of-Sight

The remote PIC and person manipulating the controls must be able to see the small UA at all times during flight. This is called maintaining a visual line-of-sight (VLOS). Unless you have a waiver that permits otherwise, it's required to maintain VLOS during flight under Part 107.

VLOS must be accomplished and maintained by unaided vision, so without using something like binoculars. You can wear eyeglasses or contact lenses -- that's fine.

The remote PIC or person manipulating the controls may have brief moments in which he or she is not looking directly at or can't see the small unmanned aircraft, as long as they can still see it or quickly maneuver it back to line-of-sight.

These moments are allowed for:

- The safety of the operation, such as briefly looking down at the control station or scanning the airspace. **To scan for traffic, the crew should systematically focus on different segments of the sky for short intervals.**

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- Operational necessity, such as intentionally maneuvering the aircraft for a brief period behind an obstruction.

Operation of Multiple Small UA

At the moment, under the standard provisions of Part 107, a remote PIC is not allowed to simultaneously operate more than one small UA at a time. Even with the use of fancy automation, the operation of multiple small UA is not permitted.

Carriage of Hazardous Material

Part 107 does not allow the carriage of hazardous materials on board the sUAS.

Right-of-Way Rules

No person may operate a small unmanned aircraft in a manner that interferes with operations and traffic patterns at any airport, heliport, or seaplane base. The remote PIC also has a responsibility to remain clear of and yield right-of-way to all other aircraft and to avoid other potential hazards that may affect the remote PIC's operation of the aircraft.

This is traditionally referred to as "see and avoid".

Operation Over People

Part 107 prohibits a person from flying a small UA directly over a person who is not under a safe cover, such as a protective structure or a stationary vehicle.

However, a small UA may be flown over a person who is directly participating in the operation of the sUAS. This includes the remote PIC, another person manipulating the controls, a VO, and crewmembers who are necessary for the safety of the sUAS operation, as assigned and briefed by the remote PIC ahead of time.

There are several ways that the remote PIC can comply with these requirements, such as:

- You can select an operational area (site) that is clearly unpopulated or uninhabited. If you do select a site that is populated or inhabited, have a plan of action that ensures people stay clear of the operating area, remain indoors, or remain under safe cover

until the small UA flight has ended. Safe cover is a structure or stationary vehicle that would protect a person from harm if the small UA were to crash into that structure or vehicle;

- You can establish an operational area in which the remote PIC has taken reasonable precautions to keep free of people who are not directly participating in the operation of the sUAS;
- You can choose an operating area that is sparsely populated, or, ideally, clear of persons if operating a small UA from a moving vehicle;
- You can have a plan of action that ensures the small UA remains clear of people who may enter the operating area;
- You can adopt an appropriate operating distance from people who are not directly participating in the operation of the sUAS.

Airport Authorization & Operation

As we cover in the National Airspace System (NAS) lectures, many sUAS operations will occur in uncontrolled airspace, but there are some that may need to operate in controlled airspace. Operations are allowed in Class B, Class C, and Class D airspace, and within the lateral boundaries of the surface area of Class E airspace designated for an airport, but only if the PIC has prior authorization from air traffic control (ATC).

As far as airport authorization goes, no notification or authorization is necessary to operate at or near an airport, unless the flight is conducted within controlled airspace. When operating in the vicinity of an airport, the remote PIC must be aware of all traffic patterns and approach corridors to runways and landing areas.

If you're looking for recurring or long-term authorization from ATC, then that authorization could come in the form of a letter of agreement (LOA) to identify shortfalls and to establish operating procedures for you sUAS.

Temporary Flight Restrictions (TFR) & Notice to Airmen (NOTAM)



Certain temporary flight restrictions may be imposed by way of a NOTAM. Therefore, it is necessary for the sUAS remote PIC to check for NOTAMs before each flight to determine if there are any applicable airspace restrictions.

We talk a lot more about this in our Airspace Operations lecture. Many sUAS operators use <http://skyvector.com> to monitor TFRs and NOTAMs on a real-time basis.

Common TFRs that relate to sUAS operations include, but are not limited to:

- Presidential TFRs and NOTAMs
- Emergency response TFRs and NOTAMs
- Standing TFRs that go into and out of effect (e.g., stadiums for sporting events)

TFRs affect all aircraft, not just sUAS operators, or not just manned aircraft pilots.

Operating in Prohibited or Restricted Areas

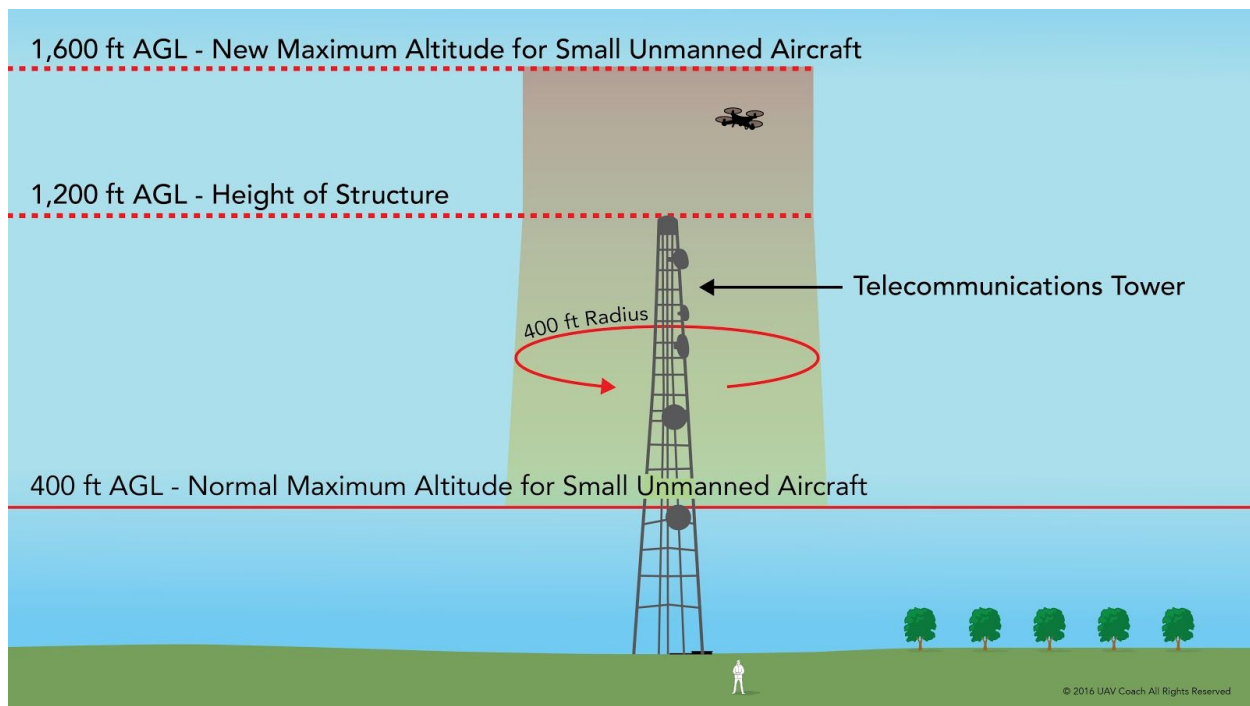
No person may operate a small unmanned aircraft in Prohibited or Restricted areas unless that person has permission from the using or controlling agency, as appropriate.

We talk more about Prohibited and Restricted airspace in our lecture called Know Your FAA Airspace Classes.

Operating Limitations

The small UA must be operated in accordance with the following limitations:

- It may not be flown faster than a groundspeed of 87 knots, which is equivalent to 100 miles per hour;
- It may not be flown higher than 400 feet above ground level (AGL). However, if it's flown within a 400-foot radius of a structure, it can go to a maximum of 400 feet above the structure's immediate uppermost limit. If flying above a structure means you will be entering controlled airspace, be aware of that fact and follow air traffic control (ATC) procedures, which we cover in other lectures;



- Minimum visibility, as observed from the location of the Control Station (CS), may not be less than 3 statute miles (sm); and
- If there are clouds, the UA must be at least 500 feet below the clouds and at least 2,000 feet horizontally from the clouds.

The content in this course is not legal advice, and if you have any questions about complying under Part 107, or other legal considerations like business formation, release forms, and client contracts, you should seek out a lawyer for professional advice.

We had the drone lawyers at [Drone Law Pro](#) review the lectures in this module, but no opinion, legal or otherwise, is being given concerning your specific situation.

If you have a legal issue or want a legal opinion about Part 107 regulations, interpretation of those regulations or how they apply to you and your specific situation, I encourage you to contact a drone lawyer.

