

2. Airspace

2.1 - Airspace Classification



Structure & Formatting Reminder

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

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

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

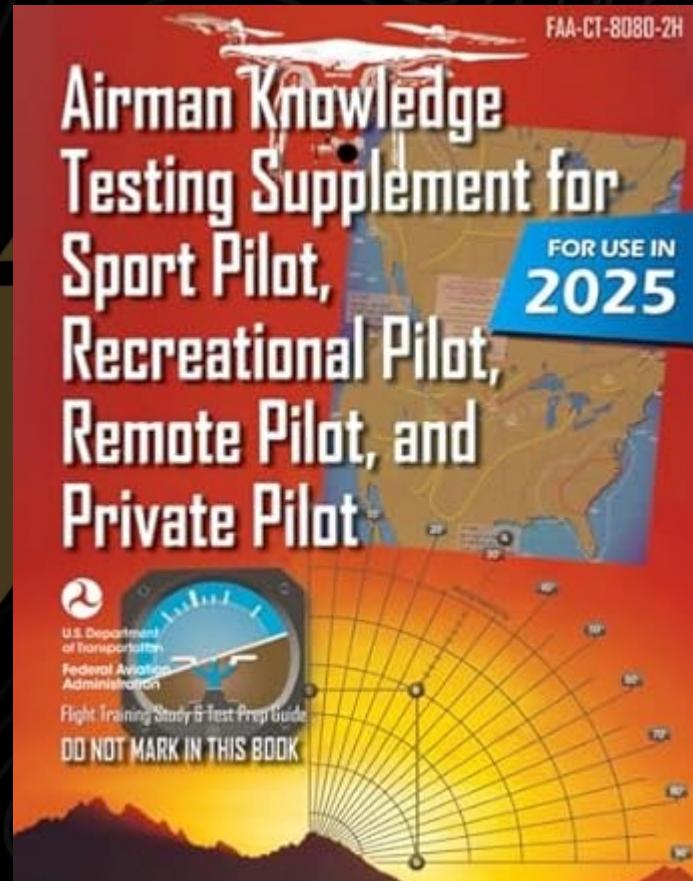
Take the quiz at the end to gauge your understanding.



Airman Knowledge Testing Supplement

Many of the points covered in the slideshow and quiz reference images and concepts found in the “Airman Knowledge Testing Supplement”.

You can download the document from the FAA [here](#). Alternatively, a hard copy can be purchased online for around \$10.



2.1 - Five Types of Altitude

- **INDICATED** Altitude
- **PRESSURE** Altitude
- **TRUE** Altitude
- **ABSOLUTE** Altitude
- **DENSITY** Altitude



2.1 - Five Types of Altitude

Indicated Altitude

Indicated Altitude is the uncorrected altitude shown by the altimeter.

It is an instrument reading and is not necessarily indicative of true or absolute altitude.



Boldmethod



Propwash Drone Solutions LLC

2.1 - Five Types of Altitude

Pressure Altitude

Pressure Altitude is the altitude shown by the altimeter when adjusted to 29.92" Hg.

Used as a common reference for distance above the common datum plane (where the standard day is measured from).

ATIS provides pressure altitude which tells you where to set your altimeter.

Aircraft Fly “Standard Baro”
In The Flight Levels



NAVER



Propwash Drone Solutions LLC

2.1 - Five Types of Altitude

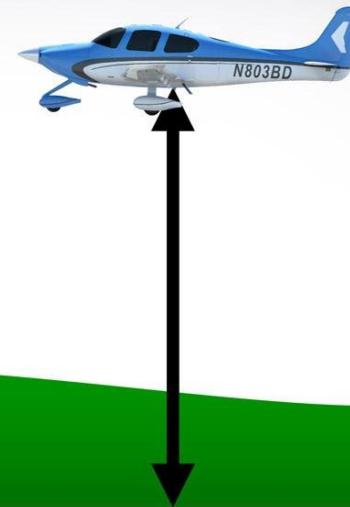
True Altitude (MSL)

True Altitude is the distance between the aircraft and sea level.

Shown on aeronautical charts as MSL (Mean Sea Level)

MSL Provides a common reference point for every aircraft.

True Altitude



Mean Sea Level - 0' MSL

boldmethod

Boldmethod



Propwash Drone Solutions LLC

2.1 - Five Types of Altitude

Absolute Altitude (AGL)

Absolute Altitude is simply the distance between the aircraft and the terrain – how high from the ground.

Expressed as AGL (Above Ground level).

Absolute Altitude



993' AGL



1,104' AGL

boldmethod ▶

Boldmethod



Propwash Drone Solutions LLC

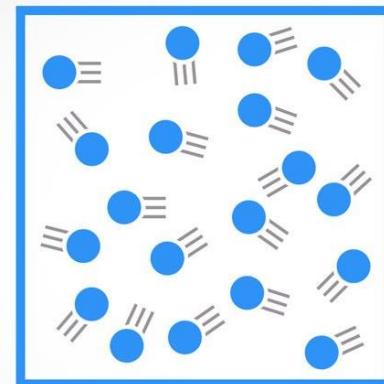
2.1 - Five Types of Altitude

Density Altitude

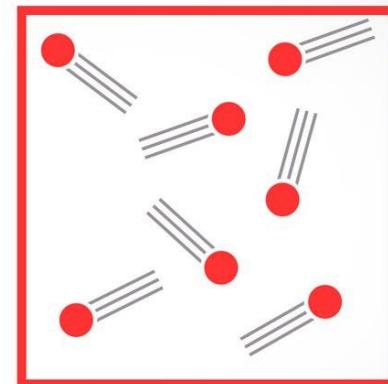
Density Altitude is the altitude in the standard atmosphere related to air density.

It determines performance in a non-standard atmosphere.

Molecule Energy



Cold Air



Hot Air

boldmethod

Boldmethod



Propwash Drone Solutions LLC

What is the difference between MSL and AGL?



Propwash Drone Solutions LLC

What is the difference between MSL and AGL?

MSL (Mean Sea Level) is altitude measured from average sea level, while AGL (Above Ground Level) is altitude measured from the surface directly beneath the object.



2.1 - General Airspace

Air Traffic Control (ATC) manages the airspace around specific airports with the primary goal of preventing collisions.

NOTE: UAV pilots are generally **not** permitted to contact ATC unless in an emergency should **monitor traffic** to ensure other aircraft are not in the area.

Note: It can be helpful to talk with a tower over the phone (not radio) prior to a flight. Waivers might even require this.



2.1 - General Airspace



2.1 - General Airspace

FL600

Usage: Primarily Military Jets

FL600 is Flight Level at a **pressure altitude** of 60,000 feet.

Why? Altimeter instruments measure using pressure but at very high altitudes the barometric pressure is so low that the instrument needs to be adjusted as to reflect the accurate altitude (MSL).

Floor: FL600

Ceiling: n/a

Anything above FL600 becomes class E (Echo) airspace.

Color on Sectional Chart: not on a sectional chart.



Class A (Alpha) Airspace

FL 600

Airspace Classification

Class A

18,000' MSL

Class B

14,500' MSL

Class G

Nontowered
airport with
Instrument
approach

1,200'
AGL

700'
AGL

Class G

Class E

Class C

1,200'
AGL

700'
AGL

Class G

1,200'
AGL

700'
AGL

Class D

Nontowered
airport with
no Instrument
approach

MSL = Mean Sea Level (measured above sea level – not the ground)

AGL = Above Ground Level (measured above ground level)



Propwash Drone Solutions LLC

2.1 - General Airspace

Class A (Alpha) Airspace

Usage: Long distance commercial flights, military.

Floor: 18,000' MSL

Ceiling: FL600

Color on Sectional Chart: not shown



Class B (Bravo) Airspace

FL 600

Airspace Classification



MSL = Mean Sea Level (measured above sea level – not the ground)

AGL = Above Ground Level (measured above ground level)



Propwash Drone Solutions LLC

2.1 - General Airspace

Class B (Bravo) Airspace

Usage: Large and busy airports (Remember: “Big - Big City - Blue”)

Floor: Surface (SFC - 0 feet AGL)

Ceiling: 10,000 feet MSL

Radius: 30 NM (usually 10 NM, 20NM, and 30 NM for each tier)

***Tiered like an **upside down wedding cake** - smaller at the ground and wider at the top. Three layers tall. *** Layers are not all circular and can be differing heights depending on the airport.

Color on Sectional Chart: Solid Blue Line



Propwash Drone Solutions LLC

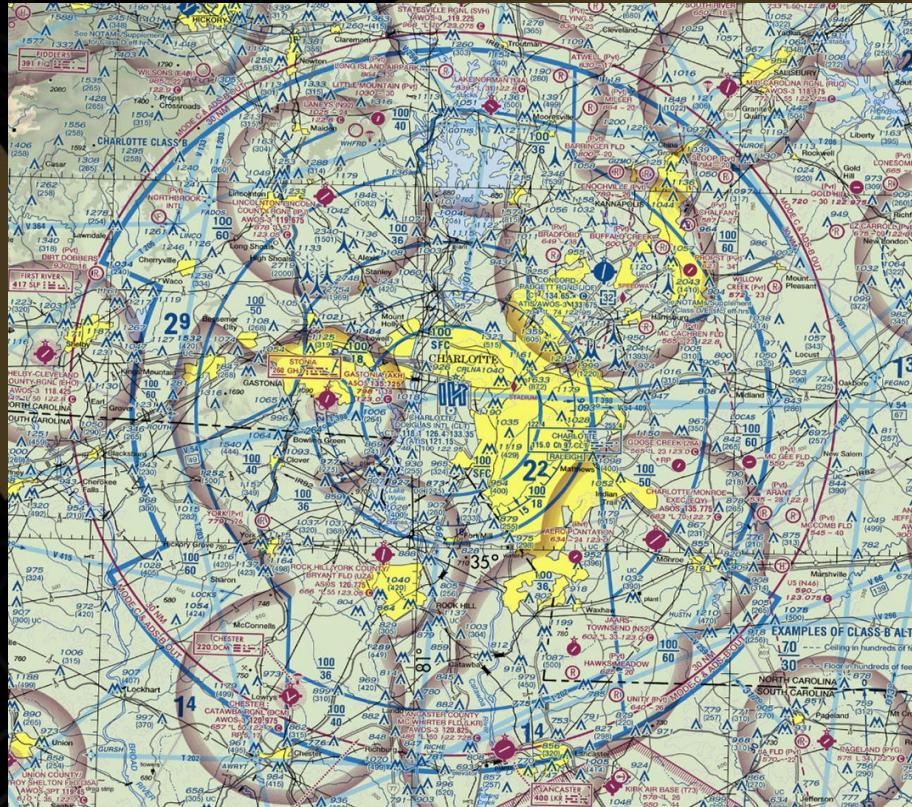
2.1 - General Airspace

Class B (Bravo) Airspace

Example Airports: Charlotte (CLT),
Phoenix (PHZ), Los Angeles (LAX),
Denver (DEN), Atlanta (ATL), Boston
(BOS), Dallas Fort Worth (DFW)

Color on Sectional Chart: Solid
Blue Line

There are currently 37 class B
airports in the US.



Class C (Charlie) Airspace



2.1 - General Airspace

Class C (Charlie) Airspace

Usage: Medium to Large airports

Bottom Tier:

Floor: Surface (SFC - 0 feet AGL)

Ceiling: 1,200 feet MSL

Radius: 5NM (can vary)

Top Tier :

Floor: 1,200 feet MSL — **Ceiling:** 4,000 feet MSL

Radius: 10NM (can vary)

Like Class B, C is tiered like an **upside down wedding cake** - smaller at the ground and wider at the top. Only 2 layers tall. Tier height can vary depending on the airport.



2.1 - General Airspace

Class C (Charlie) Airspace

Example Airport: Raleigh (RDU), Daytona Beach (DAB), Harrisburg (MDT), Wichita (ICT)

Color on Sectional Chart: Solid Magenta

There are currently 122 Class C airports in the US



Class D (Delta) Airspace



MSL = Mean Sea Level (measured above sea level – not the ground)
AGL = Above Ground Level (measured above ground level)



Propwash Drone Solutions LLC

2.1 - General Airspace

Class D (Delta) Airspace

Usage: Regional (not typically international) airports

Floor: Surface (SFC)

Ceiling: 2,500 feet AGL

Radius: 4NM but can vary depending on airport

If control tower is closed Class D becomes class E (Echo) and/or G (Golf) airspace



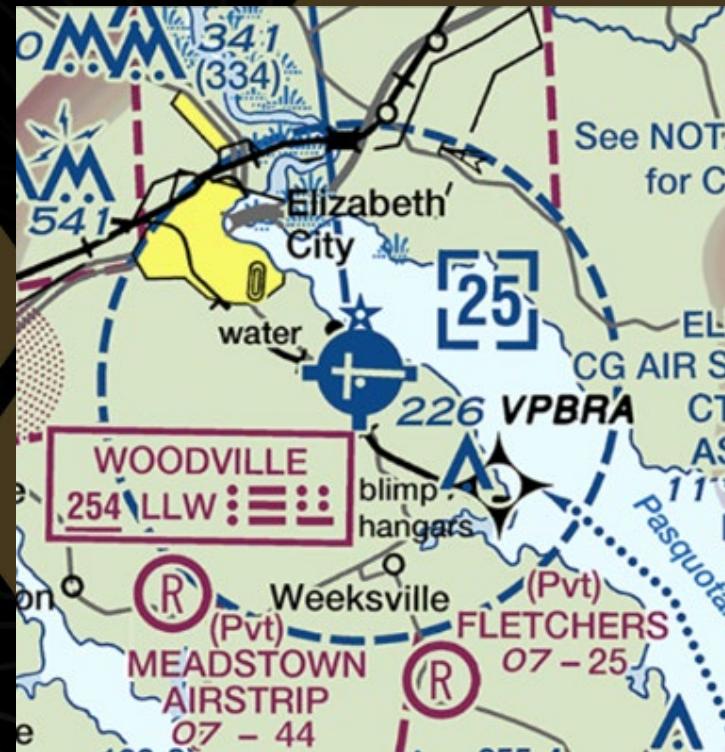
2.1 - General Airspace

Class D (Delta) Airspace

Example Airport: Pueblo (PUB), Bozeman (BZN), Pensacola (PNS), Lincoln (LNK), Yakima (YKM).

Color on Sectional Chart: Blue Dashed Line

There are 474 class D airports in the US.



2.1 - General Airspace

Class E (Echo) Airspace

Usage: Typically small non-towered regional airports, helipads, and areas surrounding other airports.

Floor: 1,200 feet AGL - **unless near an airport starts at 700 feet AGL** – can be Surface (SFC) at certain airports.

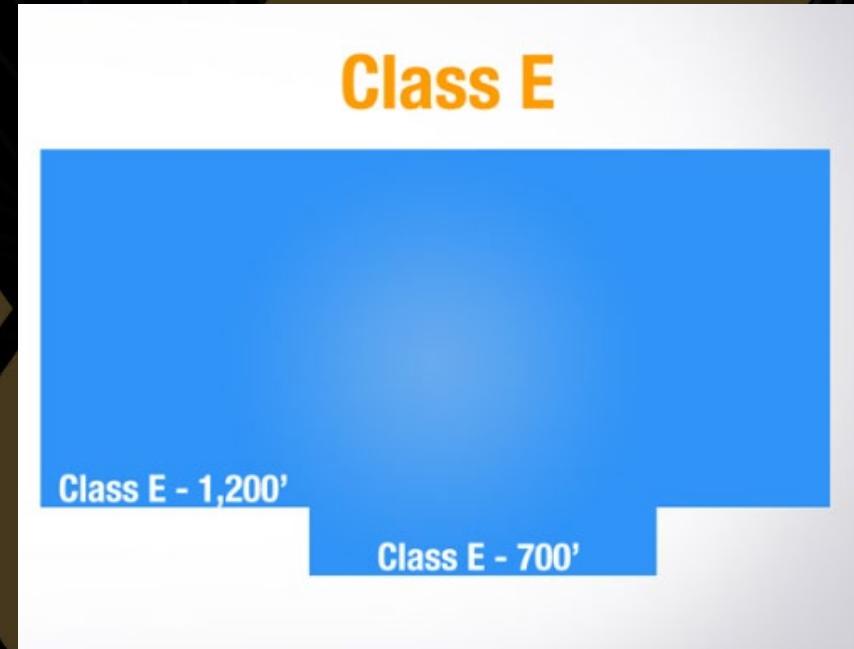
Ceiling: 18,000 feet AGL



2.1 - General Airspace

Class E (Echo) Airspace - Transitional

Begins at 700 or 1,200 feet AGL around airports to provide a controlled environment for Instrument (IFR) aircraft transitioning between the en route system and the terminal area.



2.1 - General Airspace

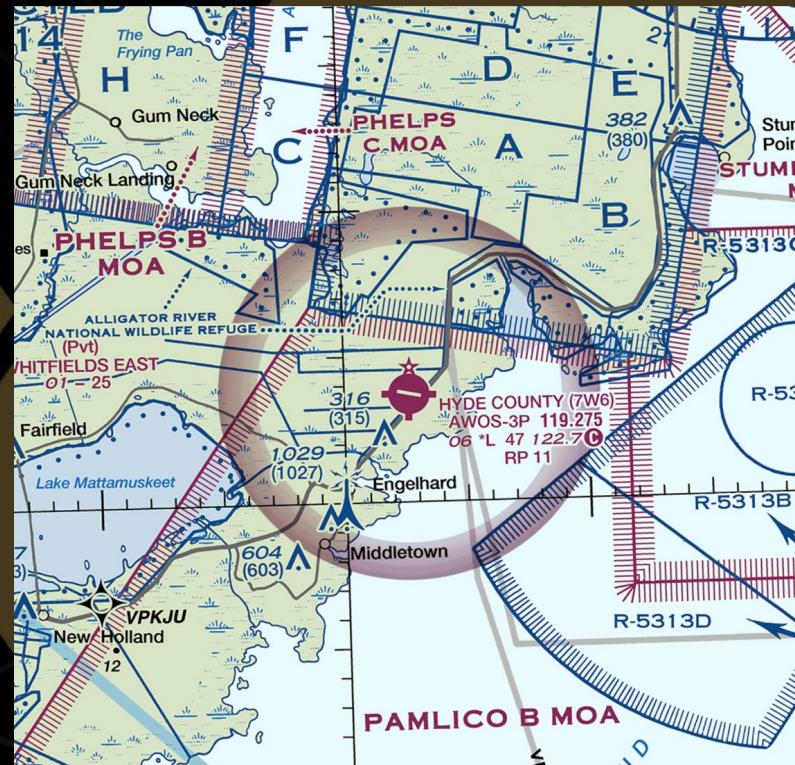
Class E (Echo) Airspace - Transitional

Example Airports: Washington-Warren (OWC), Astoria (AST), Gatesville (GOP), Newton City (EWK)

Color on Sectional Chart: - Shaded Magenta Circles

Ceiling: 700' AGL

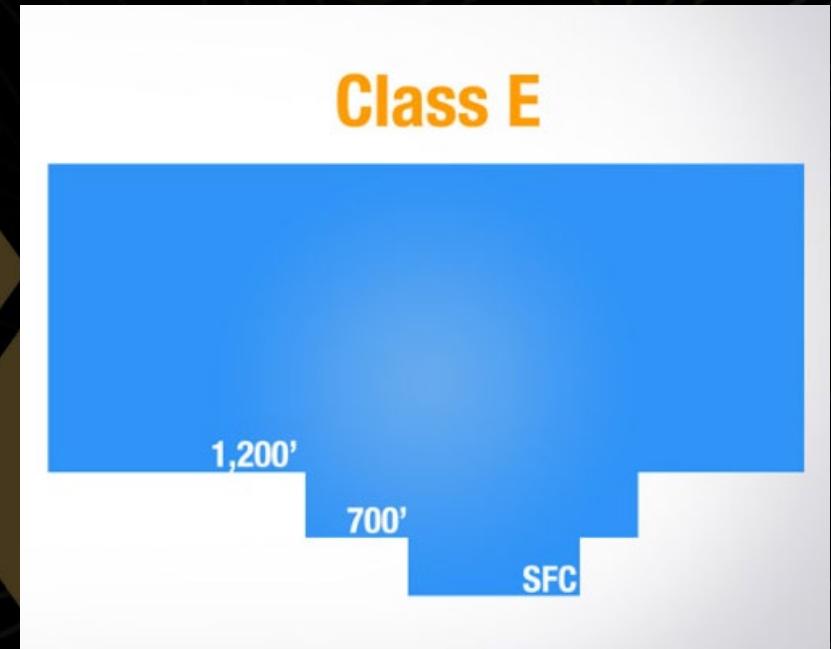
There are 511 class E airports in the US



2.1 - General Airspace

Class E (Echo) Airspace

Begins at ground level around certain non-towered airports to protect IFR operations and instrument approaches.



2.1 - General Airspace

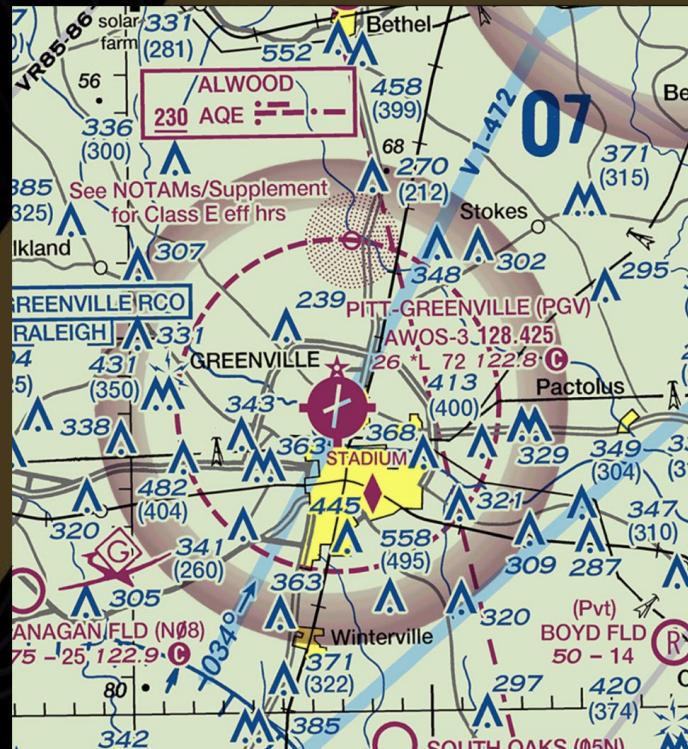
Class E (Echo) Surface Airspace

Example Airport: Augusta (AUG) Pitt-Greenville (PGV), Angelina (LFK), Zanesville (ZZV), Cavern City (CNM)

Color on Sectional Chart:

- Dashed Magenta Line indicates that Class E (Echo) airspace starts at 0 feet AGL (SFC)

Sometimes designated as E2, E2, or E4



2.1 - General Airspace

Class F (Foxtrot) Airspace

NOT USED IN NAS



Propwash Drone Solutions LLC

Class G (Golf) Airspace

FL 600

Airspace Classification

Class A

18,000' MSL

Class B

14,500' MSL

Class G

Nontowered
airport with
instrument
approach

1,200'
AGL

700'
AGL

Class G

Class E

Class C

1,200'
AGL

700'
AGL

Class G

Class D

1,200'
AGL

700'
AGL

Class G

Nontowered
airport with
no instrument
approach

MSL = Mean Sea Level (measured above sea level – not the ground)

AGL = Above Ground Level (measured above ground level)



Propwash Drone Solutions LLC

2.1 - General Airspace

Class G (Golf) Airspace

Usage: Uncontrolled airspace - **G** is “good” for flying.

*Does not require authorization to fly in unless there are other restrictions or
Temporary Flight Restrictions*

Floor: Surface (SFC)

Ceiling: 14,500 feet MSL

Color on Sectional Chart: anything that is not otherwise labeled.



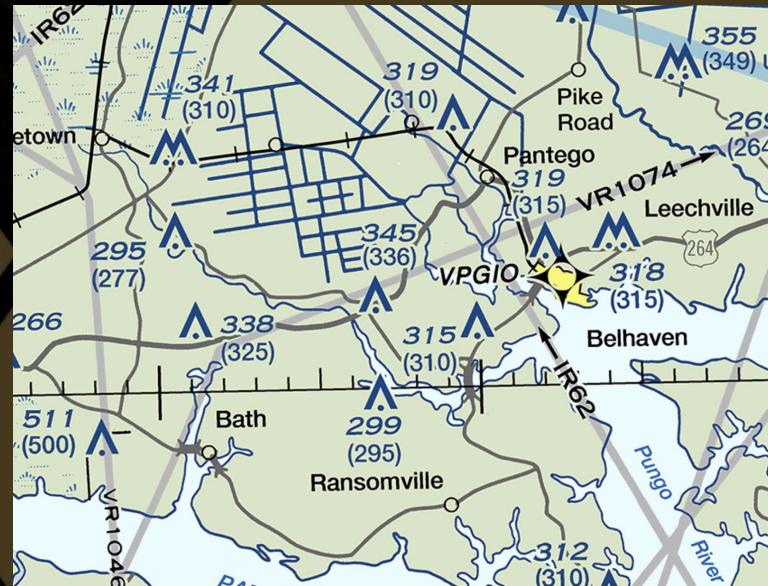
2.1 - General Airspace

Class G (Golf) Airspace

Examples:

Anywhere that is not class B, C, D, or E airspace.

Color on Sectional Chart: No specific color.



2.1 - General Airspace

Review of Each Airspace – Colors/Lines

- Class A – No color
- Class B - Blue Shaded
- Class C - Magenta Solid
- Class D – Blue Dashed
- Class E – Magenta Shaded (and dashed)
- Class F – Does not exist
- Class G – No Color



Which classification of airspace can you fly a UAV in without clearance?



Which classification of airspace can you fly a UAV in without clearance?

You can fly a UAV without ATC clearance in Class G (uncontrolled) airspace and typically in Class E airspace.

You must have clearance to operate in Class B, C, D, and surface Class E airspace.



2.1 - Class B Floors & Ceilings

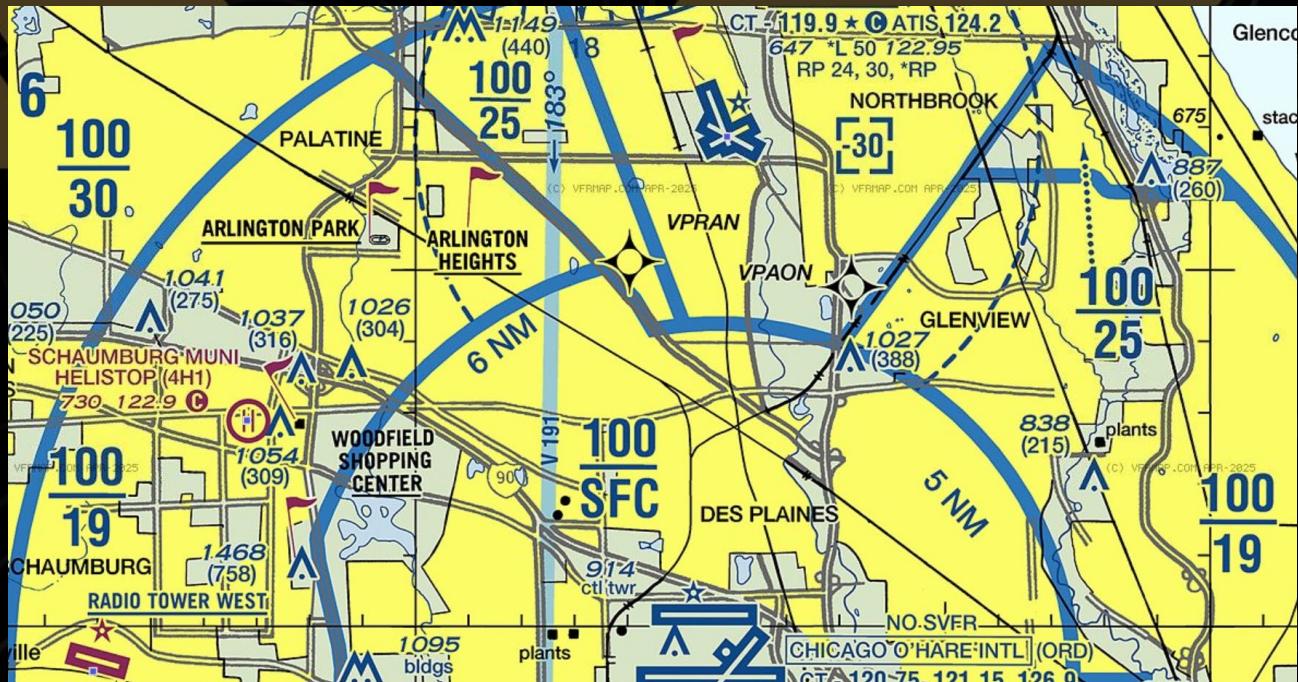
FAA airspace **floors and ceilings** define the lower and upper altitude limits of each airspace class, marking where that controlled or uncontrolled airspace begins and ends vertically.

How they appear on a sectional chart:



2.1 - Class B Floors & Ceilings

Remember that floors and ceiling are different depending on the airport and can be made up of multiple **shelves** within a given tier.



2.1 - Class B Floors & Ceilings

Ceiling: 10,000 MSL (100/40)
Floor: 4,000 MSL (100/40)



2.1 - Class B Floors & Ceilings

Ceiling: 10,000 MSL (100/X)
Floor: ? (X/100)



2.1 - Class B Floors & Ceilings

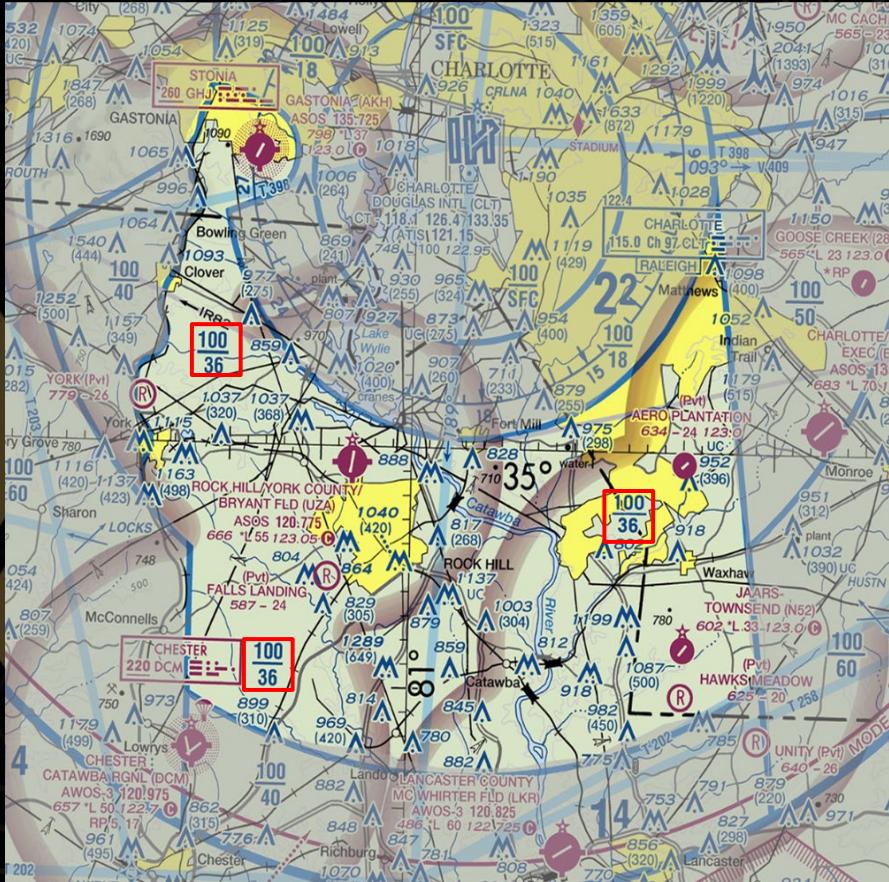
Ceiling: 10,000 MSL (100/60)
Floor: 6,000 (60/100)



2.1 - Class B Floors & Ceilings

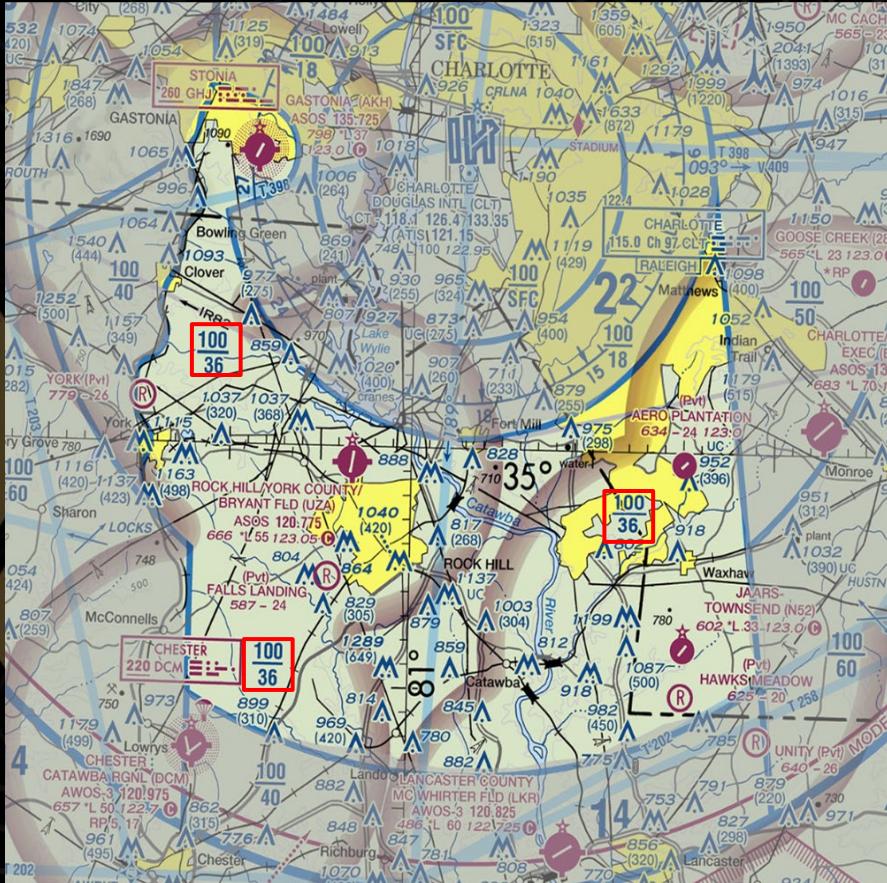
Ceiling: ? MSL (/?36)

Floor: 3,600 MSL (7/36)



2.1 - Class B Floors & Ceilings

Ceiling: 10,000 MSL (100/36)
Floor: 3,600 MSL (100/36)



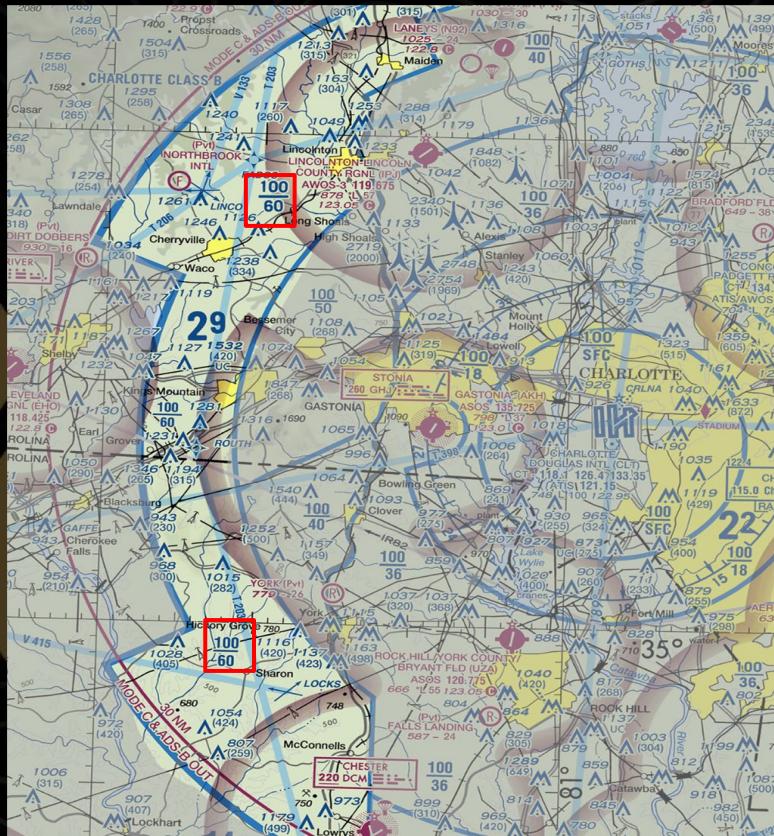
2.1 - Class B Floors & Ceilings

Ceiling: ? MSL
Floor: ? MSL



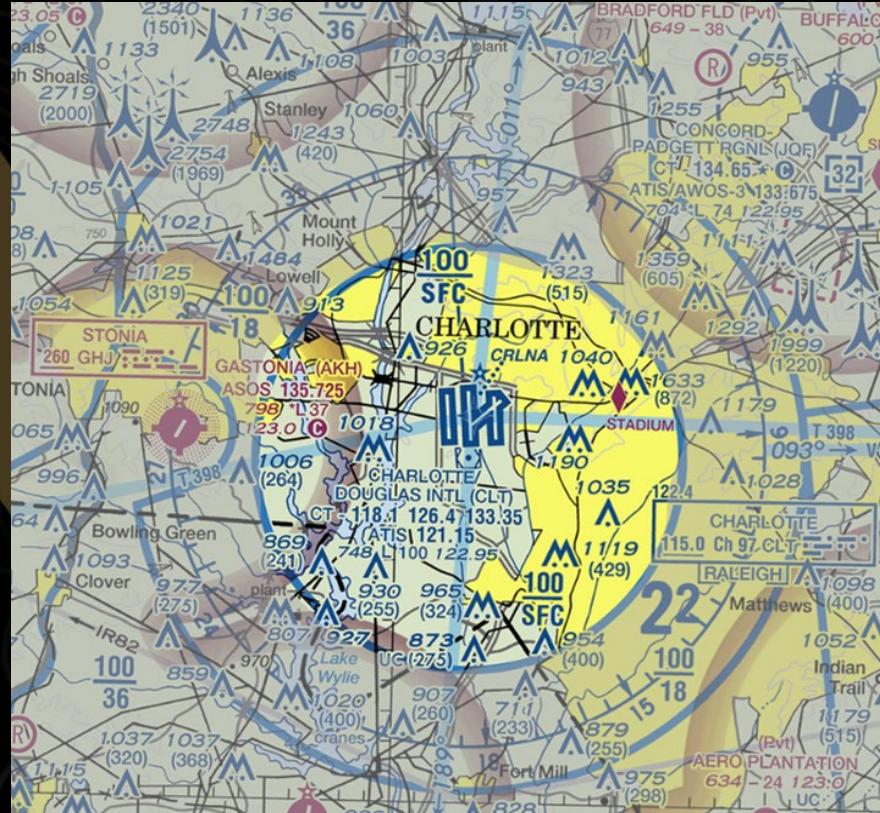
2.1 - Class B Floors & Ceilings

Ceiling: 10,000 MSL (100/60)
Floor: 6,000 MSL (100/60)



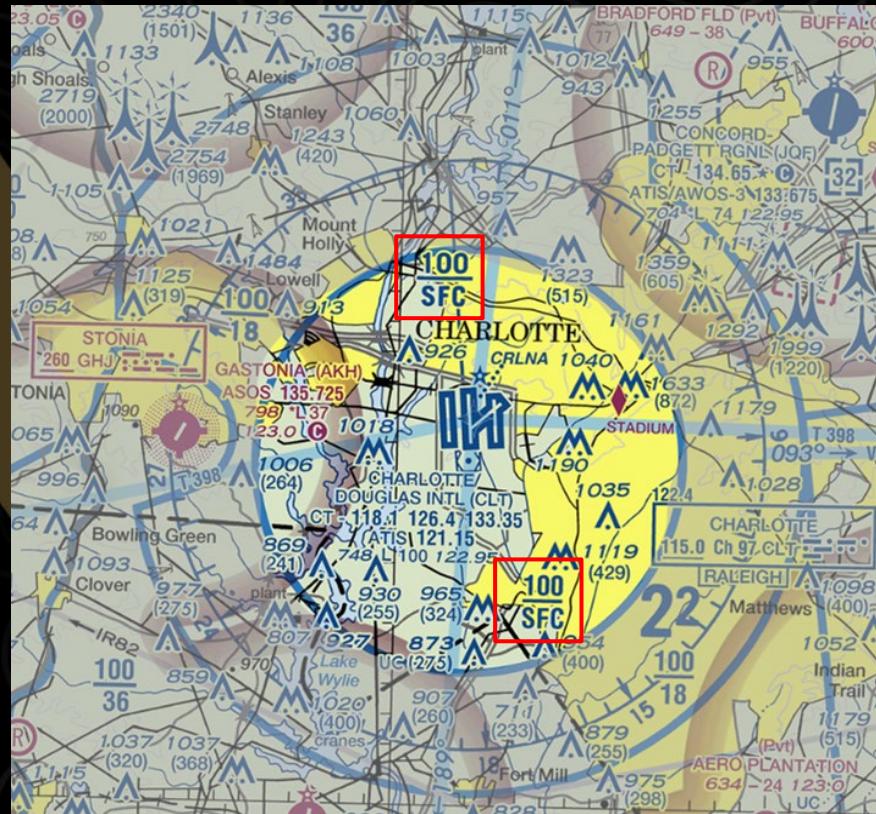
2.1 - Class B Floors & Ceilings

Ceiling: ?
Floor: ?



2.1 - Class B Floors & Ceilings

Ceiling: 10,000 MSL (100/SFC)
Floor: Surface (100/SFC)



2.1 - Class B Floors & Ceilings

Ceiling: ?
Floor: ?

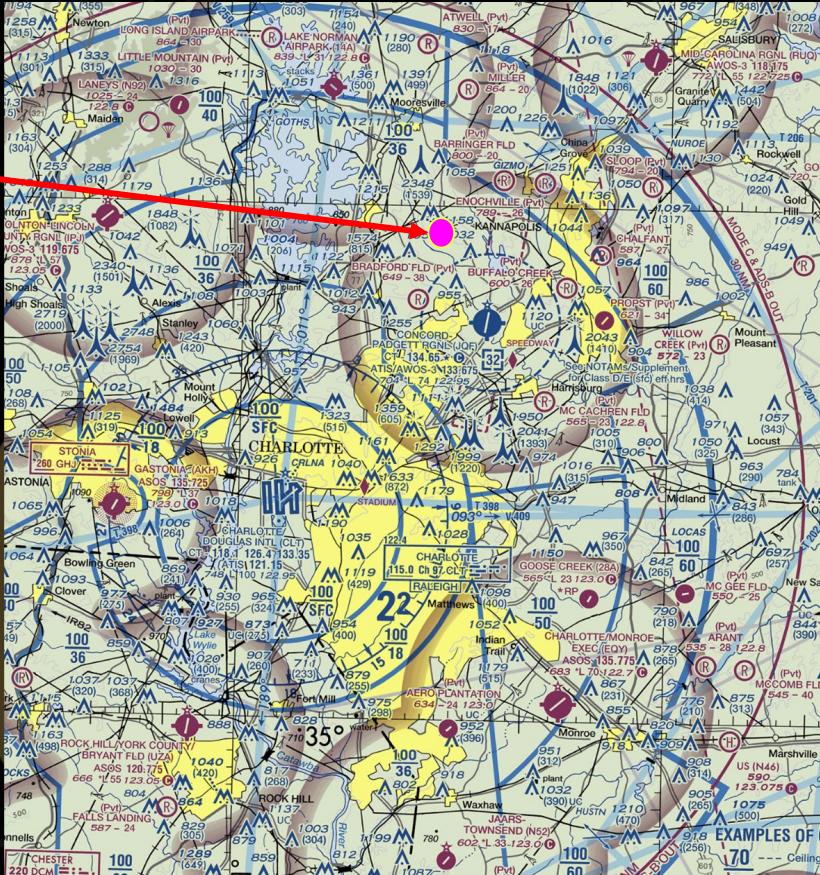


2.1 - Class B Floors & Ceilings

Class B

Ceiling: 10,000 MSL
Floor: 3,600 MSL

Careful, this point is in Class E transitional airspace which means the ceiling is at 700' (important for UAS ops).



2.1 - Class C Floors & Ceilings

RDU - Raleigh Durham International (Class C)

Bottom Tier

Ceiling: 4,400ft MSL

Floor: Surface



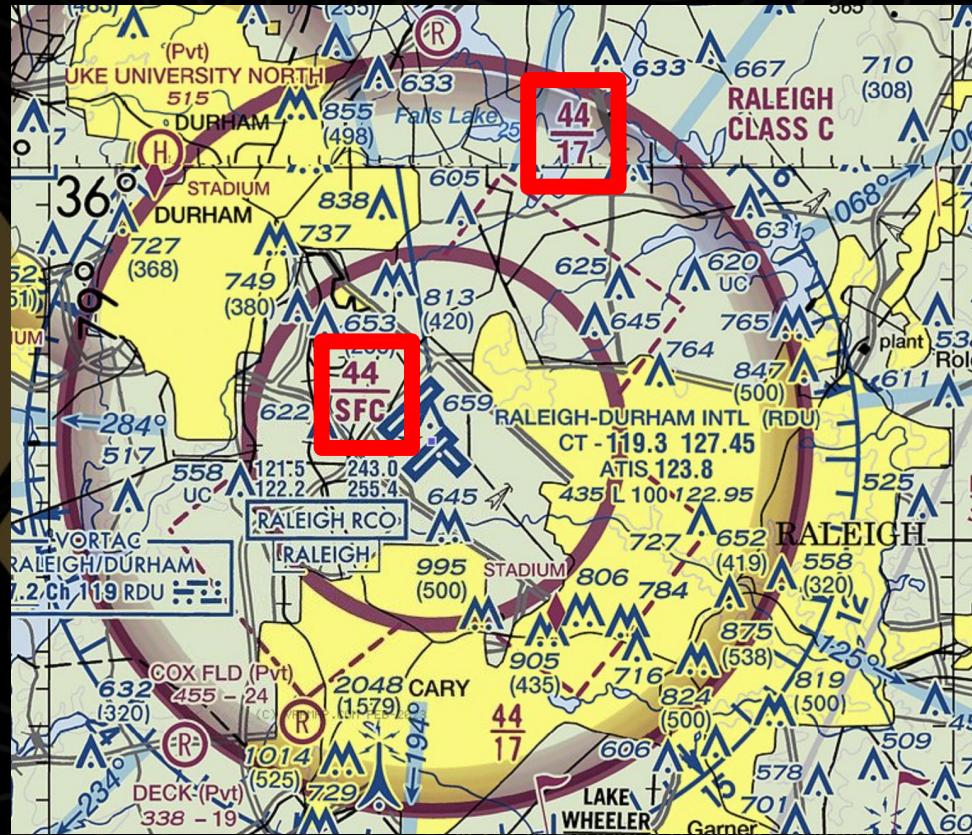
Top Tier

Ceiling: 4,400 MSL

Floor: 1,700 MSL



NOTE: RDU also includes class E airspace both to 700' (shaded magenta) and to the surface SFC (dashed magenta).



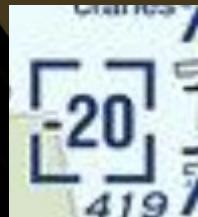
2.1 - Class C Floors & Ceilings

Boxes show parts of the airspace with specific floor and ceiling heights; a “–” means the airspace starts at the surface, and no “–” means it starts above the surface.

Limits around Norfolk, VA

Blue Box Tier

The floor starts at SFC



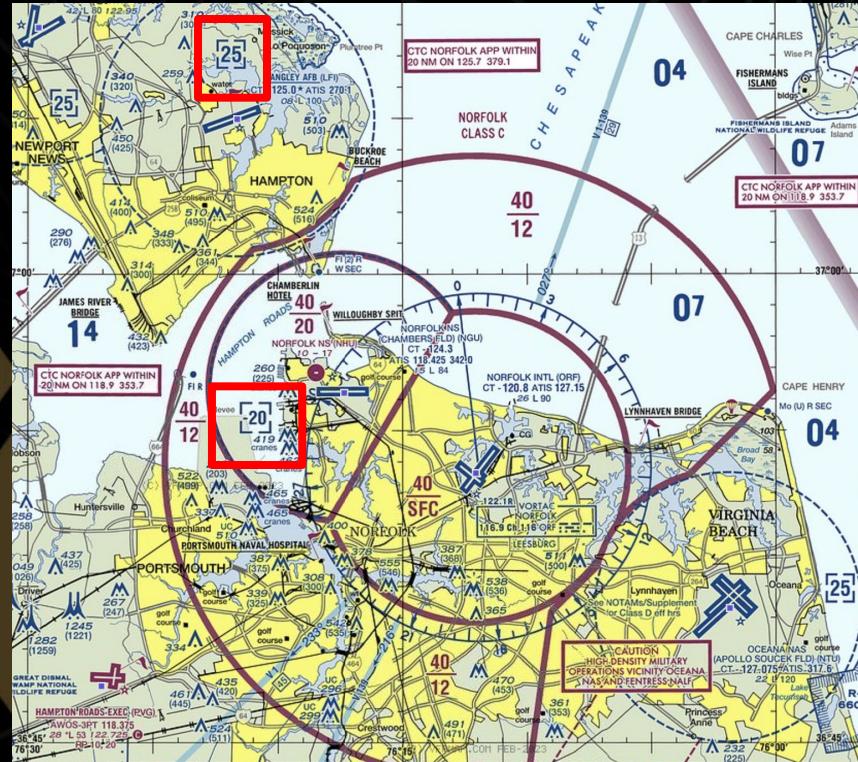
Minus “-” means to SFC

Blue Box Tier

Under 2,500ft MSL is
Class D



No minus “-” means it stars at
the indicated value of 2,500 MSL.



2.1 - Reading Airspace on Sectional Charts

Tower Limits

Obstruction (Likely A Tower)

Drones are allowed to fly 400 feet over an obstruction



- Top Number (271): Top of obstruction in MSL
- Bottom Number (262): Actual height of obstruction - in AGL.

*Legal flight ceiling for UAV is 400 feet above top of obstruction:

$$- 262 + 400 = 662 \text{ ft AGL}$$

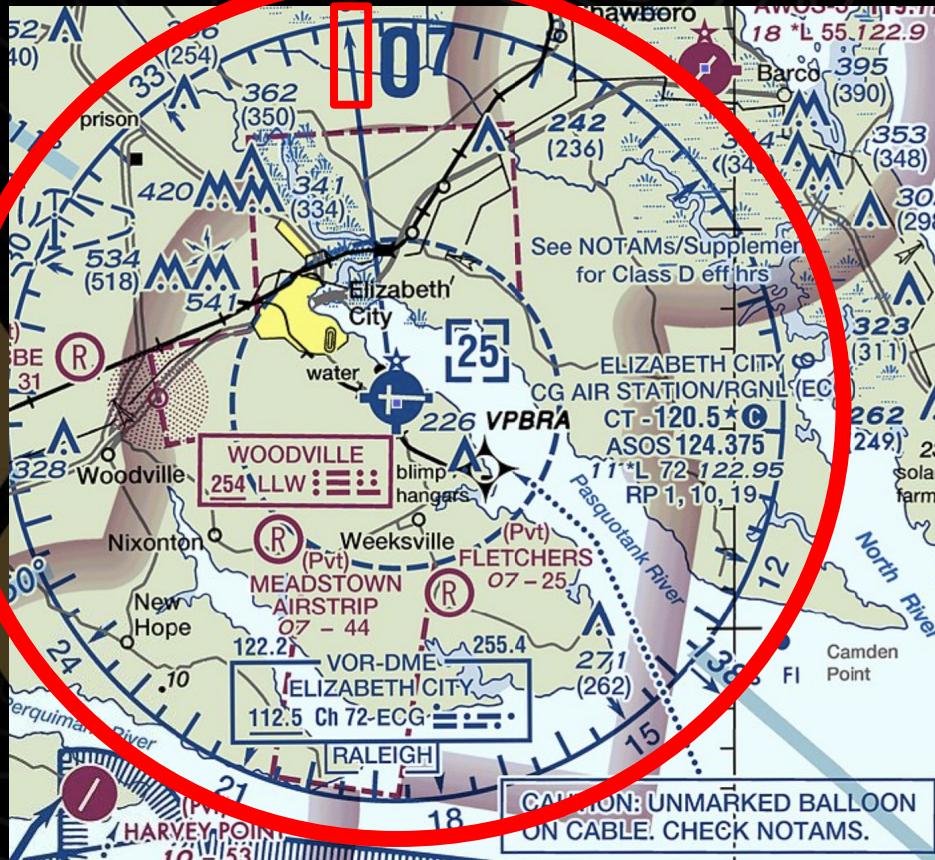
662' is still below class E ceiling of 700ft AGL (if the tower was over 300 feet AGL we would be in class E airspace and would need ATC clearance – more on this later.)



2.1 - Reading Airspace on Sectional Charts

Blue compass ring provides direction for crewed aviation.

Compass – provides Magnetic North (which is shown on instruments and is different than True North).



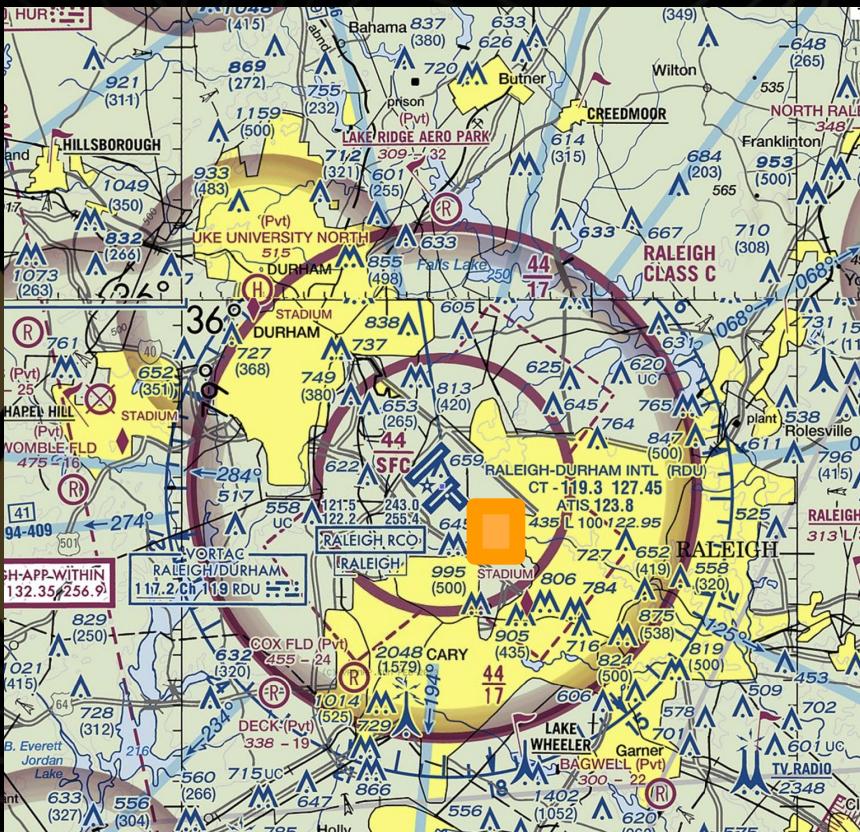
2.1 - Reading Airspace on Sectional Charts

Scenario #1



2.1 - Reading Airspace on Sectional Charts - Scenario #1

1. If you were flying a UAV at 350ft AGL at the orange square what type of airspace would you be in?
2. Are you allowed to fly a UAV here?
3. If so, how high can you fly?



2.1 - Reading Airspace on Sectional Charts - Scenario #1

1. If you were flying a UAV at 350ft AGL at the orange square what type of airspace would you be in?
 2. Are you allowed to fly a UAV here?
 3. If so, how high can you fly?
 - Answer #1
 - Class C Airspace
 - Answer #2
 - No, not allowed to fly - prohibited between SFC and 4400 MSL
 - Answer #3
 - You are prohibited from flying a UAV at any height in Class C airspace without a waiver.



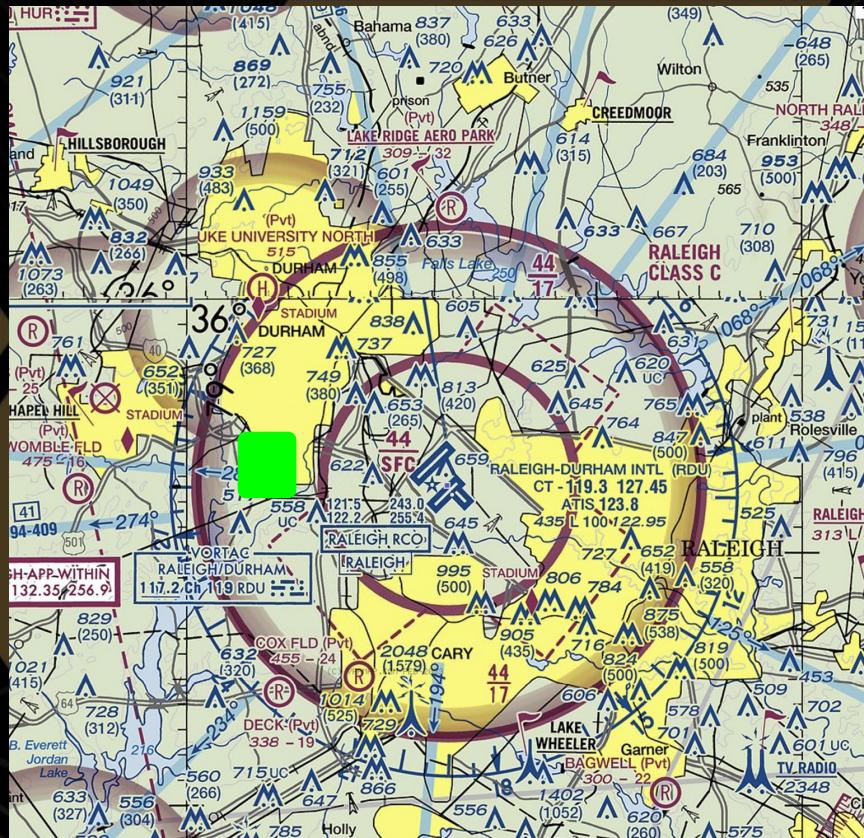
2.1 - Reading Airspace on Sectional Charts

Scenario #2



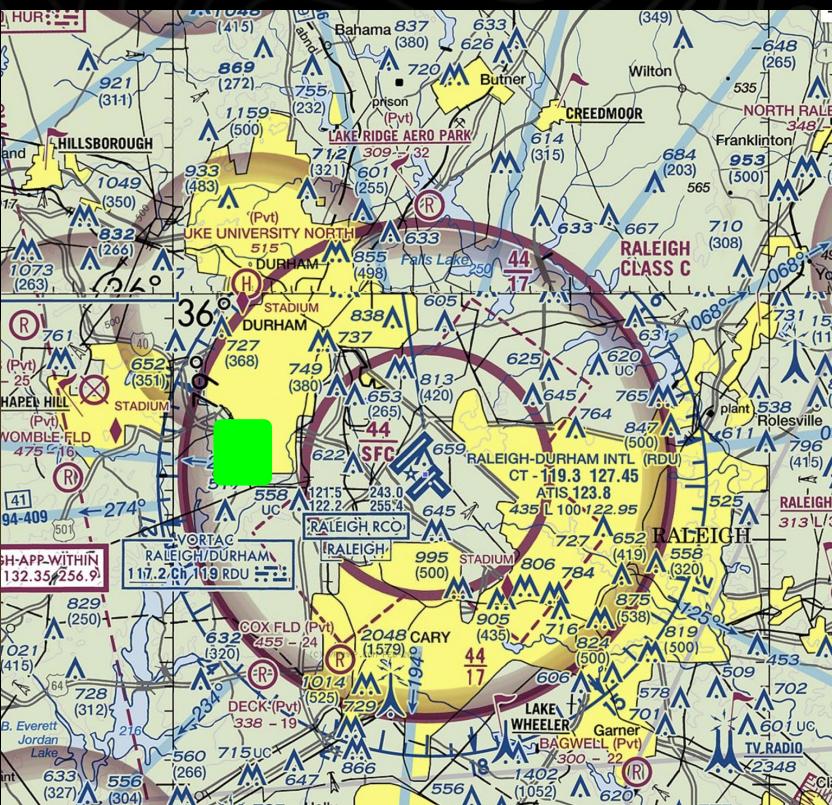
2.1 - Reading Airspace on Sectional Charts - Scenario #2

1. If you were flying a UAV at 800ft MSL at the green square what type of airspace would you be in?
2. Are you allowed to fly a UAV here?
3. If so, how high can you fly?



2.1 - Reading Airspace on Sectional Charts - Scenario #2

1. If you were flying a UAV at 800ft MSL at the green square what type of airspace would you be in?
 2. Are you allowed to fly a UAV here?
 3. If so, how high can you fly?
 - Answer #1
 - Even though it is under the class C ceiling this is class E airspace starting at 700' (as indicated by magenta shading).
 - Answer #2
 - No, you are allowed to fly - the floor of this E airspace is 700 feet MSL due to its proximity to airports. Additionally, you are above the 400ft AGL limit.
 - Answer #3
 - You can legally fly here when under the 700' AGL Class E floor (400' AGL without a waiver).



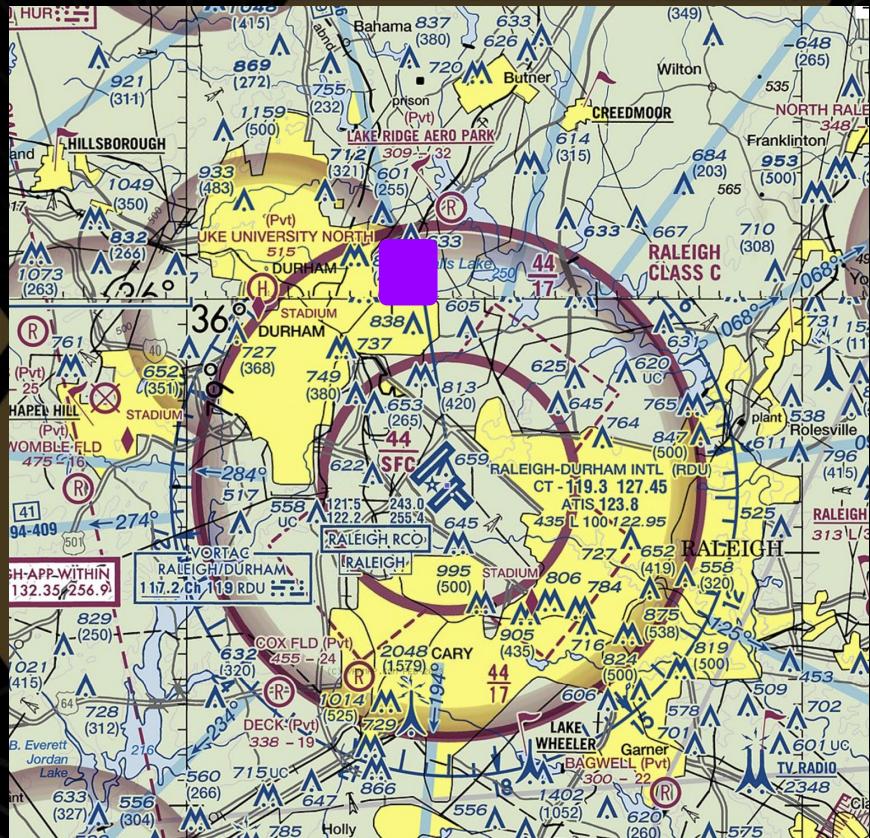
2.1 - Reading Airspace on Sectional Charts

Scenario #3



2.1 - Reading Airspace on Sectional Charts - Scenario #3

1. If you were flying a UAV at 350ft MSL at the purple square what type of airspace would you be in?
 2. Are you allowed to fly a UAV here?
 3. If so, how high can you fly?



2.1 - Reading Airspace on Sectional Charts - Scenario #3

1. If you were flying a UAV at 350ft MSL at the purple square what type of airspace would you be in?
 2. Are you allowed to fly a UAV here?
 3. If so, how high can you fly?

- Answer #1
 - This is class G airspace because it is below both the 1700 ceiling for class C (solid magenta ring) and below the 700 ft MSL ceiling as (magenta shading).
 - Answer #2
 - Yes, are allowed to fly - you are below the 700ft MSL floor of class E airspace.
 - Answer #3
 - RDU is at 436' in elevation which means that the Class E floor at 700 ft MSL is at 264 AGL ($700-436=264$).
 - You can legally fly here when under the 264 feet AGL.



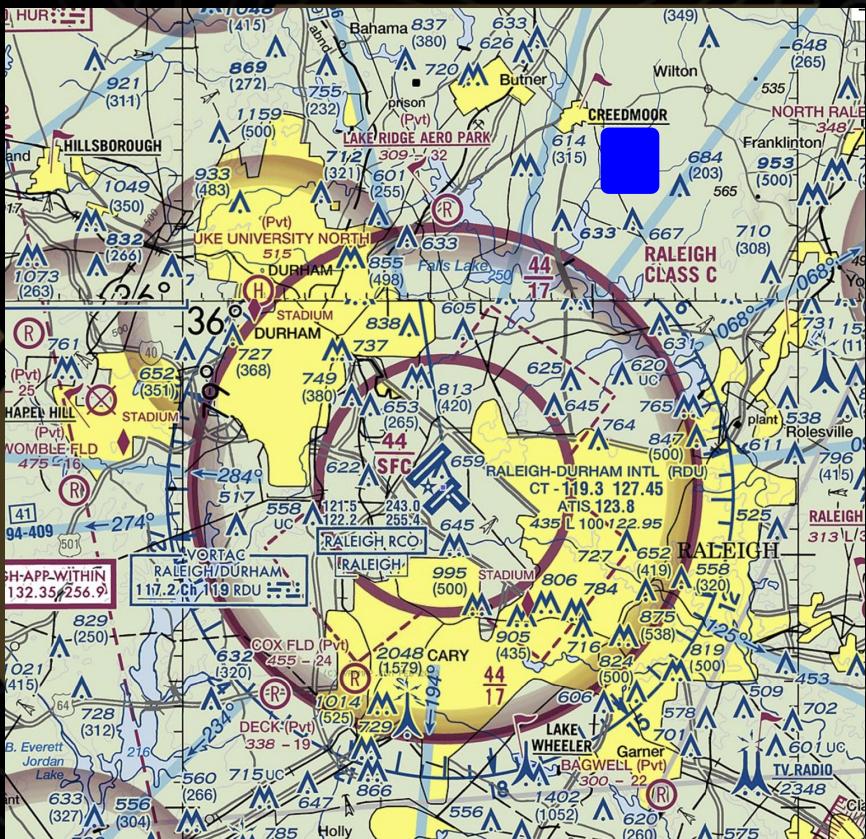
2.1 - Reading Airspace on Sectional Charts

Scenario #4



2.1 - Reading Airspace on Sectional Charts - Scenario #4

1. If you were flying a UAV at 350ft AGL at the blue square what type of airspace would you be in?
2. Are you allowed to fly a UAV here?
3. If so, how high can you fly?



2.1 - Reading Airspace on Sectional Charts - Scenario #4

1. If you were flying a UAV at 350ft AGL at the blue square what type of airspace would you be in?
 2. Are you allowed to fly a UAV here? If so, how high can you fly?
- Answer #1
 - This is Class G airspace as it is not bound by any of the Class C or Class E markings.
 - Answer #2
 - Yes, are allowed to fly - Class G is unrestricted airspace.
 - Answer #3
 - 400 feet AGL is the limit for a UAS without a waiver.



Why is it essential to understand the regulations around
airspace restrictions?



Why is it essential to understand the regulations around airspace restrictions?

It is essential to understand airspace restrictions to ensure flight safety, avoid legal violations, and prevent conflicts with manned aircraft or sensitive areas such as airports and military zones.



2.1 - Special Use Airspace



Propwash Drone Solutions LLC

2.1 - Special Use Airspace

Prohibited Airspace

Prohibited airspace is an area established for **national security** or **welfare** reasons.

EXAMPLE: Bush Family Presidential Compound - Kennebunkport, Maine



2.1 - Special Use Airspace

Restricted Airspace

Flight in restricted airspace is **not necessarily prohibited** but it is subject to restrictions.

Unusual, often invisible, **hazards** to aircraft (artillery, aerial gunnery, guided missiles) exist in these areas.

Authorization is required.

EXAMPLE: Area surrounding Fort Liberty, NC

Check charts for more info / active altitudes / phone numbers.



2.1 - Special Use Airspace

Warning Areas

Warning areas extend 3NM from the US coast and contain activity that might be hazardous.

EXAMPLE: Off the Atlantic coast.



2.1 - Special Use Airspace

Military Operation Areas (MOAs)

Established to **separate military activities** (air combat, aerobatics, low-altitude high speed, training, from other traffic).

Clearance from controlling agency can be granted if separation can be provided.

*Usually does not always extend to surface.

EXAMPLE: Pamlico MOA – check charts for more info / altitudes/ phone numbers.



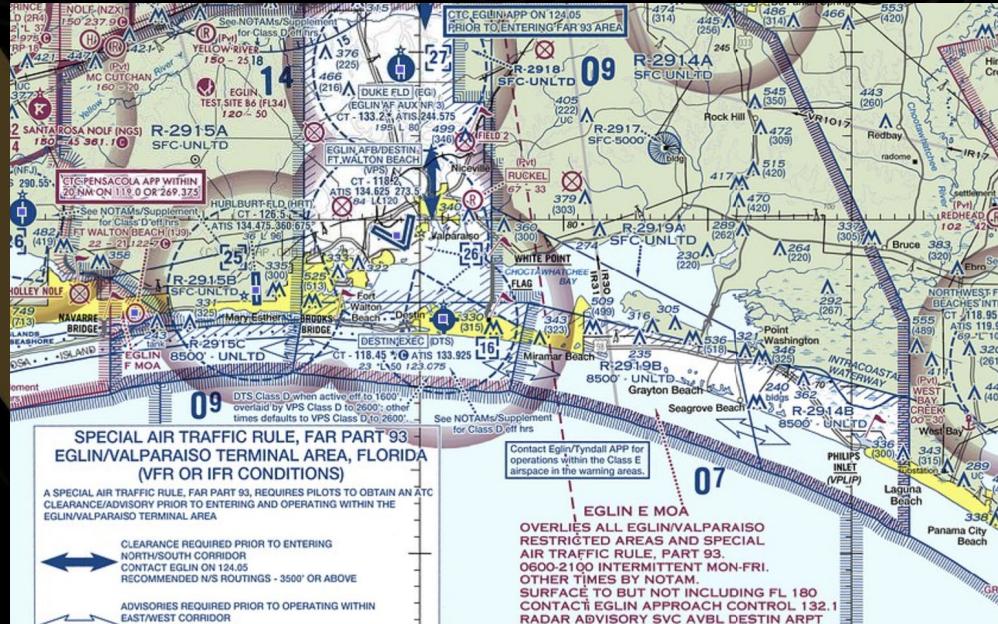
2.1 - Special Use Airspace

Alert Areas

Alert areas contain a **high volume** of pilot training or unusual aerial activity.

Flight is permitted in accordance with FAA regulations.

Example: Gulf Coast Florida (a big mess)



2.1 - Special Use Airspace

Controlled Firing Areas

Flight is **permitted** in controlled firing areas.

In a CFA all **activities are suspended** when a spotter aircraft, radar, or ground lookout indicates an aircraft might be approaching the area.

Example: Dare County Range, NC



What is the purpose of special use airspace?



What is the purpose of special use airspace?

The purpose of Special Use Airspace (SUA) is to separate or restrict certain types of flight activity for safety, security, or national interest, such as military operations, live-fire exercises, or protection of sensitive areas.



2.1 - Other Airspace Areas



2.1 - Other Airspace Areas

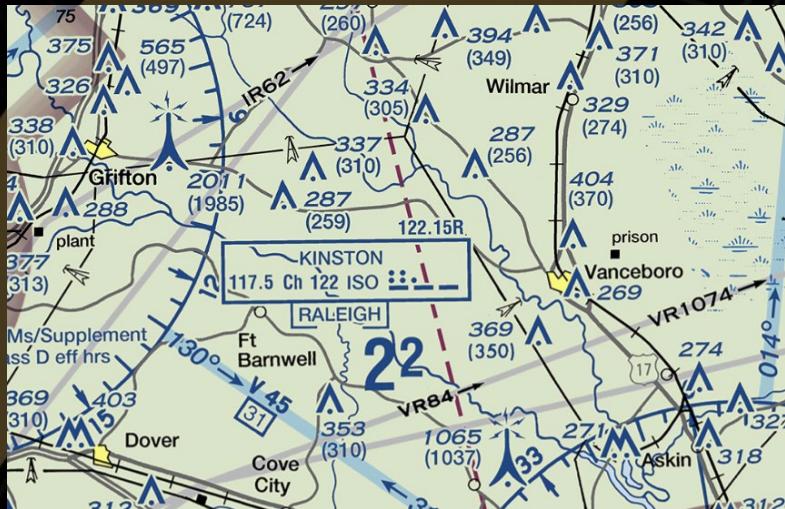
Airport Advisory Services

An AAS covered an area **within 10 miles** of an airport where a Flight Service Station is located.

- Active when the airport is without a control tower or where the tower is not in operation.

Broadcasted information includes:

- Wind direction and velocity
 - Designated runways & taxi routes
 - Altimeter settings
 - Airborne and ground traffic
 - NOTAMs
 - Traffic patterns and instrument approach procedures.



How is an AAS helpful for a UAV pilot?



Propwash Drone Solutions LLC

How is an AAS helpful for a UAV pilot?

They provide real-time airport information such as weather, runway conditions, and traffic advisories especially near non-towered or remote airports, enhancing situational awareness and safety during nearby operations.



2.1 - Other Airspace Areas

Military Training Routes (MTRs)

Military training routes involve **low-altitude**, **high speed** training paths.

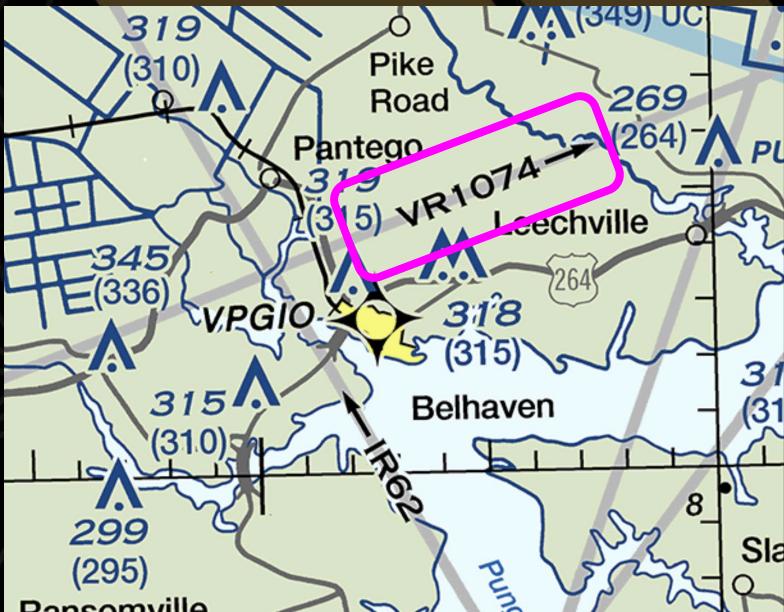
- **IR Routes** are usually above 1,500 feet and are flown IFR (**Instrument Flight Rules**)
- **VR Routes** are usually below 1,500 feet and are flown VFR (**Visual Flight Rules**)



2.1 - Other Airspace Areas

Military Training Routes (MTRs)

4 numbers - MTR under 1,500 AGL



3 numbers - MTR over 1,500 AGL



Note: 0-99 omit the leading zeros.

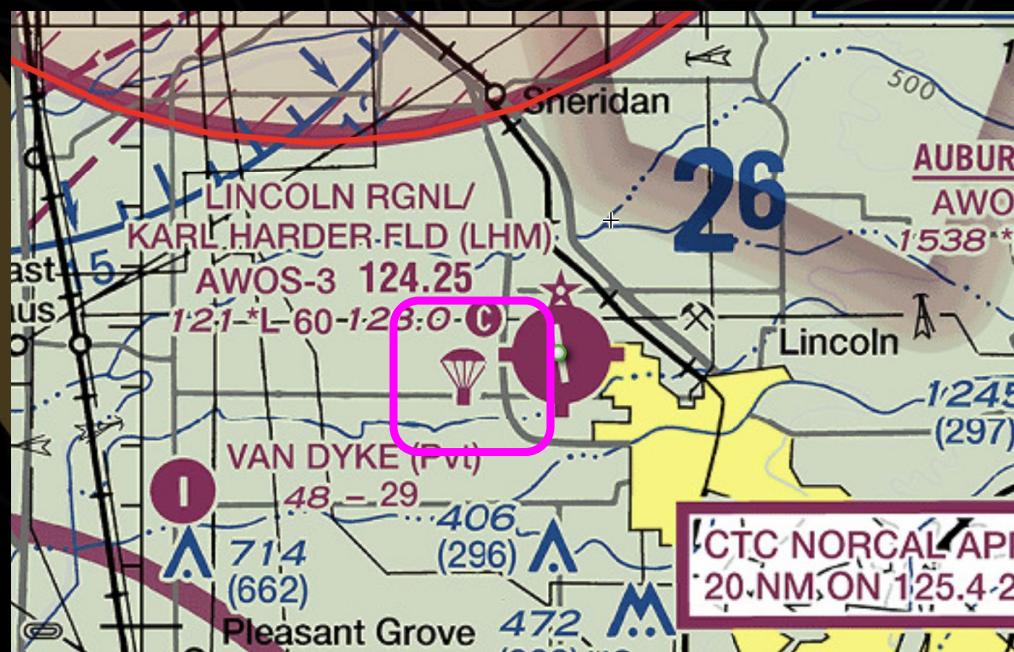
2.1 - Other Airspace Areas

Parachute Jump Operations

Areas of frequent parachute operations are shown on the sectional chart.

Pilots releasing parachutists should broadcast on the CTAF

- Altitude, position, and jump time.



2.1 - Other Airspace Areas

Terminal Radar Service Areas (TRSAs)

TRSAs are established around some larger and busier class D airports (think of it as D+ airspace)

The marked area is **not technically controlled airspace** but aircraft pilots are encouraged to contact approach.

EXAMPLE: Wilmington, NC



2.1 - Other Airspace Areas

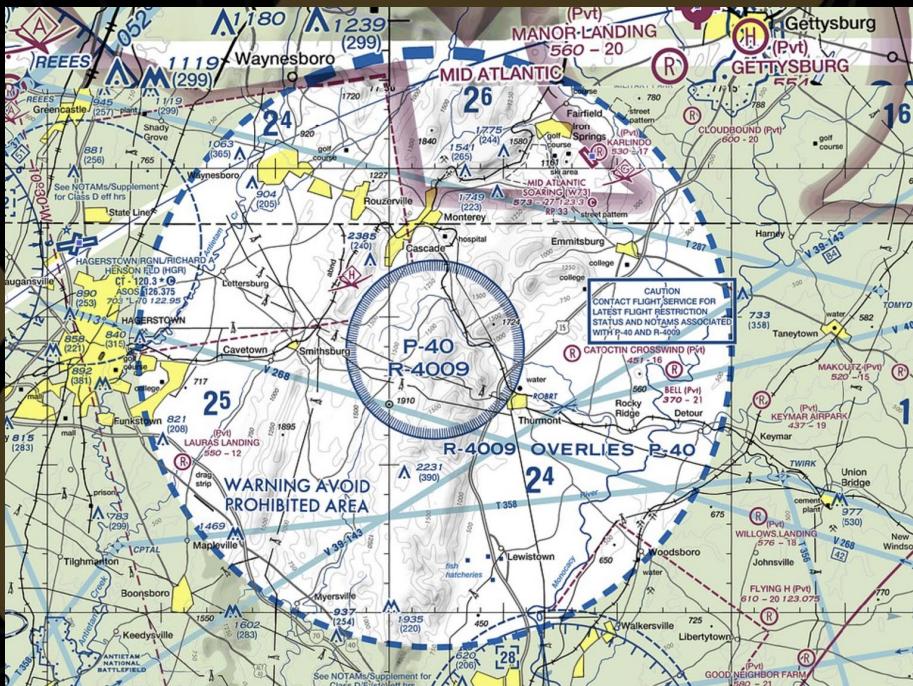
National Security Areas (NSA)

NSAs are established around areas requiring increased security and safety for ground facilities.

Flight is **not prohibited** (unless covered under a TFR) but pilots are asked to **voluntarily avoid** those areas.

EXAMPLE: Camp David

NOTE: P-40 R-4009 in the center is restricted and would require authorization.

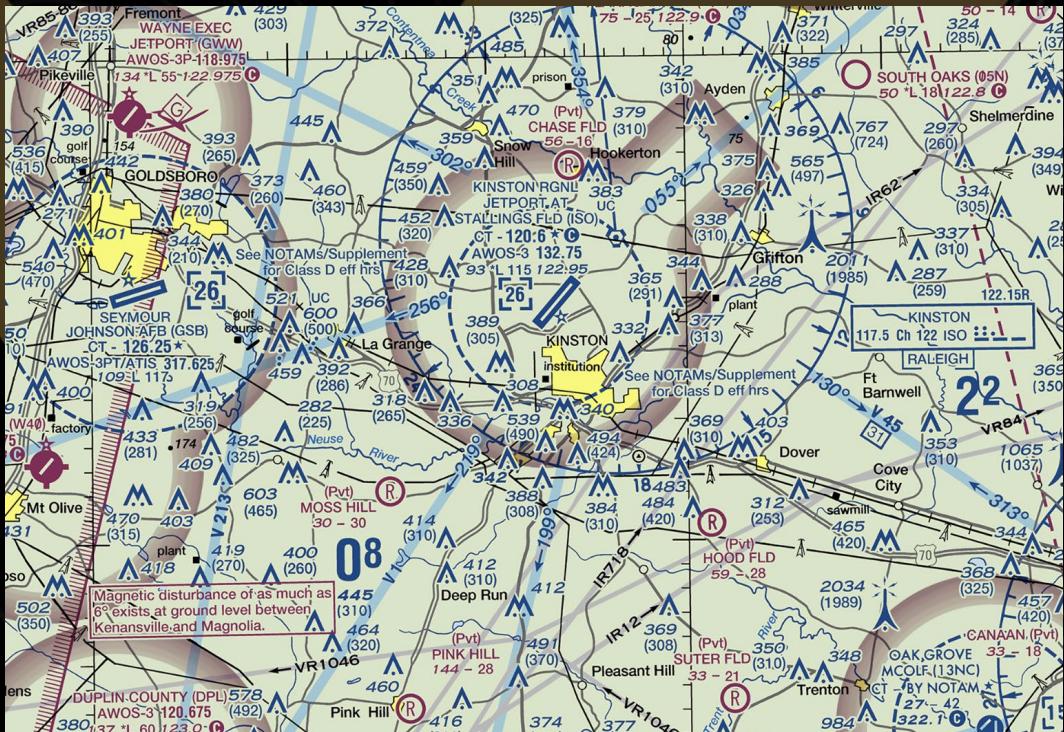


2.1 - Other Airspace Areas

Victor Airway - Visual Flight Rules (VFR) Routes

A general flight path not defined as a specific course. Used by pilots in planning flights into, out of, through or near complex terminal airspace to avoid Class B airspace.

An ATC clearance is NOT required to fly these routes.



2.1 - Other Airspace Areas

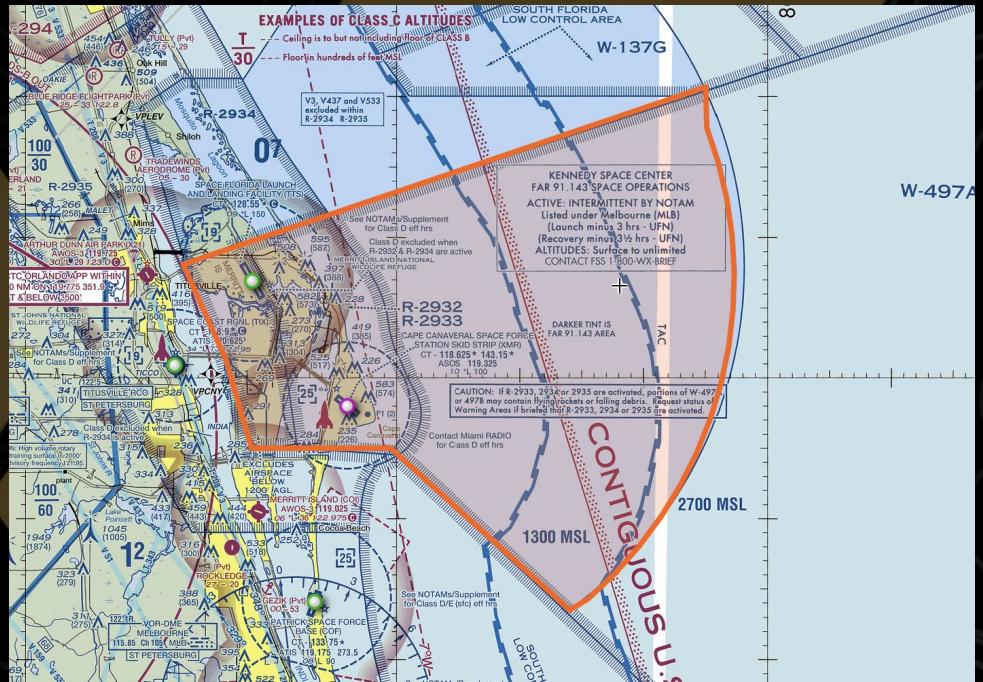
Temporary Flight Restrictions (TFRs)

Issued for safety or security purposes.

Reasons for issuing a TFR

- Natural disasters (wildfires, hurricanes)
 - Major sporting events
 - Emergency or national security situations.

TFRs are displayed a variety of apps and other services.



Under what circumstances can you ignore a TFR?



Propwash Drone Solutions LLC

Under what circumstances can you ignore a TFR?

You cannot ignore a Temporary Flight Restriction (TFR) unless you have explicit authorization from the controlling agency or you are part of an exempted operation (like certain emergency or law enforcement flights with prior approval).

Violating a TFR can lead to fines, certificate suspension, or interception by law enforcement.



Unit 2 Airspace – 2.1 Review Quiz

- [2.1 - Airspace Classification – QUIZ](#)
- This quiz contains 29 questions.
 - You may take it as many times as you like.
 - The order of questions are randomized each time.
 - The large majority of the questions are worded exactly as they appear on the exam.

