FAA Part 107 TEST GUIDE

FLY YOUR DRONE COMMERCIALLY!

A "spoon feeding" guide to passing the FAA PART 107 Test

droneybee.com

CONTENTS

DO YOU NEED TO PASS THE FAA PART 107 EXAM?

Do you need the Part 107 certification? Short answer is, yes if you want to do anything "commercial" with a drone.

Making money in any way with a drone is classified as "commercial use". This includes the selling of photos and videos taken using the UAV, providing contract services like factory inspection, agricultural inspection, wildlife survey operations and providing security and surveillance operations with the UAV – essentially anything you'd do to make money with a drone.

Effective August 29, 2016: If you want to use the UAV for these commercial purposes, according to FAA: "The person actually flying a drone must be at least 16 years old and have a remote pilot certificate with a small UAS rating, or be directly supervised by someone with such a certificate. To qualify for a remote pilot certificate (Part 107), an individual must either pass an initial aeronautical knowledge test at an FAA-approved knowledge testing center or have an existing non-student Part 61 pilot certificate."

HOW TO TAKE THE TEST?

In order to book the test, follow this updated booklet on contact information and information about testing centres in different areas put by the FAA. Knowledge Testing Centers charge approximately $150 to people seeking to take the initial aeronautical knowledge test. If you fail and want to retake, the same charge applies (which you can do 2 weeks later).

Make sure to also refer to this FAQ section put up by the FAA.

When you go to the testing centre, don't forget to take your ID with you! You may also take a four function (+, - , *, /) calculator with you into the testing centres.

How is the test structured?

The test consists of multiple choice questions with 3 choices (2 wrong answers and 1 correct answer) and can have up to 63 questions. The time duration of the test is 2 hours. However, you may finish it earlier than this and get to know your test result on the spot. In order to pass the exam, you need a 70% correct score.

Is this test relevant to flying drones?

Unfortunately, much of the knowledge that will be tested in the FAA Part 107 exam will have little or nothing to do with flying your regular commercial "drones".

However, a lot of it goes back to the FAA's history of providing really safe airspace. Though the information is not directly related to flying drones, you'll be knowledgeable in terms of how airspace safety is maintained.

Think of it as an opportunity to get a "sneak peek" into the world of the superset of airspace safety regulations and standards that handles large aircrafts and helicopters. This will make the whole endeavor motivating for you!

SOME TEST TAKING TIPS

MAKE QUICK NOTES

When you study for the Part 107 exam, make quick notes of concepts you don't understand/ cannot memorize as quickly. For example, for the METAR and TAF reports type questions, you may not be able to rememmber every little abbreviation. Keep quick notes of these and memorize it a day before the exam. For the rest, just learn and practice.

MARK QUESTIONS

While taking the exam, mark the vague questions which you are not sure of, for later. Often, you might get the answer (or clue to the answer) to an earlier question you were not able to answer to after answering some other questions down the line.

ELIMINATE "DISTRACTION ANSWERS"

The test questions contain 3 possible answers and even if you don't know the right answer, there is a 33% chance that you will get the answer right. Out of this, in most questions, 1 choice is almost always an easy to eliminate distraction asnwer. This gives you a 50% chance to get the answer correct for most questions!

HOW TO USE THIS GUIDE?

We recommend you read this guide from front to back to easily familiarize yourself with how the test will actually be like. After you have done this, we have provided a "recommended resources" section at the end of this guide for you to go through to familiarize yourself with everything you will need to know to pass the FAA Part 107 exam.

We'll start with the easiest type of questions to the more "difficult" ones. Each section in this guide is organized as a type of question that will appear in the exam. It is categorized as follows:

1. Basic drone laws
2. Airspace rules
3. Weather
4. Team & Crew
5. Visual Observer
6. Crew resource management and risks
7. Hazardous attitudes
8. User manual, maintenance and documentation of your drone
9. Radio
10. Airplane Physics
11. NOTAMS
12. METAR and TAF reports
13. Sectional charts
14. Sectional chart supplements

If this appears to be overwhelming, don't be. As you'll quickly see in this guide, preparing for the FAA Part 107 with this guide is about knowing what type of question to expect within each of these different categories and then taking a dive into the resources and sample tests in the "recommended resources" section of this guide to finish it off!

Also, remember that a lot of the Part 107 exam will involve reading sectional charts. Familiarize yourself with it and you'll have a pretty easy time with taking the test. This

should be fairly easy, given that the chart legend will be provided at the time of taking the test. The only difficulty should be in "zooming down" to the area and separate the relevant information out of all the chaos.

BASIC DRONE LAWS

This type of question should be one of the easiest for you to answer. Even the distraction questions that come up are fairly easy to eliminate. Even if you have only speed-read through the resources that we have provided in the "recommended resources" section, this should be easy to follow for you.

The following is an example question from this type of category:

According to 14 CFR Part 107, what is required to operate a small UA within 30 minutes after official sunset?

A. Use of anti-collision lights. (Correct answer)

B. Must be operated in a rural area.
C. Use of a transponder.

Some important facts that will help you with this type of question:

- **0.04**: Maximum blood alcohol level.
- **8 hours**: The time that must pass since you have had alcohol.
- **10 days**: The maximum time you can take to file an FAA accident report.
- **30 days**: The time you have to notify the FAA if you move.
- **90 days**: The lead time required when requesting an FAA waiver.
- **1 year:** Time that must pass after a final narcotics conviction.
- **0.55 lbs**: The lightest drone that must be registered.
- **55 lbs**: Heaviest legal drone (must be less than, not equal to, 55 lbs).
- **500 feet**: Minimum number of feet below a cloud you must fly.
- **2,000 feet**: Minimum number of feet horizontally from a cloud you must fly.
- **$500**: The repair cost of accident damage that requires you to report an accident to the FAA
- **Level 3**: The "serious injury" AIS level that requires you to file an accident report.
- **122.9**: The MULTICOM frequency for self-announce procedures.
- **2000 feet**: The distance you should operate from a tower to avoid hitting guy wires.

- **13 years old:** The youngest person who can register a drone.
- **24 months**: How long this certification is good for.
- **30 minutes**: The twilight time before sunrise or after sunset when you can still fly.
- **3 statute miles**: The distance your anti-collision lights must be visible from when flying during twilight. Also the minimum visibility you must have while flying.
- **1:** The number of drones you can fly simultaneously.
- **400 feet**: The maximum height you can fly AGL or above a taller building within a 400-foot radius.
- **100 MPH/87 Knots**: Fastest you can fly.

AIRSPACE RULES

Questions that involve situations in which different rules for different airspaces are fairly common in the Part 107 test. Knowing different airspaces will also be important to answer some of the questions in the "Sectional charts" category type questions. Here is a sample question from this category:

According to 14 CFR PART 107, how may a remote pilot operate an unmanned aircraft in class C airspace?

A. The remote pilot must have prior authorization from the Air Traffic Control (ATC) facility having jurisdiction over that airspace. (Correct answer)
B. The remote pilot must monitor the Air Traffic Control (ATC) frequency from launch to recovery.
C. The remote pilot must contact the Air Traffic Control (ATC) facility after launching the unmanned aircraft.

(Sectional chart type question that we'll look into later in this guide) You have been hired to inspect the tower under construction at 46.9N and 98.6W, near Jamestown Regional (JMS). What must you receive prior to flying your unmanned aircraft in this area?

A. Authorization from the military.
B. Authorization from ATC.
C. Authorization from the National Park Service.

Remember the following to help you answer the questions in this category (In any airspace that is controlled, you will need ATC permission):

Class A. Airspace from 18,000 feet to 60,000 feet in the US.

Class B. This type surrounds big, major airports and within 0-10,000 feet. It has multiple layers (visualize an upside down wedding cake)

Class C. This type surrounds medium sized airports with a control tower, a radar and some traffic They are usually 5 NM (nautical mile) radius from 0-4,000 feet, and a 10 NM radius from 1,200-4,000 feet.

Class D. This type surrounds airports with a control tower and is within 0-2,500 feet. They have no specific radius, just shaped around flight patterns. Outside control tower hours, Class D airspace is Class G.

Class E. Usually it starts at 1,200 feet and goes up to 18,000 feet. (You are not allowed to fly your drone this high anyway)

Class G. Uncontrolled airspace (below class E airspace)

WEATHER, AIR, TEMPERATURE AND ALTITUDE

With these type of questions, the FAA wants to test your knowledge on the effects of weather, air and altitude on the performance of your craft. Here are some example questions that you might come across:

What effect does high density altitude have on the efficiency of a UA propeller?

A. Propeller efficiency is increased.
B. Propeller efficiency is decreased. (Correct answer)
C. Density altitude does not affect propeller efficiency.

What are characteristics of a moist, unstable air mass?

A. Turbulence and showery precipitation.

B. Poor visibility and smooth air.

C. Haze and smoke.

What are the characteristics of stable air?

A. Good visibility and steady precipitation
B. Poor visibility and steady precipitation

C. Poor visibility and intermittent precipitation.

Remember the following facts:

- Type of air and effects:
  Moist and unstable air will have turbulence and showery precipitation.
  Unstable air will have intermittent precipitation.
  Stable air will have poor visibility and steady precipitation.

- Density and altitude:
- "High density" = high altitude, meaning thinner air and lower perfomance
- A rain cloud is called a **Nimbus.**
- When there is temperature inversion it means there is warm air on top of cold air. There will be lower visibility and fog but the air will be smooth.
- When the air is cool and dry stability increases. When the air is hot and humid, stability decreases.

TEAM, CREW AND VISUAL OBSERVER

FAA considers safe flying as working as a team during your commercial drone endeavours. For example, having a visual observer (VO) is necessary if you are doing FPV flying. The pilot can focus on the FPV screen while the VO can make the visual sight of the drone to ensure safety. The person piloting the drone (which will be you, if you are taking the test!) is the RPIC (Remote pilot in command) and will be held responsible for safe flying.

Here are some sample questions:

When using a small UA in a commercial operation, who is responsible for briefing the participants about emergency procedures?

A. The FAA inspector-in-charge.
B. The lead visual observer.
C. The remote PIC. (Answer)

According to 14 CFR part 107, who is responsible for determining the performance of a small unmanned aircraft?

A. Remote pilot-in-command. (Answer)
B. Manufacturer.
C. Owner or operator

CREW RESOURCE MANAGEMENT AND RISK MANAGEMENT

The FAA wants to ensure that the "crew" that manages the drone flying mission has everything planned properly and isn't breaking any laws. Here are some example questions:

When adapting crew resource management (CRM) concepts to the operation of a small UA, CRM must be integrated into

A. The flight portion only.
B. All phases of the operation.
C. The communications only.

Safety is an important element for a remote pilot to consider prior to operating an unmanned aircraft system. To prevent the final "link" in the accident chain, a remote pilot must consider which methodology?

A. Crew Resource Management.
B. Safety Management System.
C. Risk Management.

Which is true regarding the presence of alcohol within the human body?

A. A small amount of alcohol increases vision acuity.
B. Consuming an equal amount of water will increase the destruction of alcohol and alleviate a hangover.
C. Judgment and decision-making abilities can be adversely affected by even small amounts of alcohol.

You are a remote pilot for a co-op energy service provider. You are to use your UA to inspect power lines in a remote area 15 hours away from your home office. After the drive, fatigue impacts your abilities to complete your assignment on time. Fatigue can be recognized

A. Easily by an experienced pilot.

B. As being in an impaired state.

C. By an ability to overcome sleep deprivation.

HAZARDOUS ATTITUDES

Certain personality traits can increase the likelihood of causing a disaster. The FAA wants you to identify these personality traits and avoid them (how much ever babying this might seem like). Here are some example questions:

You have been hired as a remote pilot by a local TV news station to film breaking news with a small UA. You expressed a safety concern and the station manager has instructed you to "fly first, ask questions later." What type of hazardous attitude does this attitude represent?

A. Machismo.
B. Invulnerability.
C. Impulsivity.

A local TV station has hired a remote pilot to operate their small UA to cover breaking news stories. The remote pilot has had multiple near misses with obstacles on the ground and two small UAS accidents. What would be a solution for the news station to improve their operating safety culture?

A. The news station should implement a policy of no more than five crashes/incidents within 6 months.
B. The news station does not need to make any changes; there are times that an accident is unavoidable.
C. The news station should recognize hazardous attitudes and situations and develop standard operating procedures that emphasize safety.

Here's a list of hazardous attitudes that you must avoid, according to the FAA:

- **Machismo** : Impressing others
- **Impulsivity :** Being fool hardy
- **Resignation:** Being a fatalist (Everything is upto fate or god)
- **Anti-authority:** All rules are meant to be broken
- **Invulnerability:** Oh, accidents? They only happen to others or in movies

USER MANUAL, MAINTENANCE SCHEDULE AND DOCUMENTATION OF YOUR DRONE

The FAA wants you to know what documentation or user manual you should refer to. With many drones, you might not even have a user manual or doc. The maintenance scheduling is also important according to the FAA, lest you use a malfunctioning drone with increased risk of crashing.

Here is a sample question:

Under what condition should the operator of a small UA establish scheduled maintenance protocol?

A. When the manufacturer does not provide a maintenance schedule.
B. UAS does not need a required maintenance schedule.
C. When the FAA requires you to, following an accident.

RADIO

This communication method may be old, but nevertheless, you'll be questioned on your radio knowledge. Most of the questions pertaining to your knowledge on radio talk will be from the sectional charts and reading METAR and TAF report. We'll see this when we get to those sections.

Remember the following:

CTAF: CTAF is for pilots to talk to each other when there's no tower

UNICOM: UNICOM is a base station that broadcasts to pilots when there's no tower

MULTICOM: MULTICOM is used as the CTAF when there's no CTAF (122.9 or 122.95)

AWOS: This is the weather broadcast radio.

Also remember the following NATO radio codes:

A	Alpha
B	Bravo
C	Charlie
D	Delta
E	Echo
F	Foxtrot
G	Golf
H	Hotel
I	India
J	Juliet

K	Kilo
L	Lima
M	Mike
N	November
O	Oscar
P	Papa
Q	Quebec
R	Romeo
S	Sierra
T	Tango
U	Uniform
V	Victor
W	Whiskey
X	X-ray
Y	Yankee
Z	Zulu

AIRPLANE PHYSICS

Most of the questions under this category will pertain to fixed wing aircrafts. This might annoy you because you are flying a quadcopter after all! However, here's some motivation : Remember that there are fixed wing drones that are in certain cases much, much more efficient than regular quadcopters. Here are some example questions:

When operating an unmanned **airplane**, the remote pilot should consider that the load factor on the wings may be increased anytime

A. The CG is shifted rearward to the aft CG limit.
B. The airplane is subjected to maneuvers other than straight and level flight.
C. The gross weight is reduced.

A stall occurs when the smooth airflow over the unmanned airplane`s wing is disrupted, and the lift degenerates rapidly. This is caused when the wing

A. Exceeds the maximum speed.
B. Exceeds maximum allowable operating weight.
C. Exceeds its critical angle of attack. (correct answer)

If an unmanned airplane weighs 33 pounds, what approximate weight would the airplane structure be required to support during a 30° banked turn while maintaining altitude?

[Explanation: In a turn of 30 degrees of bank and while maintaining level flight (no altitude loss because you slightly pitched up), you will have a 1.154 load factor. This means that in this turn you will be feeling like you are pulling 1.154 G's. 33 pounds x 1.154 = 38.082 pounds].

A. 34 pounds.
B. 47 pounds.
C. 38 pounds.

Here are some relevant information to keep in mind:

Stalls occur when the wing exceeds its critical angle of attack.

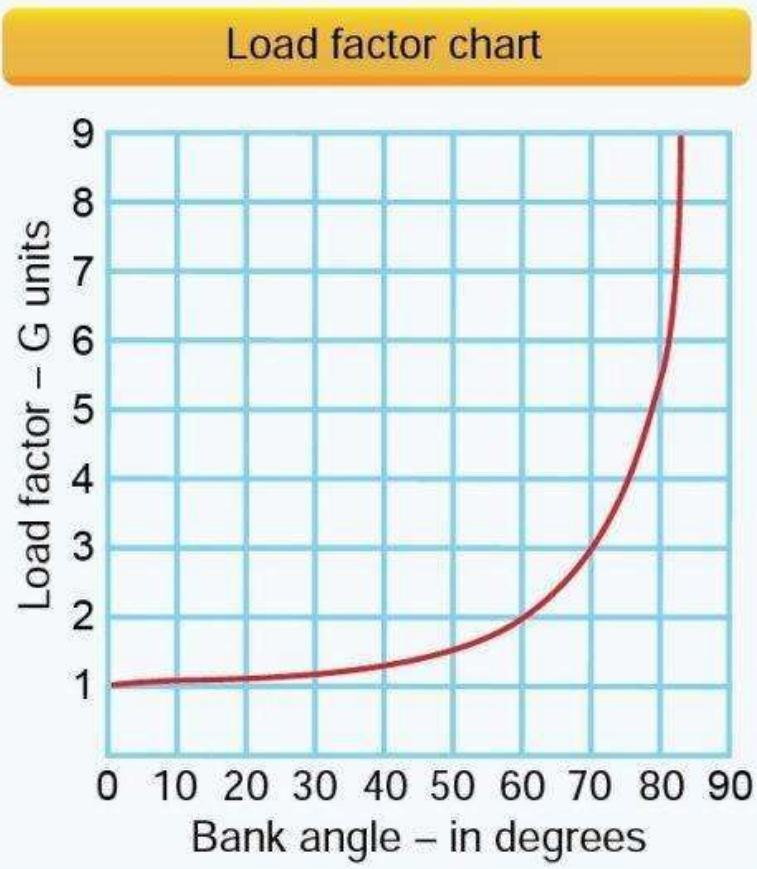
Center of Gravity (CG) Limits Supposed to be defined in the Pilot's Operating Handbook or UAS Flight Manual, but those don't exist for drones.

Angle of attack Determines when the craft stalls. This doesn't change if the vehicle weight changes.

Load Factor Increases during any maneuver.

Also remember the load factor chart for fixed wing aircrafts to answer questions based on load factors:

Angle of bank ϕ	Load factor n
0°	1.0
10°	1.015
30°	1.154
45°	1.414
60°	2.000
70°	2.923
80°	5.747
85°	11.473
90°	∞



NOTAMS (NOTICE TO AIRMEN)

This type of question will involve anything that has to do with emergency notices. Here is a sample question that will very likely appear in the exam:

How would a remote PIC "CHECK NOTAMS" as noted in the CAUTION box regarding the unmarked balloon?

A. By utilizing the B4UFLY mobile application.
B. By contacting the FAA district office.

C. By obtaining a briefing via an online source such as: 1800WXBrief.com.

METAR AND TAF REPORTS

METAR refers to meteorological aviation reports and TAF refers to Terminal Aerodrome forecasts. This type of question will test your ability to read obscure weather code and translate it into something that is understandable by the human mind. If you are able to read METAR, you should be fine with reading TAF.

Here's an example question:

(Refer to FAA-CT-8080-2G, Figure 12.) What are the current conditions for Chicago Midway Airport (KMDW)?

[METAR KLAX 121852Z 25004KT **6SM** BR SCT007 SCT250 16/15 A2991

SPECI KMDW 121856Z 32005KT **1 1/2SM** RA OVC007 17/16 A2980 RMK RAB35]

A. Sky 700 feet overcast, visibility 1-1/2SM, rain.
B. Sky 7000 feet overcast, visibility 1-1/2SM, heavy rain.
C. Sky 700 feet overcast, visibility 11, occasionally 2SM, with rain.

Here's a short guide on how to read the METAR and TAF. It'll only take you like an hour to master it! With this type of question, be careful with distraction answers. They can be deceiving so make sure you pay attention!

SECTIONAL CHARTS

Sectional chart reading will most likely be the **most common type** of question that you'll encounter in the FAA Part 107 test. Make sure you master how to read them them!

Here are some sample questions. Check out this booklet for the actual figures. For example, the figure for the first question is in page 55.

1. (Refer to FAA-CT-8080-2G, Figure 21.) What airport is located approximately 47 (degrees) 40 (minutes) N latitude and 101 (degrees) 26 (minutes) W longitude?

   A) Mercer County Regional Airport. B) Semshenko Airport. **C) Garrison Airport.**

2. (Refer to FAA-CT-8080-2G, Figure 26.) What does the line of latitude at area 4 measure?

   A) The degrees of latitude east and west of the Prime Meridian. **B) The degrees of latitude north and south of the equator**. C) The degrees of latitude east and west of the line that passes through Greenwich, England.

The FAA study guide has everything you need to know on how to read sectional charts.

Here's a comprehensive video guide (About 1 hours and 20 minutes!) on reading sectional charts: https://www.youtube.com/watch?v=ibPfoydutgA

SECTIONAL CHART SUPPLEMENTS

The most detailed information about airports, protected areas, military operation areas, military training routes and such can be found in the sectional chart supplements.

Sample question:

The most comprehensive information on a given airport is provided by

A. the Chart Supplements U.S.
B. Notices to Airmen (NOTAMS).
C. Terminal Area Chart (TAC).

RECOMMENDED RESOURCES

- FAA study guide (80% of what'll be there in the test will be covered in this guide)
- Appendix 1 of the FAA study guide
- Advisory circular
- SkyVector
- Test Supplement Book by FAA (Become familiar with the sectional chart legends. Go through it multiple times so your ability to read the legend during the test will be faster)
- AIM (Use as a reference)
- Commercial drones FM podcast on prepping for the PART 107 exam
- Remote Pilot 101 Practice test : https://www.youtube.com/watch?v=JxLOwxjX-68
- FREE drone certification guide: https://www.youtube.com/watch?v=6_ucCKFJUCU
- Jonathan Rupperecht Sample Test 1 (highly recommended)
- Jonathan Rupperecht Sample Test 2 (highly recommended)
- Jonathan Rupperecht Sample Test 3 (highly recommended)
- 3DR Practice test
- FAA Practice test