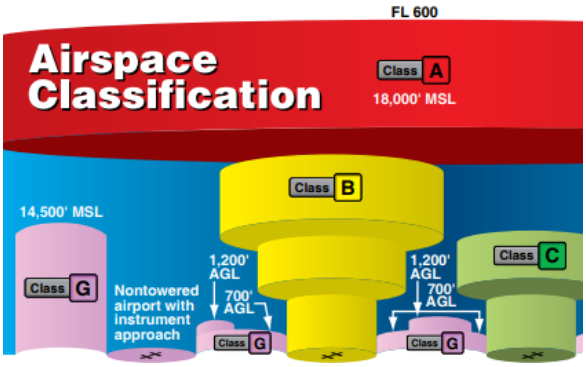
National Airspace System

Objective	
To ensure the applicant learns the purpose of and can exhibit a clear understanding of the National Airspace System and how VFR pilots operate within it.	
Purpose	
Every flight a pilot makes occurs within some class of airspace, whether or not they are aware of it. The rules that must be followed for each class of airspace vary widely, and it is crucial that pilots understand the National Airspace System and how they fit within it. This lesson introduces pilots to the various classes of airspace they will encounter regularly so that they can operate safely and efficiently in the system.	

Schedule	Equipment
• **Ground Lesson**: 45 minutes • **Student Q&A**: 10 minutes	• VFR Sectional Chart • Whiteboard / Markers (optional)
Student Actions	**Instructor Actions**
• Ask any questions, receive study material for the next lesson. • Watch linked video. • Review listed references.	• Deliver the ground lesson (below). • Answer student questions.

Completion Standards

- Student can identify various airspace features on their local VFR sectional chart.
- Student can explain the following concepts:
  - The various classes of airspace
  - The basic VFR weather minimums for each class of airspace.
  - Special VFR weather minimums and requirements.
  - The equipment and communications requirements for each class of airspace.
  - The types of Special Use Airspace and the rules for each.
  - The types of Temporary Flight Restrictions and how to find information about them.

References

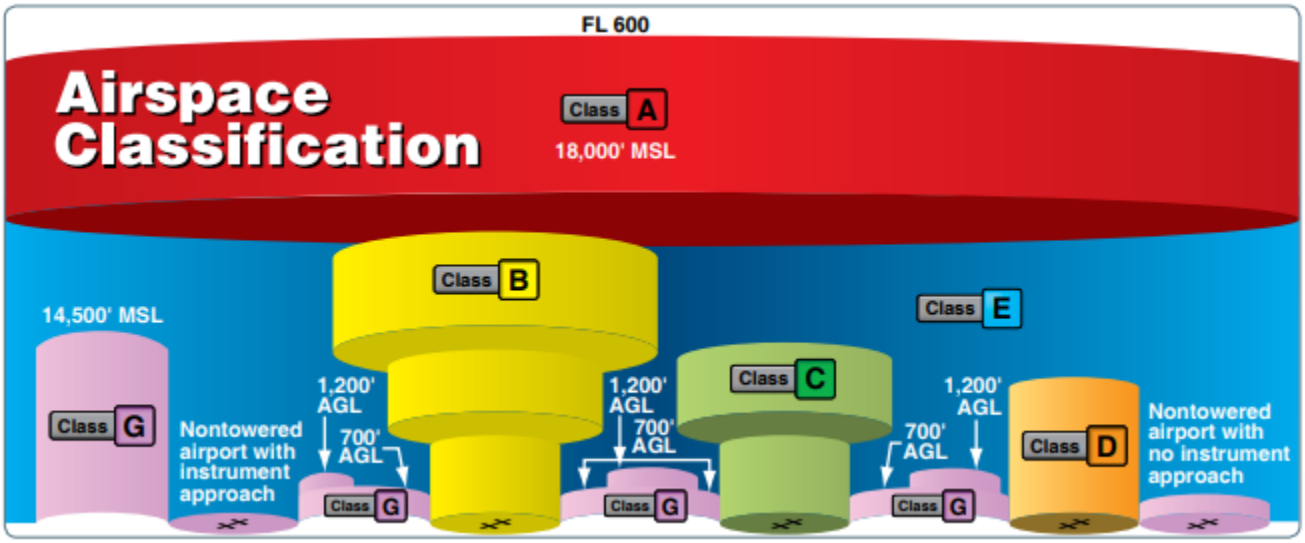
- ERAU SpecialVFR - “Airspace - Lesson 1”
    - YouTube - https://www.youtube.com/watch?v=c6ZieuNvjHw
- FAA-H-8083-25C (Pilot’s Handbook of Aeronautical Knowledge) - Chapter 15 [Airspace]
- FAA-S-ACS-6C (Private Pilot ACS) - Area I Task E
- FAA-S-ACS-7B (Commercial Pilot ACS) - Area I Task E
- FAA-S-ACS-25 (CFI ACS) - Area II Task G

Ground Lesson Outline

- Airspace
    - Lateral Extents, Floor, Ceiling
        - AGL vs MSL
    - Pilot Certification, Communications, Clearance, Speed, and Equipment Requirements
    - Visibility and Cloud Clearance Requirements
- Regulatory vs. Non-Regulatory Airspace
    - Regulatory - A, B, C, D, E, G, Restricted/Prohibited
    - Non-Regulatory - Military Operations Areas (MOA), Warning Areas, Alert Areas, Controlled Firing Areas
- Controlled Airspace - A, B, C, D, E
- Uncontrolled Airspace - G
- Airspace Classes - Properties and Requirements
    - Class A - § 91.135 - IFR and Instrument Rated Only
    - Class B - § 91.131 - Explicit Clearance Required, Private Certificate or Endorsement, Mode C XPDR
    - Class C - § 91.130 - Two-Way Communications, Mode C XPDR
    - Class D - § 91.129 - Two-Way Communications
    - Class E - § 91.127 - No Communications Required
    - Class G - § 91.126 - Uncontrolled
- ADS-B Required Airspace
- Basic VFR Weather Minimums - § 91.155
- Special VFR (SVFR) Requirements
- Special use airspace (SUA)
    - Restricted and Prohibited Areas - § 91.133
    - MOAs
    - Alert/Warning Areas/Controlled Firing Areas
- Temporary Flight Restrictions (TFR) - Get a briefing! (1-800-WX-BRIEF)
    - Disaster/Hazard Areas - § 91.137, § 91.138 (Hawaii)
    - Presidential TFR - § 91.141
    - Space Flight Operations - § 91.143
    - Sporting Events / Airshows - § 91.145
- Depiction on Sectional Charts
- Currency of Publications - TPPs - 28 days / Everything else - 56 days

Ground Lesson Content

- **Airspace** - Airspace is simply a logical way of dividing up the sky around airports, common air traffic routes, and other facilities to protect and organize the traffic flow. The *National Airspace System* is a system of airspace that provides pilots and airplanes with an orderly means to move from airport to airport, while avoiding conflicts, delays, or collision risks.
    - **Lateral Extents, Floor, Ceiling** - To talk about airspace, it must be described in terms of its lateral extents (its shape as seen from above), its floor (the altitude at which it begins), and its ceiling (the altitude at which it ends).
        - **AGL vs MSL** - The floors and ceilings of various airspaces are described in either MSL (feet above Mean Sea Level) or AGL (feet Above Ground Level) depending on the type of airspace.



    - **Pilot Certification, Communications, Clearance, Speed, and Equipment Requirements** - Different classes of airspace impose different requirements on pilots, aircraft, and flight plans.
    - **Visibility and Cloud Clearance Requirements** - Most types of airspace also impose different VFR weather minimums, in order to more efficiently separate IFR from VFR traffic.
- **Regulatory vs. Non-Regulatory Airspace** - Airspace is divided into *Regulatory* and *Non-Regulatory* airspace. Regulatory airspace, which is to say, airspace that is defined in the FARs and that provides specific regulatory requirements for entry is the most common type of airspace.
    - **Regulatory** - Class A, B, C, D, E, G, Restricted/Prohibited
    - **Non-Regulatory** - Non-Regulatory airspace includes primarily that which is advisory in nature, or created primarily to keep aircraft away from hazardous activities.
        - **Military Operations Areas (MOA)** - Areas of military flight training.
        - **Warning Areas** - Areas of military training, or other dangerous activities.
        - **Alert Areas** - Areas of dangerous activities, commonly high-density flight training activity.
        - **Controlled Firing Areas** - Usually established near firing ranges, where it would be dangerous for passing aircraft.
- **Controlled Airspace** - A, B, C, D, E
- **Uncontrolled Airspace** - G
- **Airspace Classes - Properties and Requirements**
    - **Class A - § 91.135** - IFR and Instrument Rated Only
    - **Class B - § 91.131** - Explicit Clearance Required, Private Certificate or Endorsement, Mode C

XPDR
- **Class C - § 91.130** - Two-Way Communications, Mode C XPDR
- **Class D - § 91.129** - Two-Way Communications
- **Class E - § 91.127** - No Communications Required
- **Class G - § 91.126** - Uncontrolled

Class Airspace	Entry Requirements	Equipment*	Minimum Pilot Certificate
Class A	ATC clearance	IFR equipped	Instrument rating
Class B	ATC clearance	Two-way radio, transponder with altitude reporting capability	Private—(However, a student or recreational pilot may operate at other than the primary airport if seeking private pilot certification and if regulatory requirements are met.)
Class C	Two-way radio communications prior to entry	Two-way radio, transponder with altitude reporting capability	No specific requirement
Class D	Two-way radio communications prior to entry	Two-way radio	No specific requirement
Class E	None for VFR	No specific requirement	No specific requirement
Class G	None	No specific requirement	No specific requirement

*Beginning January 1, 2020, ADS-B Out equipment may be required in accordance with 14 CFR part 91, section 91.225.

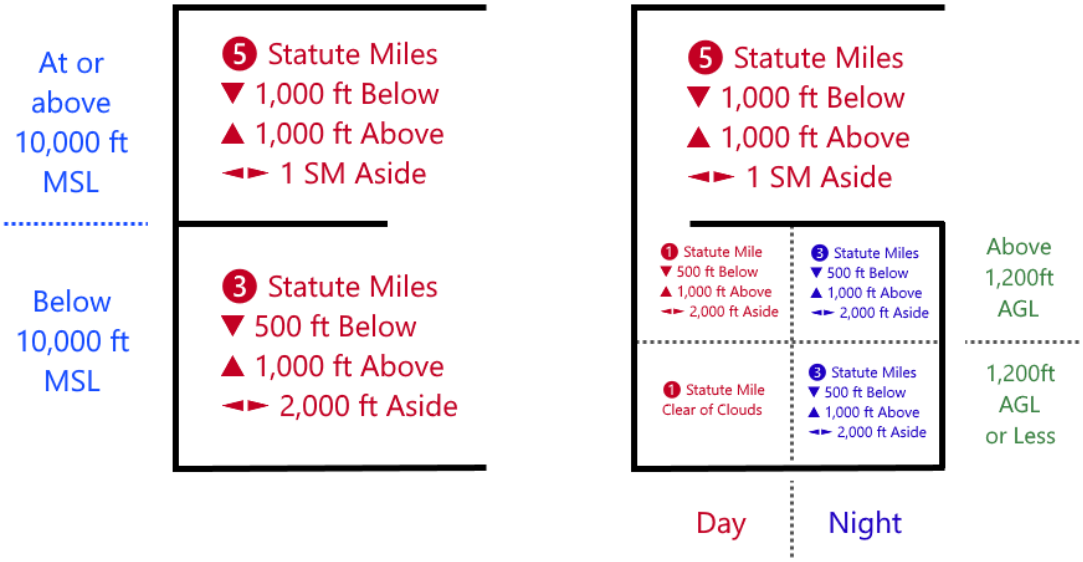
- **ADS-B Required Airspace - § 91.225(d)**

- **Basic VFR Weather Minimums - § 91.155**

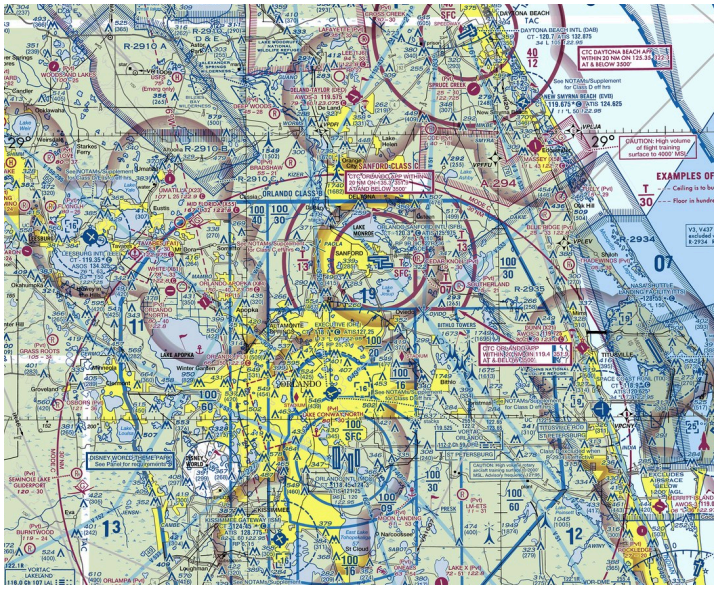
Basic VFR Weather Minimums				
Airspace			Flight Visibility	Distance from Clouds
Class A			Not applicable	Not applicable
Class B			3 statute miles	Clear of clouds
Class C			3 statute miles	1,000 feet above 500 feet below 2,000 feet horizontal
Class D			3 statute miles	1,000 feet above 500 feet below 2,000 feet horizontal
Class E	At or above 10,000 feet MSL		5 statute miles	1,000 feet above 1,000 feet below 1 statute mile horizontal
	Less than 10,000 feet MSL		3 statute miles	1,000 feet above 500 feet below 2,000 feet horizontal
Class G	1,200 feet or less above the surface (regardless of MSL altitude).	Day, except as provided in section 91.155(b)	1 statute mile	Clear of clouds
		Night, except as provided in section 91.155(b)	3 statute miles	1,000 feet above 500 feet below 2,000 feet horizontal
	More than 1,200 feet above the surface but less than 10,000 feet MSL.	Day	1 statute mile	1,000 feet above 500 feet below 2,000 feet horizontal
		Night	3 statute miles	1,000 feet above 500 feet below 2,000 feet horizontal
	More than 1,200 feet above the surface and at or above 10,000 feet MSL.		5 statute miles	1,000 feet above 1,000 feet below 1 statute mile horizontal

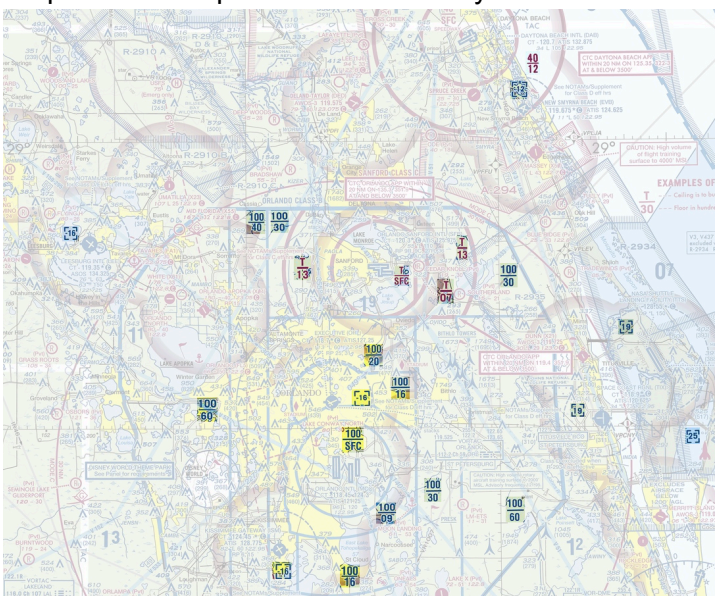
- **Special VFR (SVFR) Weather Minimums - § 91.157**
  - **1 Statute Mile Visibility, Clear of Clouds**
  - **Requires an ATC Clearance**
  - **Available only in controlled airspace (to the surface) designated for an airport**
    - I.e. The inner ring of a Class C or Class B, or a Class D/E surface area.

- **Class E vs G VFR Minimums Memory Aid**

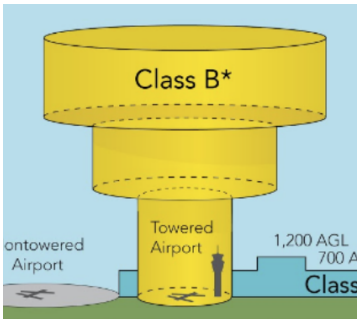


- **Special use airspace (SUA)**
  - **Restricted and Prohibited Areas - § 91.133**
    - Restricted airspace is *sometimes* closed to pilots, and may be scheduled or the times specified by NOTAM. Pilots must contact ATC or the controlling agency to determine the status.
    - Prohibited airspace is *always* closed to pilots.
  - **MOAs** - Entry is allowed without permission, but should be avoided if the MOA is active. Pilots should contact the controlling agency to determine the status. Exercise extreme caution.
  - **Alert/Warning Areas/Controlled Firing Areas** - Entry is allowed without permission but should be avoided if the status is unknown. Exercise extreme caution.
- **Temporary Flight Restrictions (TFR) - Get a briefing! (1-800-WX-BRIEF)**
  - **Disaster/Hazard Areas - § 91.137, § 91.138 (Hawaii)**
  - **Presidential TFR - § 91.141**
  - **Space Flight Operations - § 91.143**
  - **Sporting Events / Airshows - § 91.145**
- **Depiction on Sectional Charts** - Floors/ceilings depicted are depicted in various ways.

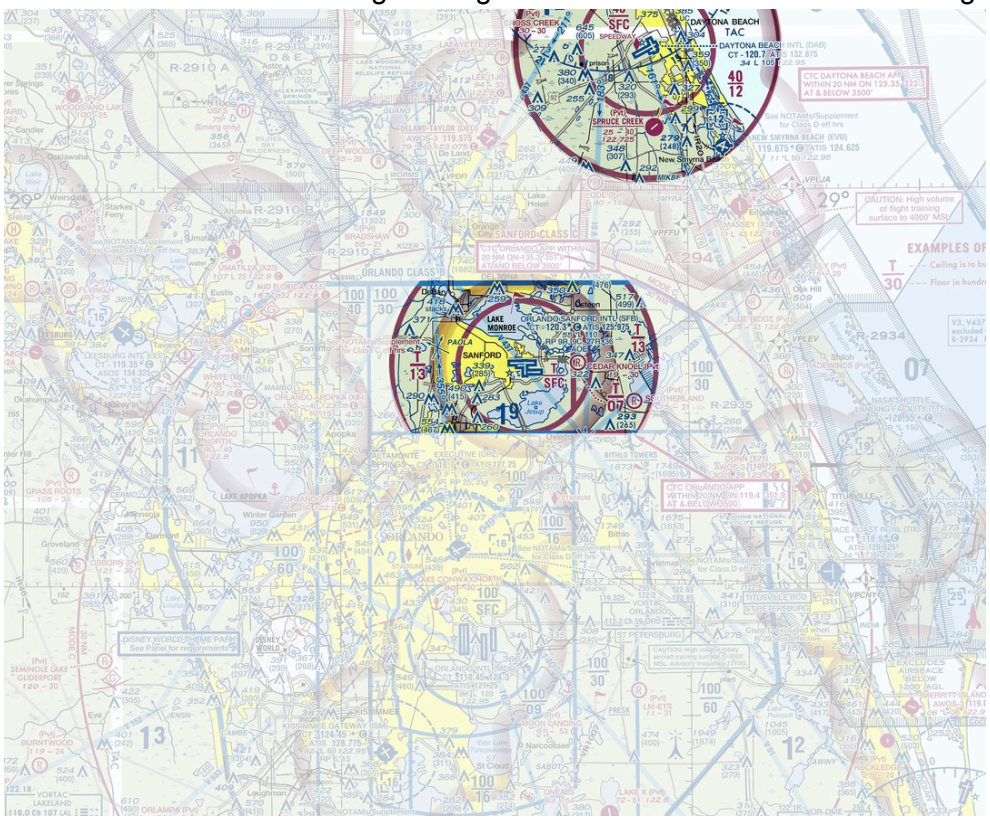


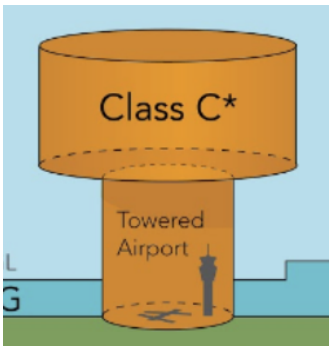


- **Class A** - Not Depicted!
- **Class B** - Unusually shaped, usually has many ‘layers’. Shaped like an upside down wedding cake. Floors and ceilings in hundreds of feet MSL.



- **Class C** - Usually mostly circular, and 2-layered. Normally a central 5 NM ring from the surface, and a 10 NM ring starting at 1200 feet AGL. Floors and ceilings in hundreds of feet MSL.



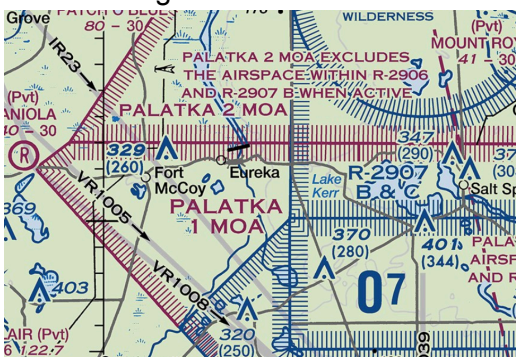


- **Class D** - Normally 4 NM radius, 2500 feet AGL ceiling. Ceiling given in hundreds of feet MSL.

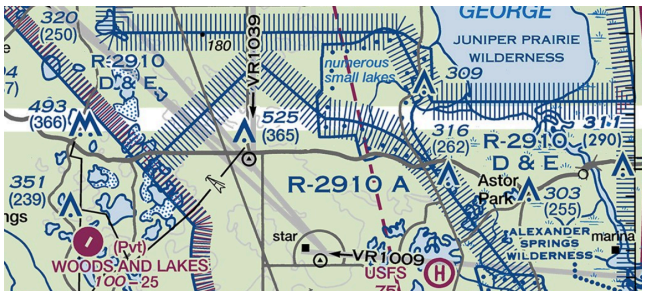
- **Class E** - Only depicted when it deviates from the normal 1,200ft AGL rules. Magenta shading indicates Class E from 700 ft AGL. Dashed magenta indicates Class E from the surface. Normally extends up to, but not including 18,000 feet MSL. When blue shading is depicted (only in the western US), Class E begins at 14,500 feet MSL, but not lower than 1,200 feet AGL.

- **Class G** - Not Depicted! Normally surface to 1,200 feet AGL, except where Class E airspace is depicted lower.

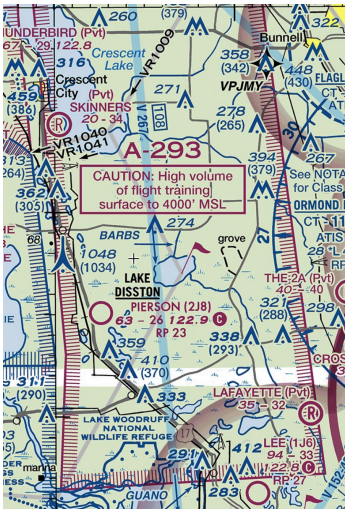
- **MOA** - Magenta hatched border. Usually named. Altitudes and controlling agencies are specified in the sectional chart legend area.



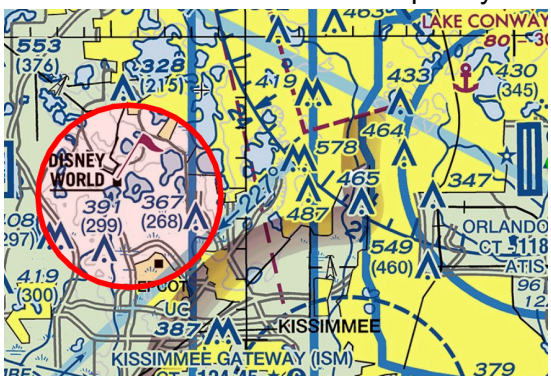
- **Restricted/Prohibited Areas** - Blue hatched border. Named R or P-####. Altitudes and controlling agencies are specified in the sectional chart legend area.



- **Alert Areas** - Magenta hatched border. Named A-###. Usually caution note provided.



- **TFRs -** Not depicted on sectional charts due to temporary nature, but often visible on EFBs!



- **Currency of Publications** - Aeronautical charts and publications are updated on the following frequencies:
    - Terminal Procedures Publications (TPPs) - 28 days
    - All VFR Charts - 56 days
    - Chart Supplements - 56 days