

NATIONAL AIRSPACE SYSTEM

FULFILLS PA.I.E, CA.I.E, AI.II.G

Objective	
The student shall understand operational rules and charted depictions of airspace of interest to VFR pilots. The student shall become familiar with reading VFR charts and the effects of airspace on cross country flight planning.	
Instructor Actions	Student Actions
- Explain the classifications and operating rules for the general and special use airspace listed in this lesson plan - Discuss air traffic services offered in each type of airspace - Introduce the student to methods of avoiding inadvertent airspace penetration in flight - Discuss reading the Chart Supplement	- Take notes and participate in instructor's discussion - Take quiz on 'rocket ship' style airspace questions - Practice identifying airspace weather minimums in SBT style questioning
Case Studies	Equipment
- Aircraft breaching R-2916 - <u>Accident</u> - <u>Information</u> - <u>Aircraft violating TFR</u>	- Airspace Models - Aeronautical Chart User's Guide - Chart Supplement - Computer - VFR Sectional
Completion Standards	
The student shall explain requirements to enter various types of airspace. The student shall demonstrate proficiency in identifying airspace on a VFR sectional.	

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RESOURCES

[14 CFR 91.126 Operation in Class G](#)
[14 CFR 91.127 Operation in Class E](#)
[14 CFR 91.129 Operation in Class D](#)
[14 CFR 91.130 Operation in Class C](#)
[14 CFR 91.131 Operation in Class B](#)
[14 CFR 91.135 Operation in Class A](#)

[AIM Chapter 3](#)

[FAA-H-8083-2 Risk Management Handbook](#)
[FAA-H-8083-3C Airplane Flying Handbook](#)
[FAA-H-8083-9 Aviation Instructors Handbook](#)
[FAA-H-8083-25C PHAK Chapter 15: Airspace](#)

[Aeronautical Chart Users' Guide](#)
[VFR Sectional](#)

[FAA National Airspace System Overview](#)

1. INTRODUCTION

Every point above the surface, from the metropolis of New York to the rural forests of Washington, has been charted by the FAA and assigned an airspace designation. Airspace refers to the classification given to a particular region that designates the rules to operate in that area. There is always a classification given to an area, that is an area cannot exist without any airspace.

There are six types of general airspace, most common for pilots to transient, and six types of special use airspace, usually reserved for military or national security reasons. Not all airspace is two dimensional, its lateral shape varies with different altitude ranges, nor may it be active continuously.

The Aeronautical Chart User's Guide is the most up to date FAA publication for interpreting all FAA charts. This lesson is more methodical preparation of the user guide as well as Chapter 3 of the Airmen's Information Manual (AIM).

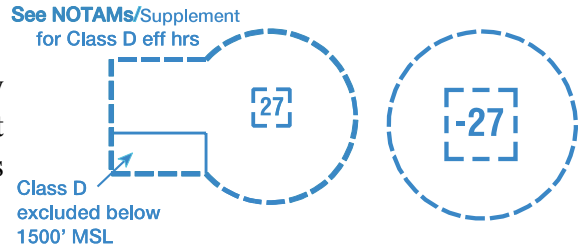


2. GENERAL TYPES OF AIRSPACE

2.1. Class D

Class D airspace is simple to both recognize and interpret. It is depicted by a dashed blue line with a ceiling altitude, in hundreds of feet MSL, in a dashed box. Class D airspace is assumed to begin at the surface unless a note states otherwise, as seen below. If the top altitude includes a minus in front, that would indicate the ceiling extends up to but does not include that altitude. The upper note indicates that the effective hours of the airspace may vary, and the airports NOTAMs or chart supplement should be consulted.

Class D airspace typically is found at moderately busy airports, such as those with business jet or heavy flight training operations. If an airline provides service to a Class D airport, its volume is low.



Whenever Class D airspace is active, a control tower facilitates the flow of traffic in and out of the airspace. However, they are NOT responsible for VFR traffic separation. It is up to each pilot to see-and-avoid other traffic. If the tower closes, the airspace reverts to either a Class E surface area, which must meet the Class E surface area requirements: approach must be able to communicate with aircraft down to the runway and there must exist weather reporting from an approved system (such as AWOS/ASOS).¹ Otherwise the airspace reverts to Class G to the floor of the overlying airspace, which is typically a Class E 700ft area.

Transponders are not required to enter Class D airspace.² Two way radio contact with the tower is required for entry. If an aircraft is on flight following on course to enter a Class D, it still remains the responsibility of the pilot to avoid that airspace unless they are told they are cleared by approach or center. Conflicting information can be found in AIM 3-2-1 and FAA Order JO 7110.65X 2-1-16.

More information about Class D airspace can be found in 91.129 and AIM 3-2-6.

¹ AIM 3-2-6.e.1.(a) https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap3_section_2.html#yMi?M11b8Sher

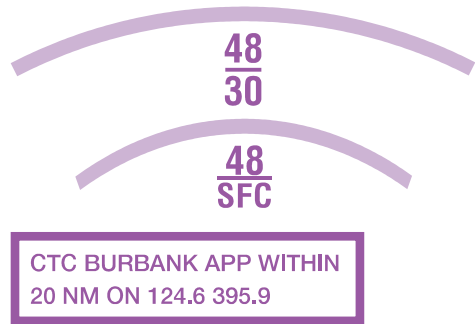
² This should not encourage people to fly with transponders not turned on. According to 91.215(c): "each person operating an aircraft equipped with an operable ATC transponder maintained in accordance with 91.413 shall operate the transponder". This would imply that if the transponder is not maintained with its 24 month inspection, it is permissible to fly with it off. However, 91.335

2.2. Class C

A region of Class C airspace is depicted by a solid magenta line. The floor and ceiling altitudes of that region are depicted by the two altitudes in hundreds of feet separated by a fraction bar, as seen in figure x. In this case, the inner circle has a floor at the surface and extends upward to and includes 4800 feet MSL. The outer ring starts at 3000 feet MSL (inclusive) and extends upward to the same altitude of 4800 feet MSL. The note indicates the Class C is intermittent and is identified by the name *BURBANK CLASS C*. Other notes may exist about contacting the facility.

BURBANK CLASS C

See NOTAMS/Directory
for Class C eff hrs



Class C airspace is found at larger airports that service moderate airline and business jet traffic. Whenever Class C airspace is active, an approach control facilitates the flow of traffic in and out of the airspace. Tower control is typically reserved for takeoff and landing traffic (although there are some exceptions such as KFLI).

MODE C & ADS-B OUT
30 NM

In more congested areas, class C airspace may exist beneath Class B airspace. In this case, the upper limit of Class C may be designated with a “T”. This simply means that the ceiling of that region of Class C airspaces is the floor of the overlying airspace and is used when there are multiple overlying shelves.

T
SFC

Class C airspace requires two way radio communication with approach control and an ADS-B out transponder. VFR traffic are only separated from IFR traffic.

More information about Class C airspace can be found in [AIM 3-2-4](#) and [91.130](#).



2.3. Class B

LAS VEGAS CLASS B

Class B airspace is depicted similarly to Class C, but with a solid blue line. Class B airspaces are rarely simple concentric rings. Rather, their shape is influenced by runway orientations and local terrain limitations.



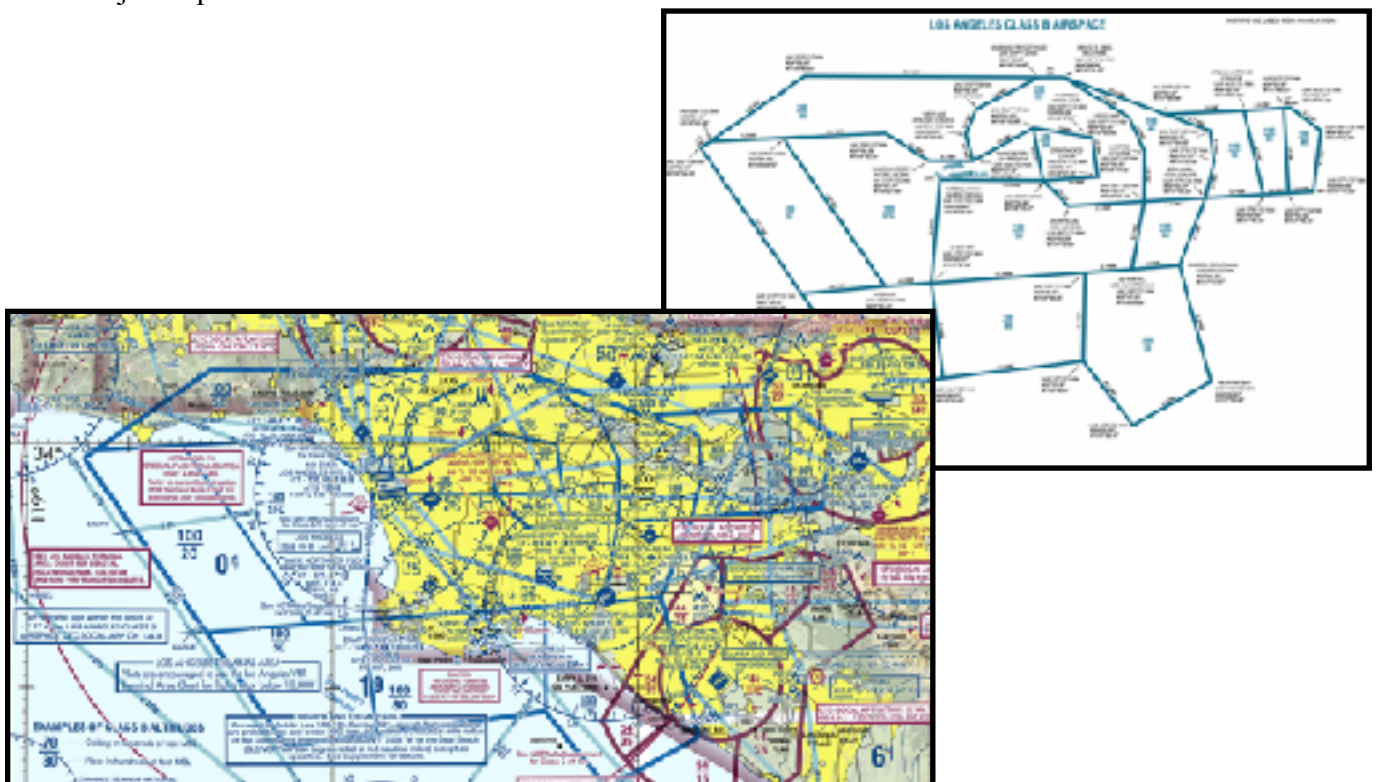
Class B surrounds the area at the busiest of airports, such as JFK, LAX, and MIA. Both two-way radio communication and explicit clearance must be attained before entry. Many Class B airports are closed to student pilots, and any student pilot flying within the Class B airspace must have received special training in accordance with 61.95.

Most, if not all, class B airports are encircled with a thin, solid magenta line to indicate some areas where Mode C and ADS-B Out are required per 91.215(b)(2), 91.225(d)(2), and AIM 3-2-3(b)(6). Other Mode C and ADS-B Out required airspace is not uniquely depicted, but is located inside and above Class B and Class C airspace and in Class E airspace above 10,000 MSL but not including airspace at and below 2500 feet AGL (91.225).

Explicit ATC clearance, delivered in the phrase: “cleared into the Bravo” is required to operate in Class B airspace. Traffic separation is provided to all aircraft.

More information about Class B airspace can be found in AIM 3-2-3 and 91.131.

Some Class B and class C airspaces have published routes to facilitate the flow of VFR traffic. Often called corridors, transitions, or flyways, they can be found on the TAC or FLYWAY charts published for some major airports.



2.4. Class A

Class A airspace is simply all airspace from 18,000 feet MSL up to and including FL 600. It is not depicted on any FAA chart and is reserved for IFR traffic. Mode C and ADS-B Out is required.

Once an aircraft climbs through 18,000 feet MSL, they must set their altimeter setting to 29.92” Hg per 91.121. Then, all altitudes become known as flight levels and are referred to by hundreds of feet, such as flight level 320 indicating 32,000 feet.

More information about Class A airspace can be found in AIM 3-2-2 and 91.135.

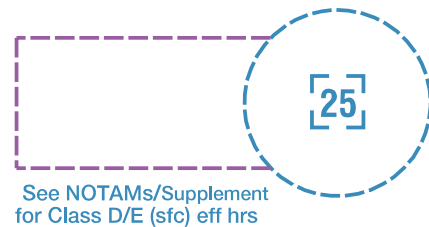


<https://www.boldmethod.com/learn-to-fly/airspace/everything-you-need-to-know-about-class-a-airspace/>

2.5. Class E

Class E airspace extends from 1200 feet AGL up to 17999 feet MSL, unless otherwise depicted. For VFR traffic, the only concerns of Class E airspace are the weather minimums required, since no radio communication or specific equipment is required for entry³. Class E airspace serves more useful to IFR traffic.

An area where Class E begins at 700 feet AGL is depicted on the soft side of a gradient-edged magenta line. An area where Class E begins at the surface is depicted with a dashed magenta line. This may be the primary airspace around an airport (Class E surface area), or an extension to Class D, Class C, or Class E surface area airspace (Class E surface extension).



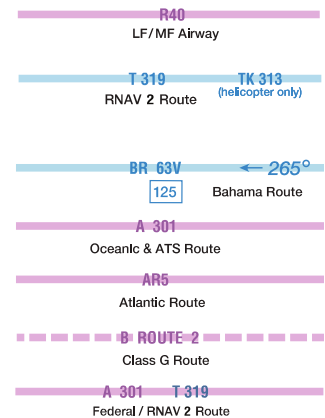
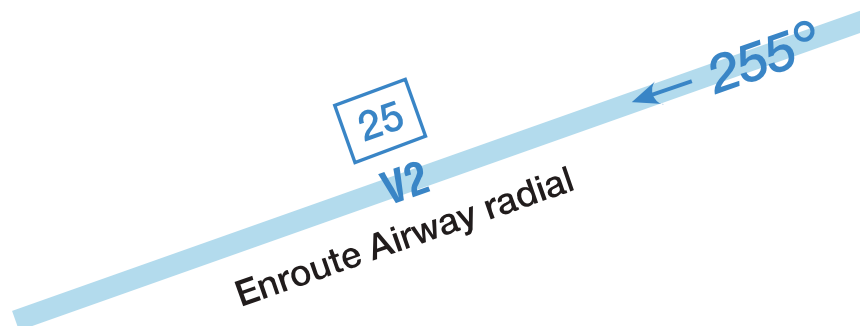
An area where Class E begins at a specified altitude is shown with a blue zipper with either a MSL or AGL altitude in that region. An area where class E begins at a floor of 14500 MSL is depicted on the solid side of the blue gradient-edged line.

2400 AGL
4500 MSL



³ With the exception of the 91.215 Mode-C and 91.225 ADS-B requirement for operations above 10000 feet MSL and above 2500 feet AGL.

Airways are 8 mile wide corridors of class E airspace with a base of 1200 feet AGL. Numerous types of airways exist, but most commonly are Victor Airways or T-Routes, although Bahaman routes are popular in the Southeast US. Magnetic courses may be included on the airway, and sometimes the airway length is depicted in a box in NM.



Operating procedures are equivalent for all types of Class E airspace with one exception. There are, albeit very few, airports that have operating control towers in Class E or Class G airspace. 91.127(c) states:

Communications must be established prior to 4 nautical miles from the airport, up to and including 2,500 feet AGL

More information about Class E airspace can be found in 91.127 and AIM 3-2-6.



2.6. Class G

Class G is everything that isn't depicted or defined as Class A, B, C, D, or E, typically the surface to 700 feet AGL or 1200 feet AGL. Class G is the uncontrolled airspace, and ATC has no authority or responsibility to facilitate the flow of traffic.

More information about Class E airspace can be found in 91.126.

2.7. Equipment Requirements Summary

Airspace	Entry Requirements	Equipment	Minimum Rating
Class A	IFR Flight Plan	IFR	Instrument Rating
Class B	Explicit ATC clearance	Radio and ADS-B Transponder	Private*
Class C	Two-way radio contact	Radio and ADS-B Transponder	No specific requirement
Class D	Two-way radio contact	Radio	No specific requirement
Class E	None for VFR	No specific requirement	No specific requirement
Class G	None	No specific requirement	No specific requirement
*Student pilots may enter if <u>61.95</u> is met.			

2.7.1. ADS-B Requirements

- Within mode C veil of Class B airport (see 91 Appendix D), up to 10000 ft MSL
- Within Class C or Class B
- Above Class C or Class B up to 10000 ft MSL
- At or above 10000 ft MSL, excluding 2500 ft AGL or less

3. AIRSPACE WEATHER MINIMUMS

91.155 governs the required visibility⁴ and distance from clouds for VFR operation in each class of airspace. These are expected to be memorized.

If the ceiling is less than 1000 feet AGL, you may not fly under that ceiling in controlled airspace.

If an airport's reported visibility is less than 3 miles, you may not takeoff, land, or enter the traffic pattern in that associated controlled airspace. If ground visibility is not being reported, you must have at least 3 miles flight visibility during takeoff, landing, or traffic pattern operations.

Airspace		Visibility		Distance from Clouds
Class A		No VFR		No VFR
Class B		3 sm		Clear of Clouds
Class C		3 sm		152 Rule
Class D		3 sm		152 Rule
Class E	Below 10,000 MSL	3 sm		152 Rule
	At or above 10,000 MSL	5 sm		1000 feet above 1000 feet below 1 sm horizontal
Class G	At or below 1200 AGL	Day	1 sm	Clear of Clouds
		Night	3 sm	152 Rule
	Above 1200 AGL but below 10,000 MSL	Day	1 sm	152 Rule
		Night	3 sm	152 Rule
	Above 1200 AGL and 10,000 MSL	5 sm		1000 feet above 1000 feet below 1 sm horizontal

152 - 1000 feet above, 500 feet below, 2000 feet horizontal

3.1. Special VFR

Sometimes, it may be necessary to land when the weather conditions are inadequate for VFR flight. A pilot may request a Special VFR clearance to enter controlled airspace while remaining clear of clouds with 1 statute mile of visibility. A Special VFR clearance will never be solicited by ATC, rather it must be requested from the pilot. To use Special VFR at night, the aircraft must be equipped for IFR flight under 91.205(d) and the pilot must be instrument rated. However, Appendix D to part 91 lists several airports where Special VFR operations are prohibited. More information about Special VFR can be found in 91.157.

⁴ Ground visibility is the visibility reported on the ground, flight visibility is the visibility seen from the cockpit. All in statute miles.

4. SPECIAL USE AIRSPACE

Special use airspace...is the designation for airspace in which certain activities must be confined, or where limitations may be imposed on aircraft operations that are not part of those activities.⁵

Airspace is typically designated as special use when it involves military activity or national security. The FAA has defined six types of special use airspace. In order from most to least restrictive: prohibited areas, restricted areas, warning areas, military operation areas, alert areas, and controlled firing areas.

4.1. Prohibited Areas

Flight into a prohibited area is never permitted at any time. Clearance will not be given nor will the prohibited area ever be inactive. Part 73 Subpart C. They are depicted with a blue hashed box and the prohibited area designation inside.

4.2. Restricted Areas

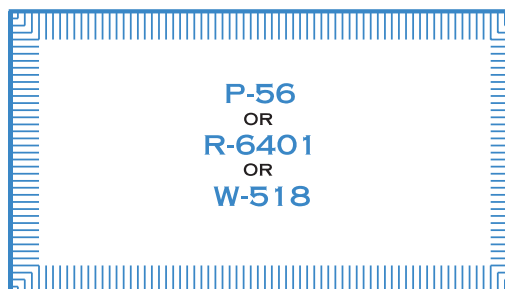
“Restricted areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles.” 73.13 provides guidelines on operations within restricted areas. The boundaries of restricted areas are plotted on the VFR sectional, but unlike prohibited areas, they are not necessarily active continuously.

VFR traffic is permitted within a restricted area either when it is inactive or when clearance is attained from the controlling agency. Information about the hours of operation and controlling agency is found on the border of the VFR Sectional. Always call the controlling agency to confirm the area is “cold”, or inactive, before entering. They are depicted similarly to prohibited areas, with a blue hashed box and the restricted area designation inside.

More information about restricted areas can be found in AIM 3-4-3, and Part 73 Subpart B.

4.3. Warning Areas

Warning areas serve to alert pilots of activity that may be hazardous to nonparticipating aircraft. They may exist over domestic or international bodies of water, and while IFR traffic is routed away from these areas, VFR traffic may enter while active or inactive, but are discouraged from doing so. They are depicted similar to prohibited and restricted areas, with a blue hashed box and the warning area designation inside.

[illegible]

**PROHIBITED, RESTRICTED
or WARNING AREA**

⁵ PHAK 15-3

4.4. Military Operations Areas (MOA)

MOAs indicate regions of military training operations. The boundaries of MOAs are plotted on the VFR sectional, but similar to restricted areas, they are not necessarily active continuously. VFR flight is permitted while the area is inactive or active. Pilots choosing to enter an active MOA should do so with extreme caution with contact with the controlling agency for traffic advisories.

MOAs are depicted with a magenta hashed border with a unique name. Further information about the MOA, such as its altitude range, time of use, and controlling agency, are also found on the border of the sectional.

More information about MOAs can be found in [AIM 3-4-5](#).



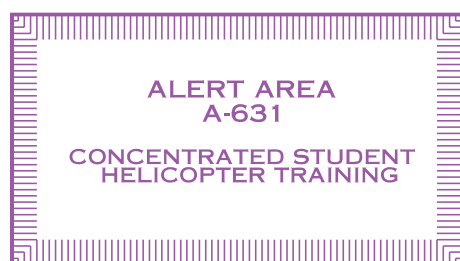
MOA NAME	ALTITUDE*	TIME OF USE†	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
RVON EAST	300 AGL TO 500 NOT NOT 14,000	INTERMITTENT 10-15 MON-FRI	MIAMI ONTR	
RVON EAST HIGH	14,000	INTERMITTENT NORMALLY DAYLIGHT HOURS MON-FRI	MIAMI ONTR	
BAISINGER	300 AGL TO 5000	INTERMITTENT NORMALLY DAYLIGHT HOURS MON-FRI OCNL SAT-SUN	MIAMI ONTR	
LAKE PLACID EAST NORTH, WEST	7000	INTERMITTENT NORMALLY DAYLIGHT HOURS MON-FRI OCNL SAT-SUN	MIAMI ONTR	
MARAN	300 AGL TO 5000	INTERMITTENT NORMALLY DAYLIGHT HOURS MON-FRI OCNL SAT-SUN	MIAMI ONTR	
TORTUGAS	5000	INTERMITTENT 0700-2000	MIAMI ONTR	

*Altitudes indicate floor of MOA. All MOAs extend to but do not include FL 180 unless otherwise indicated in tabulation or on chart.
†Other times by DoD NOTAM.

4.5. Alert Areas

Regions of intensive pilot training, high volume of air traffic, or unusual activity. Alert areas simply depict where these activities occur. There are no controlling agencies nor requirements to enter, but pilots should be alert and vigilant, especially for collision avoidance, while transitioning the area. Information about the alert area is also found on the border of the sectional.

More information about Alert Areas can be found in [AIM 3-4-6](#).



A-251 A	TO 2500	0600-2400	NO A/G
A-251 B, D	TO 2500	0600-2400	NO A/G
A-251 C	TO 2400	0600-2400	NO A/G

Alert areas do not extend into Class A, B, C and D airspace, or Class E airport surface areas.

4.6. Controlled Firing Areas

CFAs contain activities which, if not conducted in a controlled environment, could be hazardous to nonparticipating aircraft. The distinguishing feature of the CFA, as compared to other special use airspace, is that its activities are suspended immediately when spotter aircraft, radar, or ground lookout positions indicate an aircraft might be approaching the area. There is no need to chart CFAs since they do not cause a nonparticipating aircraft to change its flight path.⁶

These areas are listed in the Special Notices section of Section 3 in the Chart Supplement (see SC region)

CONTROLLED FIRING
Camden, Harrell Fld, AR 6E Camden 2 NM radius surface—005 avoidance advised Mon–Fri daylight hours. El Dorado, South Arkansas Rgnl ELD 021/024 2 NM radius surface—500 AGL avoidance advised Mon–Fri daylight hours. Texarkana Rgnl Webb Fld, AR. .25 NM radius TXK 223010 2000/blo Mon–Thu. 1900–0500Z† .5 NM radius TXK 240014 1000/blo Mon–Sat SR–SS.

⁶ https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap3_section_4.html

5. OTHER AIRSPACE AREAS

There are numerous other types of charted and uncharted airspace pertinent to pilots, including military training routes (MTRs), temporary flight restrictions (TFRs), parachute jump areas, terminal radar service areas, national security areas, wildlife/wilderness or National Park areas, tethered balloon areas, Part 93 airspace, special flight rules areas, and the Washington DC flight restricted zones.

AIM 3-5 and PHAK Chapter 15 cover these types of airspace in depth.

5.1. Temporary Flight Restrictions

It may be necessary to establish a temporary restricted area to protect public figures, space launches, or disaster relief efforts. Due to their temporary nature, they are not charted⁷ but appear in NOTAMs or at tfr.faa.gov. Flight through these areas may be authorized by ATC.

More information about TFRs can be found in AIM 3-5-3.

5.2. Parachute Jump Areas (PJA)

5.3. Terminal Radar Service Areas (TRSA)

5.4. National Security Areas

Pilots are requested to voluntarily avoid flying through the depicted NSA. (AIM 3-4-8)

5.5. Part 93 Special Air Traffic Rules (SATR) and Special Flight Rules Area (SFRA)

Not always depicted! Think LAX transition, Hudson River...

5.6. DC FRZ

Prior to operating under VFR within 60 nm of the DCA VOR/DME, pilots must complete special training which can be found on FAAWings.

⁷ with the notable exception of the Disney World theme park in Orlando