SKYWARD BOUND:

Achieving your Part 107 certification

Study Guide to pass your drone certification successfully

STEMPILOT®

Engaging Students in STEM with Flight Simulation

Additional Resources

As you prepare for your Part 107 certification, having a handy reference of key terms, useful websites, tools, and additional reading materials can make your study process smoother and more comprehensive. Below you'll find a glossary of essential terms, a curated list of useful websites and tools, and some additional reading materials to further deepen your understanding.

List of Useful Websites and Tools:

- **FAA Drone Zone:** FAA Drone Zone - Official site for drone registration, waiver requests, and more.
- **B4UFLY App:** B4UFLY - FAA's mobile app for drone pilots to check airspace restrictions and advisories.
- **LAANC Authorization:** LAANC - Low Altitude Authorization and Notification Capability for obtaining airspace authorization.
- **Sky Harbor:** Sky Harbor - An online PDF document displaying the Phonetic Alphabet
- **SkyVector:** SkyVector - Online aeronautical charts for flight planning and navigation.
- **Standard Phraseology:** for additional phrases used in aviation go to https://www.faa.gov/air_traffic/publications/atpubs/fs_html/chap11_section_1.html
- **METAR and TAF Reports:** Aviation Weather Center - Provides current METAR and TAF reports.
- **AirMap**: AirMap - Provides real-time airspace information and flight planning tools.
- **Weather Apps:** Apps like Weather Underground, The Weather Channel, and Windy are great for checking local weather conditions.
- **Weather reports:** for current and updated weather reports, visit http://www.aviationweather.gov
- **Quizlet.com:** Use Quizlet's free flashcards to study for the exam. Just visit https://quizlet.com/505106684/faa-part-107-drone-test-practice-questions-flash-cards/

Additional Reading Materials:

- **FAA's Remote Pilot – Small Unmanned Aircraft Systems Study Guide:** Available on the FAA website, this guide covers all topics you need to know for the Part 107 exam.
- **FAA Advisory Circulars:** These provide guidance on various aspects of aviation regulations and are valuable for understanding the broader context of Part 107 rules.
- **SkyScope: An Aviation Weather Visualization Tool:** PDF version is available at chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.cs.ubc.ca/~tmm/courses/cpsc533c-04-spr/reports/coelho/SkyScopeReport.pdf. This report provides in depth understanding on weather conditions and interpreting weather data.

Finding Your FAA Approved Site:

To find your nearest FAA approved testing site, go to https://www.dronepilotgroundschool.com/faa-drone-testing-centers/

Table of Contents

Disclaimer: This study guide is intended to aid in understanding and preparing for the FAA Part 107 exam. It is not a replacement for professional training or instruction. Although every effort has been made to ensure the accuracy of the information provided, users are encouraged to verify the information independently before relying on it. FAA regulations and guidelines may change, and it is the user's responsibility to stay informed of any updates. The creators of this study guide are not liable for any actions taken based on the information presented herein.

Welcome, Future Drone Pilots!

So, you want to fly a drone? At STEMPilot Inc., we understand the excitement and potential of drone technology. Like many, I wasn't aware of the Part 107 certification until someone asked if I had a license. What an interesting question! I had no idea that, much like needing a fishing license, you must register and become certified to legally fly a drone in public spaces.

This guide was created as part of my role at STEMPilot Inc., where I was asked to help create this study guide and pursue my Part 107 certification simultaneously. I invite you to join me on this adventure as we study and learn together how to pass the Part 107 exam and become certified drone pilots.

This comprehensive guide will cover all the laws and regulations you need to know to pass the Part 107 exam. The best part is that the exam is purely theoretical—you don't need any prior drone flying experience to pass.

Ready to fly high? Here's the lowdown on Part 107 certification:

- If you're 16 or older, you can get FAA-certified to fly drones commercially and get paid to do it!
- Pass the Part 107 Exam: Taken in person at an FAA-approved site.
- Score 70% or higher to earn your certification.
- Be at least 16, fluent in English, and mentally and physically fit.

Without certification, you risk fines. So, get certified and soar legally!

Preparation Tips for Acing the Part 107 Exam:

- **Use our STEMPilot Study Guide:** Your best friend for this journey.
- **Study Consistently:** Aim for 2-4 hours a week.
- **Take Practice Exams:** Keep at it until you're scoring at least 85%.
- **Use the Airman Knowledge Testing Supplement:** The same booklet you'll use during the real exam!
- Check Out the Pilot's Handbook of Aeronautical Knowledge on the FAA website.

Exam Structure: What to Expect

The Part 107 exam is a 2-hour test with 60 multiple-choice questions, covering:

- Regulations and Requirements
- Airspace
- Meteorology
- Loading and Performance
- Operations

You'll need a standard calculator, a pencil, and an FAA sectional chart (provided by the instructor). The exam fee ranges from $150-$175 per attempt. No two exams are the same, so stay sharp!

Chapter 1: FAA regulations and requirements

So, you want to be a drone pilot? At STEMPilot, we get it—drones are exciting! But did you know you need a special certification, called Part 107, to fly a drone in public places like parks and beaches?

Getting your Part 107 is simpler than you might think. You just need to pass a knowledge exam, no prior drone flying experience required. However, you can't just wing it; you need to know the FAA regulations and laws to fly legally.

Almost 25% of the exam focuses on FAA rules to keep everyone safe. In this chapter, we'll cover:

- What an unmanned aerial system is
- Who the FAA is and what they do
- What Part 107 covers
- FAA regulations and laws

I know, I know, this might sound a bit dull. But before we dive into the thrilling world of drones, you need to understand what they are, and the rules designed for them. Ready to take off? Let's go!

What is an unmanned aerial system?

Before we discuss what the FAA is and the different regulations you as a drone pilot must know, let's discuss what a drone is. An unmanned aerial system (UAS) is an aircraft that flies with a wireless controller without a pilot in the cockpit. There are many types of different unmanned aerial systems that you can fly. However, Part 107 only requires you to know two types of aircraft:

A **fixed wing** is an aircraft that flies with wings that do not move. Unlike helicopters and multirotor drones, fixed wing aircrafts do not just fly using propellers but with wings that are fixed to the fuselage for lift. The most common type of fixed wing aircraft you will see are airplanes and gliders.

A **multirotor** drone is an unmanned aerial system that flies using multiple rotors. Each rotor is equipped with 1 motor and 1 propeller. One of the most popular types of multirotor that you will see in the skies are quadcopters. **Quadcopters** are a type of multirotor that has 4 motors. Quadcopters come in various sizes and can be used for various jobs such as search and rescue missions, filming, and surveying.

Who is the FAA and what do they do?

You've probably heard of the FAA, or Federal Aviation Administration, in your classes, on the news, or from our STEM and SAFEDrone curriculum. But do you really know what they do? Think of the FAA as the referees of the sky, ensuring everything runs smoothly and safely. They regulate and oversee civil and commercial aviation transportation in the U.S. There are nine regional offices, and the main headquarters is in Washington, DC. As a pilot, you need to follow all federal FAA regulations.

So, what exactly does the FAA do? Here's a quick rundown:

- Promote aviation safety
- Develop new aviation technology
- Manage air traffic control for civil and military aircraft
- Control aircraft noise and environmental impacts
- Regulate commercial space transportation
- And more!

Following FAA regulations keeps everyone safe while flying. Understanding these rules is crucial for all pilots.

What does Part 107 cover?

The Part 107 is designed to cover the following:

- Flight of small unmanned aerial systems weighing 55 lbs. or less
- Pilots that want to charge for their services
- Flying in public spaces
- Daytime and nighttime operations under specific restrictions

The Part 107 does not apply to the following:

- Any aircraft that is operated by a remote pilot in command who elects to conduct pursuant under section 333 (USC 44807 (Part 91))
- Public aircrafts (government unmanned aerial systems)
- Air carrier operations
- Any aircraft subject to the provisions of 49 USC 44809 (recreational purposes)

FAA regulations and laws

Flying your drone means following some key FAA rules found in the Code of Federal Regulations. **Code of Federal Regulations** is a collection of regulations created by government agencies that we follow. However, remote pilots are only required to follow:

1. **Operation Limits:** Understand and respect the FAA's limits on how and where you can fly.
2. **Proper Procedures:** Follow the FAA's procedures for safe and legal drone operations.
3. **Waivers and Authorizations:** Learn when and how to get special permissions for certain flights.
4. **Accident Reporting:** Know the steps to report any drone-related accidents.
5. **Drone Registration:** Make sure your drone is registered with the FAA.

General provisions, definitions, and the applicability of the regulations enforced by the FAA

Ready to master the skies? Here's the lowdown on what you need to know to fly your drone safely and legally:

FAA Operational Requirements:

1. **Drone Weight:** Must be 55 lbs. or less.

2. **Keep It in Sight:** Always maintain Visual Line of Sight (VLOS). Glasses and spotters are okay, but your eyes must stay on the drone.
3. **Flight Distance:** No flying two miles away and back without permission.
4. **Day & Night Flying:** Allowed with restrictions. Your drone needs flashing lights.
5. **Speed & Height Limits:** Max speed is 100 mph; max height is 400 feet above ground level (AGL).
6. **Pre-Flight Checks:** Document all inspections.
7. **Weather Check:** Always check weather conditions before takeoff.
8. **One Drone Per Operator:** Only one drone at a time.
9. **Airspace Rules:** Permission required for Class B, C, and D airspace. No flying in Class G without traffic control permission.
10. **No Hazardous Materials:** Transporting hazardous materials is a no-go.
11. **Fly Safely:** Reckless flying is prohibited.

Key Terms You Need to Know:

- **Visual Line of Sight (VLOS):** You must see your drone without any devices. Corrective lenses are allowed, but VR goggles aren't.
- **Remote Pilot in Command (Remote PIC):** The top dog of your flight crew, like a ship's captain, with full control and responsibility. You need your Part 107 certification for this role.
- **Line of Sight:** If you lose sight of your drone, regain it ASAP.

Following these rules and understanding the terminology is crucial for safe and legal flying under your Remote Pilot Certification.

The Proper Procedures Required by the FAA

As a pilot, you must follow a set of procedures required by the FAA to fly safely:

- Perform a preflight check
- Provide documentation
- Follow essential air services procedures
- Adhere to the rules of conduct in DOT proceeding
- Abide by rules of practice in formal and informal investigations
- Implement the Energy Policy and Conservation Act
- Comply with terminations, suspensions, and reductions of service
- Follow all special policy statements issued by the FAA
- Adhere to guidelines for individual determination of basic air service
- Follow statements of general policy

To learn more about the required procedures you must follow, visit https://www.ecfr.gov/current/title-14

Waiver(s)/ Authorization

Flying in controlled airspaces used to be a hassle, involving a lengthy FAA process. But hang tight things have gotten much smoother! Many drones now come equipped with software that gives remote pilots instant permission to fly in specific controlled airspaces, complete with necessary restrictions.

Certificate of Waiver

Your ticket to bend the rules. For instance, if you want to fly above 400 feet, you'll need an FAA waiver.

Authorization

Permission to fly in restricted zones. For quick approval, follow the LAANC system's steps. For military airspace, check out the 'DroneZone' website. (https://faadronezone-access.faa.gov/#/)

Examples of Waiver Requests:

- Flying at night
- Operating beyond visual line of sight
- Coordinating epic drone light shows with multiple drones
- Operating in restricted airspace

Applying for Your Waiver

Plan ahead! You must apply for your waiver 90 days before your flight date. The FAA receives tons of requests daily, so approval timelines vary. Once approved, you'll get a Form 7711-1, signed, dated, and FAA-approved. If not approved, the FAA provides reasons but won't advise on how to tweak it. Visit FAADroneZone (https://faadronezone-access.faa.gov/#/) to apply for a waiver and get your drone adventures cleared for takeoff.

Reporting an Accident

If your drone causes any accidents or damage to property (not including damage to the drone itself), you must report it to the FAA. Here are some examples:

- Your drone hits a car, damaging its window.
- It collides with a streetlight, breaking the light bulb.
- Your drone injures someone, requiring them to go to the Emergency Room.

Here's what you need to do:

- If the property damage is $500 or more, fill out an FAA accident and damage report within 10 days.
- If someone is injured and requires hospitalization within 48 hours, report it directly to the FAA.
- Minor injuries like bruises do not require reporting unless they result in hospitalization.

To file a report, contact your local Flight Standards District Office (FSDO). Find yours at https://www.faa.gov/about/office_org/field_offices/fsdo

Registering Your Drone

Once you obtain your Part 107, you are required by the FAA to register your UAS. Here's how:

1. **Is Your Drone a Small UAS?** Make sure your drone is a small unmanned aerial system (UAS) intended for commercial use.
2. **Who's the Owner?** Register the drone under the owner's legal name. If the owner is under 13, it must be registered by someone 13 or older.
3. **Provide Details:** You'll need an email, phone number, the make and model of your drone, and its remote ID serial number from the manufacturer.
4. **Visit the FAA DroneZone:** Head over to faadronezone-access.faa.gov to create an account and register your drone.
5. **Fee and Validity:** It costs just $5 per drone, and the registration is valid for 3 years.
6. **Keep Your Number Handy:** After registering, you'll get a registration number and certificate via email. Display the number on your drone using stickers or other visible means.
7. **Foreign Nationals:** If you've registered your drone in another country but want to fly commercially in the U.S., you'll need a foreign aircraft permit. Check the DroneZone website for details.
8. **Stay Current:** You must pass a recurrent knowledge test every 24 months to keep your certification up to date.

Remember:

- Not registering your drone can lead to fines.
- Each drone needs its own registration number, which can't be transferred.
- Some unmanned aerial systems, like kits and amateur rockets, are not covered by these regulations.

Now that you've got the registration basics down, let's dive into the next chapter on airspace and airports. Ready for takeoff? Let's go!

Additional resources and materials:

- **FAA Website:** check the FAA website regularly for special announcements and updates on regulations and procedures.
- **Stay current:** Go to https://www.ecfr.gov/current/title-14 to catch up on the latest revisions on FAA issues regulations.
- **Regulations and Requirements flashcards:** Use flashcards to help you study for your exam.

Chapter 2: Airspace and Airports

Buckle up, aviators! We've covered the basics for your Part 107 certification, so now it's time to dive into the thrilling world of airspace and airports. These are the unsung heroes of aviation, keeping flights smooth and safe.

Airspace: Imagine it as the invisible highway in the sky, managed by our nation.
Airports: These are the bustling hubs where planes take off, land, and get ready for their next adventure, from tiny regional spots to giant international gateways.

Knowing your airspace and airport rules isn't just a requirement—it's your VIP pass to mastering the skies with your drone. We'll explore:

- Controlled Airspace
- Operating in Controlled Airspace
- Uncontrolled Airspace
- Special Airspace
- Understanding Airport Layouts
- Operating Near Airports

Ready to soar into this new chapter? Let's get started!

Controlled Airspace

Get ready to navigate the skies with style! **Controlled airspace** is a specific slice of the atmosphere where air traffic controllers guide aircraft, ensuring smooth and safe operations. Let's dive into the different classes of controlled airspace:

Class A

Class A airspace is a no-go zone for drone pilots. This airspace covers the entire United States starting from 18,000 feet mean sea level (MSL).

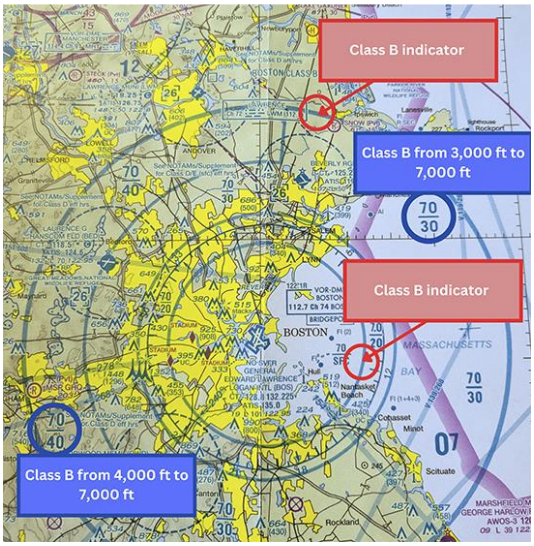
Key Points about Class A:

- **No Drone Zone:** Remote pilots can't fly here.
- **Coverage:** Spans the whole country from 18,000 feet MSL and up.
- **Exam Tip:** We won't dive deep into Class A, but it's crucial to know for your test.

So, while you won't be flying your drone in Class A, understanding it is still important.

Class B

Figure 2.a: *On sectional chart, Class B airspace is marked by solid blue circular lines, as shown in the figure indicated by the red arrows. As these rings approach the airport, the airspace extends closer to the ground. Each chart clearly outlines its designated Class B airspace for easy pilot reference.*



Here's where things get interesting! **Class B airspace** is one of the few zones where drone pilots can actually fly, but it comes with some important rules. Here's what you need to know about Class B airspace:

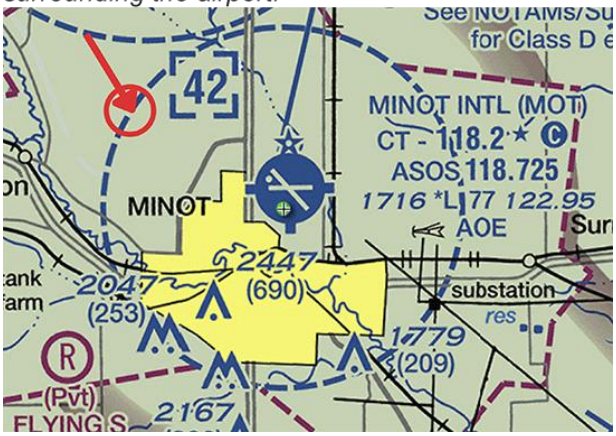
- **Location:** It surrounds the biggest and busiest airports in the U.S., like Denver International and JFK.
- **Hub Airports:** These are major hubs with tons of air traffic.
- **Permission Required:** To fly your drone here, you must get permission from the FAA.
- **Air Traffic Control (ATC):** ATC, the ground-based team managing aircraft, handles these permissions. They're the ones making sure everything runs smoothly and safely.

So, while Class B is bustling, with the right permissions, you can join the action with your drone. (Refer to Figure 2.a)

Class C

Class C airspace is reserved for smaller regional airports like Worcester Regional Airport located in Massachusetts. Even though Class C airspace is not as busy as Class B airspace, drone pilots must receive permission from air traffic control to fly in this airspace.

Figure 2.b: *To indentify Class D airspace, your sectional chart will have blue dashed lines surrounding the airport.*



Class D

Next up, let's chat about **Class D airspace**! This zone is smaller and typically found in less bustling areas, often surrounding regional airports and sometimes military airbases.

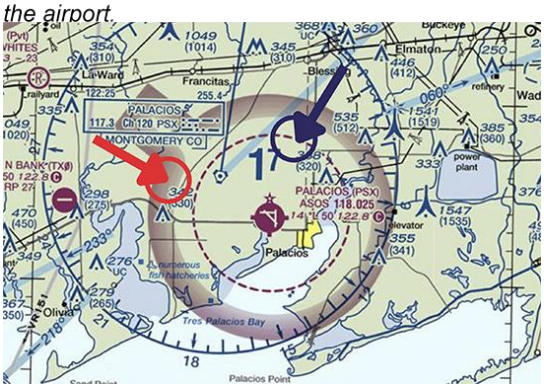
Key Points About Class D:

- **Location:** Smaller towns with less traffic.
- **Airports:** Includes regional airports and sometimes military bases.
- **ATC Permission:** Required for drone operations
- **Night Transition:** ATC in Class D areas might close at night, turning into Class E or G airspace.

So, even though Class D is more laid-back, it still comes with rules to keep everyone safe.

Class E

Figure 2.c: *To identify Class E airspace on a sectional chart, look for two indicators: a dashed magenta line, which shows the airspace starts at ground level. And a shaded pattern surrounding the airport.*



Last but not least, let's dive into **Class E airspace**! Like Class A, B, C, and D, Class E is a controlled airspace, but it has its own unique vibe.

What's Unique About Class E?

- **Private Airports:** Class E often covers private airports, making it a bit different from the busier commercial zones.
- **Smaller Airports:** It also includes smaller airports with fewer commercial flights compared to Class A, B, C, and D.

So, while Class E is still under ATC's watchful eye, it's usually associated with quieter, less busy airports. Understanding Class E helps ensure your drone flights are smooth, safe, and in line with the rules.

Operating Requirements in Controlled Airspace

As mentioned before, Class B, C, D, and E airspace requires you to request approval from air traffic control to fly in these airspaces. But how do you go about getting that permission and what type of authorization is given? In this section, we'll explore how to obtain airspace authorization and the importance of communication with Air Traffic Control (ATC).

Obtaining Airspace Authorization

As mentioned before, you must obtain permission from ATC , when flying your UAS in controlled airspace (Classes B, C, D, and E). Here's how to go about it:

1. **Use the LAANC System**: The Low Altitude Authorization and Notification Capability (LAANC) system is the quickest way to get near real-time authorization. LAANC integrates with various flight planning apps, allowing you to request and receive approval within minutes.
2. **FAA Drone Zone**: If LAANC is not available in your area, you can apply for airspace authorization through the FAA Drone Zone website. This process can take a few weeks, so plan accordingly.
3. **Information Needed**: When applying, you'll need to provide details such as the location of your operation, the maximum altitude you plan to fly, and the duration of your flight. Make sure to be precise to avoid any delays in processing your request.
4. **Approval and Compliance**: Once you receive authorization, ensure you follow all the conditions specified. This might include altitude restrictions, time of day limitations, and specific operational guidelines.

By understanding and following these steps, you can legally and safely operate your drone in controlled airspace.

Communication with Air Traffic Control (ATC)

Effective communication with ATC is crucial when flying in controlled airspace. Here's what you need to know:

- Know When to Communicate: You'll typically need to talk to ATC if you're flying near airports with Class B, C, or D airspace. In Class E airspace, check if communication is required.
- Use the Right Channels: Make sure you have the right gear, like a two-way radio for direct communication with ATC.
- Understand ATC Procedures: Learn their rules and lingo to communicate clearly and follow instructions.
- Provide Essential Info: Tell ATC your location, altitude, plans, and any other details they need. Clear communication prevents mix-ups.
- Listen and Respond Fast: Pay attention to ATC and reply quickly. If you're unsure, ask for clarification right away.
- Stay Alert: Even if you don't need to talk to ATC, keep an eye on their radio frequencies near controlled areas. This helps you spot other planes and changes in the airspace.

Following these rules keeps your drone flights safe and legal. Getting airspace approval ensures your flight is monitored, cutting risks and boosting safety. Good ATC chats let you handle real-time air changes, making operations smooth and secure. Master these skills to show you're a top-notch pilot, keeping our skies safe for everyone!

Uncontrolled airspace

Alright, sky explorers! Now that we've mastered controlled airspace, let's venture into the wild frontier of **uncontrolled airspace**, also known as Class G airspace. This is the part of the sky that doesn't fall under the regulated zones of Class A, B, C, D, or E.

What's the Deal with Class G?

- **No ATC:** Unlike controlled airspace, Class G has no air traffic control (ATC) keeping an eye on things.
- **No Indicators:** Your sectional chart won't specifically mark Class G zones, but don't worry, it's everywhere controlled airspace isn't.

Flying Rules in Class G

- **Visual Flight Rules (VFR):** Even without ATC, there are still rules! Pilots in Class G must follow VFR, which means navigating by sight in clear weather conditions.
- **Drone Pilots:** You've got to stick to these VFR guidelines to keep your flights safe and smooth.

Best Practices

- **Know Your Surroundings**: Even though Class G airspace doesn't require special authorization, always be aware of your environment. Check for any temporary flight restrictions (TFRs) or no-fly zones that might pop up.

- **Stay Updated**: Keep your drone's firmware up to date. This ensures you have the latest safety features and compliance with FAA regulations.
- **Plan Your Flight**: Always plan your flights. Use flight planning apps to check for obstacles, weather conditions, and other potential hazards. It's like having a roadmap for your drone.
- **Maintain Visual Line of Sight (VLOS)**: Always keep your drone within your line of sight. This isn't just a rule; it's a best practice to avoid accidents and ensure you can react to unexpected situations quickly.

So, whether you're gliding over open fields or cruising near small airports, knowing and following VFR in Class G airspace ensures your drone adventures are both legal and secure.

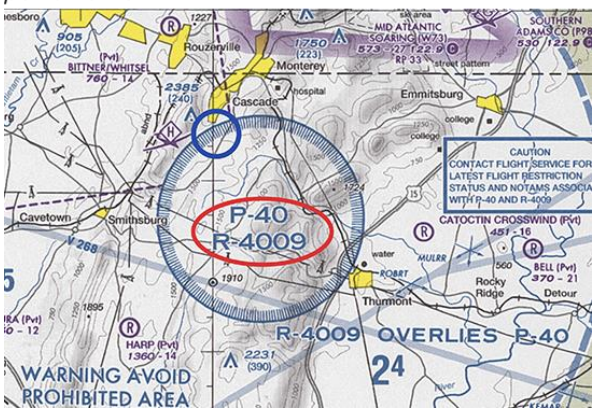
Special airspace

Imagine special airspace as exclusive VIP zones in the sky where certain activities can create no-fly rules. These zones come with specific limitations for aircraft that either need to avoid these activities or are not part of them.

Here's the lineup of special airspaces we'll explore:

- Prohibited Areas
- Warning Areas
- Military Operation Areas (MOAs)
- Alert Areas
- National Security Areas (NSAs)
- Restricted Areas

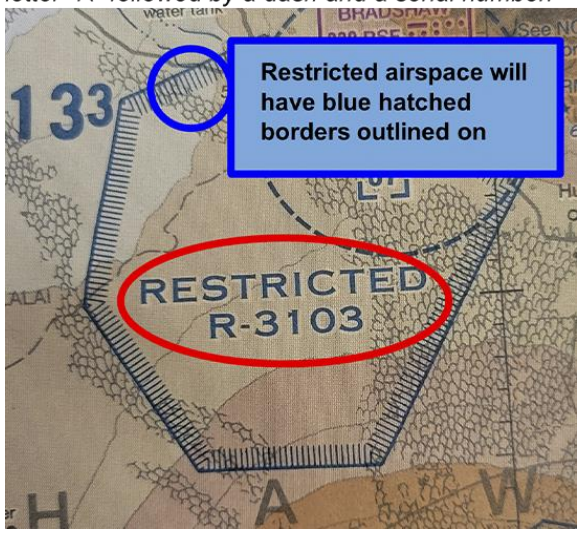
Figure 2.d: *On your sectional chart you will see a hatched blue border with the name "Prohibited" or the letter "P" followed by a dash and a 2-3 digit number. That is to let pilots know that this area is prohinted, and you are not to fly in this area at any point intime.*



Prohibited Areas

First up, **Prohibited Areas**! Think of these as the "no-entry" zones of the airspace world. Defined by exact dimensions on the ground, these areas completely ban any aircraft from flying over them. You'll find these zones officially listed in the Federal Register and clearly marked on sectional and terminal aeronautical charts. (Refer to Figure 2.c as reference)

Figure 2.e: *Like prohibited areas, restricted areas are indetenfied with a blue hatched border. Inside the border will be the name "Restricted" or the letter "R" followed by a dash and a serial number.*



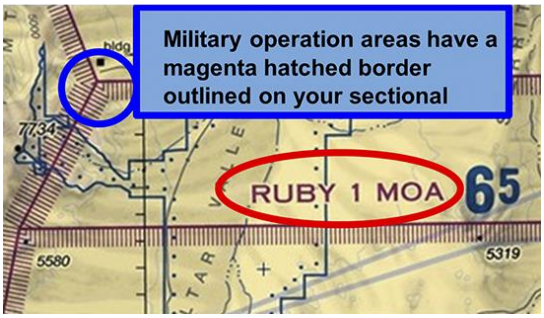
Restricted Areas

Now, let's check out **Restricted Areas** – the ultimate "danger zones" of the sky! These airspaces are like high-

stakes arenas, hosting hazardous activities such as artillery firing, and guided missile launches. To keep civilian air traffic out of harm's way, these zones are carefully designated to ensure everyone's safety. Just like prohibited areas, you can find restricted areas listed in the Federal Register and marked on your sectional charts. So, always keep an eye out for these special zones when you're navigating the skies! (To identify your restricted airspace, refer to Figure 2.e.)

Military Operation Area (MOAs)

Figure 2.f: *You will notice on your sectional chart that a Military Operations Area (MOA) is indentified with a hashed magenta border with the name MOA writtern inside.*

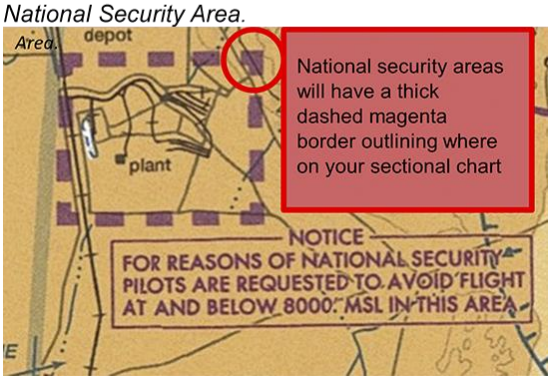


Let's talk about **Military Operation Areas (MOAs)** – the designated zones where non-hazardous military training takes place, keeping these activities separate from civilian air traffic. MOAs are usually set up outside of Class A airspace. While you can legally fly through an active MOA without permission under Visual Flight Rules (VFR), there's a catch: you might just find yourself in a high-speed encounter with a fighter jet zooming by at over 250 knots! So, it's always a smart move to contact the controlling agency before venturing into a MOA. Safety first, thrill-seekers! (Refer to Figure 2.f to learn how to identify your military operation area on your sectional chart.)

Alert Areas

Next up, let's explore Alert Areas – the sky's heads-up zones! These special airspaces are designed to inform nonparticipating pilots about high-volume aerial activities happening in the area. Imagine cruising along and suddenly finding out there's intense flight training nearby. In these zones, it's crucial for pilots to stay on their toes and keep their situational awareness sharp to ensure safety. So, when flying through an Alert Area, remember to stay vigilant and keep your eyes peeled!

Figure 2.g: *National Security Areas(NSA) are identified by thick, dashed magenta lines on your sectional chart. There will also be a notice i ndicated next to our under the outlined border explaining that the area is categorized as a National Security Area.*



National Security Areas (NSAs)

Next, let's dive into **National Security Areas (NSAs)** – the guardians of critical ground facilities like nuclear power plants. While the FAA doesn't outright ban flights in NSAs, they do ask pilots to steer clear whenever possible. Sometimes, the FAA will issue a Notice to Air Missions (NOTAM) that temporarily restricts flights in these areas. So, before you take to the skies, always check for any NOTAMs and touch base with air traffic control to ensure you're in the clear. Stay safe and informed while you fly! (Refer to Figure 2.g on how to identify your National security areas on your sectional charts.)

Warning Areas

Figure 2.h: *Warning areas are often found on the coastline. They are oftentimes identified by blue hatch lines with the word "Warning", or the letter "W" followed by a dash and a serial number. On the left is an example of what you might see on your sectional chart.*

Lastly, let's talk about **Warning Areas** – the caution zones of the sky! These areas can be hotspots for hazardous activities like high-speed military jets and missile launches, similar to restricted areas. But here's the twist: Warning Areas aren't regulated, so they don't outright ban or restrict flights. Instead, they serve as a heads-up to pilots about the potential dangers. It's a smart move to steer clear of these zones to avoid any unexpected flight incidents. So, when you see a Warning Area on your chart, consider it a friendly reminder to fly safely and stay alert! (Refer to Figure 2.h on how to identify Warning Areas on your sectional charts.)

Understanding Airport Layouts

Now that we have gone over the different airspaces we can and cannot fly in, let's take a look at airports. Airports might seem like a maze at first, but they're organized systematically.

Here's a breakdown of the key components:

- **Runways**: Runways are the areas where aircraft take off and land. They are marked with numbers that indicate their magnetic alignment. For example, a runway marked "09" is aligned approximately 90 degrees (east).
- **Taxiways**: Taxiways are paths that connect runways with ramps, hangars, and terminals. They are usually labeled with letters (A, B, C, etc.) and sometimes with numbers (A1, B2, etc.).
- **Ramps**: Also known as aprons, ramps are areas where aircraft are parked, loaded, and refueled. These areas can be bustling with activity, so understanding where they are and how they operate is essential.
- **Signage**: Airports use a variety of signs to provide information and directions. These include:
    - **Location Signs**: Black background with yellow inscription, indicating the taxiway or runway you are on.
    - **Direction Signs**: Yellow background with black inscription, showing the direction of taxiways leading out of an intersection.
    - **Mandatory Instruction Signs**: Red background with white inscription, indicating an entrance to a runway or critical area.
- **Lighting**: Airport lighting helps pilots navigate during low visibility conditions and at night. Key lights include:
    - **Runway Lights**: White lights along the edges and centerline of runways.
    - **Taxiway Lights**: Blue lights outlining the edges and green lights along the centerline of taxiways.

- **Approach Lights**: A series of lights leading up to the runway, helping pilots align during approach.

Operating Near Airports

Flying near airports comes with extra responsibilities and safety measures. Here's what you need to know:

- **Precautions and Safety Measures**:
  - **Stay Within Regulations**: Part 107 requires you to fly below 400 feet and maintain visual line of sight. When near airports, these rules are even more crucial.
  - **Check Airspace Class**: Understand the class of airspace around the airport (B, C, D, or E) and obtain the necessary authorizations using LAANC or the FAA Drone Zone.
- **Coordination with Airport Authorities**:
  - **Notify ATC**: If you're flying in controlled airspace, you must coordinate with Air Traffic Control (ATC). Provide details about your flight plan, including the location, altitude, and duration.
  - **Use NOTAMs**: Check for Notices to Airmen (NOTAMs) that might affect your flight. These notices provide information about temporary changes to airport operations.
  - **Follow Local Procedures**: Each airport may have specific procedures for drone operations. Familiarize yourself with these rules and follow them closely.

Mastering airport operations is crucial for passing Part 107 certification and flying safely near busy airports. Drone pilots must understand airport layouts, signage, lighting, and necessary precautions to ensure safer flights and compliance with regulations.

Next, let's explore the Basics of Meteorology in our journey through the skies!

Additional Resources and Materials:

- **Airspace and airports flashcards:** Use flashcards to help you study for your exam. It never hurts to be prepared.