A108 AIRSPACE

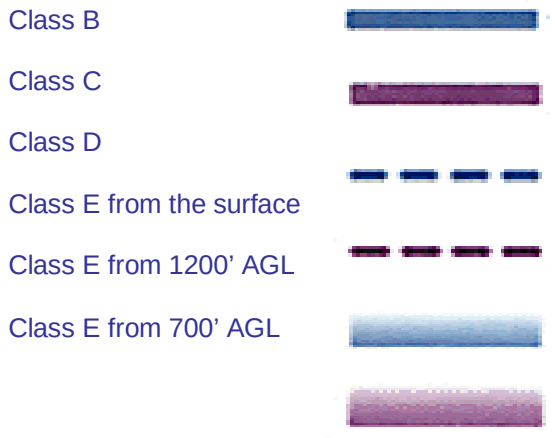
References: Aeronautical Information Manual, Chapter 3
FAA-H-8083-25A, Pilot's Handbook of Aeronautical Knowledge, Chapter 14
14 CFR Parts 71, 73, and 91

INTRODUCTION
Airspace can be a very complicated puzzle. However, it is most important that the pilot clearly understand the type of airspace that he/she is flying through and the requirements to be in that airspace. The objectives of this lesson are to learn the various types of airspace and the entry requirements for that airspace. Also, to be able to identify the airspace as depicted on aeronautical charts.

AIRSPACE
The two categories of airspace are:
- Regulatory – Class A, B, C, D, E, G, Restricted and Prohibited
- Nonregulatory – MOA, Warning, Alert, and Controlled Firing Areas

Within these two categories there are four types of airspace:
- Controlled
- Uncontrolled
- Special use
- Other airspace

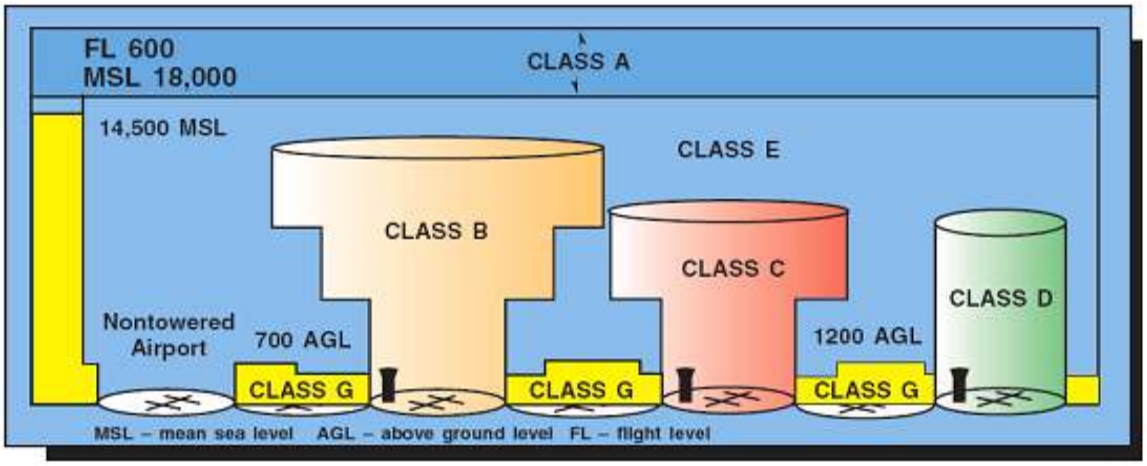
Airspace identification markings used on aeronautical charts.



CONTROLLED AIRSPACE
Controlled airspace is airspace of defined dimensions within which Air Traffic Control (ATC) service is provided to IFR (Instrument Flight Rules) flights and to VFR (Visual Flight Rules) flights in accordance with the airspace classifications.

The level of ATC service depends on the airspace classification. Controlled airspace is a generic term and covers Class A, Class B, Class C, Class D and Class E airspace in the United States. Internationally, there is also Class F.

Note: The term *generally* is used throughout the following airspace descriptions. You must review the appropriate charts for actual dimensions.



CLASS A airspace is *generally* the airspace from 18,000 feet mean sea level (MSL) up to and including FL600 (about 60,000 feet), including the airspace overlying the waters within 12 nautical miles (nm) of the coast of the 48 contiguous states and Alaska. Unless otherwise authorized, all operations in Class A airspace will be conducted under instrument flight rules (IFR). As such, the pilot and aircraft must be instrument qualified and equipped and the pilot must have a clearance from ATC to enter Class A airspace. There are no visibility or cloud clearance requirements because the flight is conducted under IFR.

CLASS B airspace is *generally* the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. Currently there are 40 such Class B airports. The configuration of Class B airspace is individually tailored to the needs of a particular area and consists of a surface area and two or more layers. Some Class B airspace resembles an upside-down wedding cake. "Explicit" two-way radio communications and a clearance are required prior to entering this airspace (i.e. "*Tiger 25 you are cleared to enter Class Bravo airspace*". *"Tiger 25, Standby"* will not suffice). Additionally, at least a private pilot certificate is required to operate in Class B airspace; however, there is an exception to this requirement. Student pilots or recreational pilots seeking private pilot certification may operate in the airspace and land at other than specified primary airports within the airspace if they have received training and had their logbook endorsed by a certified flight instructor. (See 14 CFR, part 61)

Note: Aircraft operating on a VFR flight plan require "explicit" clearance. Clearance is contained in an IFR clearance.

Class B is designated on aeronautical charts by solid blue lines. The floor and ceiling of the airspace are shown as a fraction in hundreds of feet.

A Mode C Veil exists at a 30 nm radius of Class B airports. It extends from the surface to 10,000 feet MSL. This is designated by a thin magenta line. An aircraft must have an operating Transponder with Mode C (altitude encoding) to fly inside this veil.

The airspeed limit is no more than 250 KIAS below 10,000 feet MSL; and no more than 200 KIAS in the underlying airspace or in a VFR corridor.

The visibility must be at least three statute miles and the aircraft must remain clear of the clouds for VFR flight.

Aircraft separation: VFR pilots are provided sequencing and separation from other aircraft while operating within Class B airspace.

CLASS C airspace *generally* extends from the surface to 4,000 feet above the airport elevation. It surrounds those airports that have an operational control tower with radar approach control and that have a large number of IFR operations or passenger enplanements. These are busy airports but not as busy as Class B airports. There are currently 122 Class C airports in the U.S..

Class C airspace consists of three areas. The Core is *generally* of a 5 nm radius surface area that extends from the surface to 4,000 feet above the airport elevation. The Shelf extends from 5 to 10 nm radius and extends from 1,200 feet to 4,000 feet above the airport elevation. There is also the Outer Area with a 20 nm radius, with vertical dimensions based on radar coverage and this area may include other satellite airports.

Two way radio communications (specifically Call Sign acknowledgement) are required prior to entering this airspace (i.e. "*Tiger 25, Roger" or "Tiger 25, Standby*"). The transmission *"Calling Approach, Say again"* is not authorization to enter Class C.

Class C is designated on aeronautical charts by solid magenta lines. The floor and ceiling of the airspace are shown as a fraction in hundreds of feet.

A Transponder with Mode C is required in Class C airspace.

The airspeed limit is no more than 250 KIAS below 10,000 feet MSL and no more than 200 KIAS below 2500 feet AGL and within 4nm of the primary airport.

The minimum visibility is three statute miles with a cloud clearance of 1,000 feet above, 500 feet below and 2,000 feet horizontal.

Aircraft separation is provided within Class C airspace and the Outer Area after 2 way radio communications and radar contact is established. Student pilot operations are allowed.

CLASS D airspace *generally* extends from the surface to 2,500 feet above the airport elevation surrounding those airports that have an operational control tower. The configuration of Class D airspace will be tailored to meet the operational needs of the area.

The ceiling of the Class D airspace is stated in hundreds of feet inside a blue dashed line square.

Two way radio communications (specifically Call Sign acknowledgement) are required prior to entering this airspace (i.e. "*Tiger 25, Roger" or "Tiger 25, Standby". "Calling Tower, Say again" is not authorization to enter*).

Class D is designated on aeronautical charts by dashed blue lines.

Class D airspace at airports with a part-time control tower may revert to Class E when the tower is not in operation.

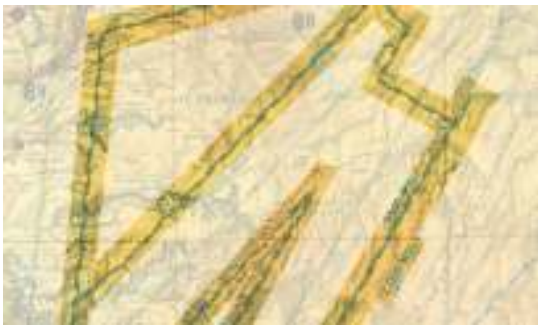
The airspeed limit is no more than 200 KIAS below 2,500 feet AGL within 4nm of the primary airport.
The minimum visibility is three statute miles with a cloud clearance of 1,000 feet above, 500 feet below and 2,000 feet horizontal separation.

Traffic advisories are given only on work load permitting basis.

CLASS E airspace is controlled airspace that is not designated A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying controlled airspace, usually Class A at 18,000 feet. It also extends from FL600 upwards with no vertical limit. There are no communication or clearance requirements for VFR flight in Class E airspace.

Class E airspace starts at 1,200 feet AGL inside of blue shading. If there is no blue shading over the area, the Class E airspace begins at 14,500 feet MSL. It begins at 700 feet AGL inside of magenta shading.

Federal Airways define navigation routes between VORs. They also define Class E airspace.
• Extend upward from 1,200’ AGL to 17,999’ MSL.
• Within parallel boundary lines 4 NM each side of the airway centerline.



Class E airspace starts at the surface inside of magenta dashed lines. Castellated blue lines designate non-standard floors of Class E airspace and the floor is stated inside the designation.

There are no special requirements required to enter Class E airspace. The airspeed limit is no more than 250 KIAS below 10,000 feet MSL and <Mach 1 above 10,000 feet MSL.

	Below 10,000 feet MSL	Above 10,000 feet MSL
• Visibility:	Three statute miles	Five statute miles
• Cloud clearance:	1,000 feet above 500 feet below 2,000 feet horizontal	1,000 feet above 1,000 feet below 1 mile horizontal

CLASS G airspace or uncontrolled airspace is the portion of the airspace that has not been designated as Class A, B, C, D, or E. It is therefore designated uncontrolled airspace. Class G airspace extends from the surface to the base of the overlying Class E airspace. Although ATC has no authority or responsibility to control air traffic, pilots should remember there are VFR weather minimums which apply to Class G airspace. There is no chart designation for Class G airspace.

The airspeed limit is no more than 250 KIAS below 10,000 feet MSL and <Mach 1 above 10,000 feet MSL.

	Below 1,200 AGL	Above 1,200 AGL & Below 10,000 MSL Day	Below 10,000 MSL Night
• Visibility:	One statute mile	One statute mile	Three statute miles
• Cloud clearance:	Clear of clouds	1,000 feet above 500 feet below 2,000 feet horizontal	1,000 feet above 500 feet below 2,000 feet horizontal

Above 10,000 MSL and above 1,200 AGL	Five statute miles of visibility 1,000 feet above 1,000 feet below 1 mile horizontal

SPECIAL USE AIRSPACE

Special Use Airspace exists where activities must be confined because of their nature. In special use airspace, limitations may be placed on aircraft that are not a part of the activities. Special Use Airspace usually consists of:

Prohibited Areas are established for security, or other reasons associated with the national welfare, and are depicted on aeronautical charts. Aircraft are forbidden to enter Prohibited Areas.

Restricted Areas denote the existence of unusual, often invisible hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. An aircraft may not enter a Restricted Area unless permission has been obtained from the controlling agency. Restricted Areas are depicted on aeronautical charts and are published in the Federal Register.

This separates civilian traffic from potentially hazardous military activities. Flight through an active Restricted Area is not permitted. Check with the controlling ATC facility (noted on Sectional Charts) for current status prior to entering.

Warning Areas consist of airspace which may contain hazards to nonparticipating aircraft in international airspace. The activities may be much the same as those for a Restricted Area. Warning Areas are established beyond the 3-mile limit and are depicted on aeronautical charts.

VFR flight through active Warning Areas is permitted, though not recommended

Military Operation Areas (MOA) consist of airspace of defined vertical and lateral limits established for the purpose of separating military training activity from IFR traffic. There is no restriction against any pilot operating VFR in these areas; however, a pilot should be alert since training activities may include acrobatic and abrupt maneuvers. MOAs are depicted on aeronautical charts.

It is a good idea to check with the controlling ATC facility (noted on Sectional Charts) for MOA status prior to entering an MOA

Alert Areas are depicted on aeronautical charts and are to advise pilots that a high volume of pilot training or unusual aerial activity is taking place. Pilots are advised to be particularly vigilant in scanning for traffic.

Controlled Firing Areas (CFA) contain activities, which, if not conducted in a controlled environment, could be hazardous to nonparticipating aircraft. The difference between Controlled Firing Areas and other special use airspace is that activities must be suspended when a spotter aircraft, radar, or ground lookout position indicates an aircraft might be approaching the area.

OTHER AIRSPACE AREAS

"Other Airspace Areas" is a general term referring to the majority of the remaining airspace. It includes: An **Airport Advisory Area** is an area within 10 statute miles (sm) of an airport where a control tower is not operating, but where a Flight Service Station (FSS) is located. At these locations, the FSS provides advisory service to arriving and departing aircraft.

Military Training Routes (MTR) are developed to allow the military to conduct low-altitude, high-speed training. The routes above 1,500 feet AGL are developed to be flown primarily under IFR, and the routes 1,500 feet and less are for VFR flight. The routes are identified on sectional charts by the designation "instrument (IR) or visual (VR)."

Temporary Flight Restriction (TFR)

An FDC NOTAM will be issued to designate a TFR. The NOTAM will begin with the phrase "FLIGHT RESTRICTIONS" followed by the location of the temporary restriction, effective time period, area defined in statute miles, and altitudes affected. The NOTAM will also contain the FAA coordination facility and telephone number, the reason for the restriction, and any other information deemed appropriate. The pilot should check the NOTAMs as part of flight planning.

Some of the purposes for establishing a TFR are:

- Protect persons and property from an existing or imminent hazard.
- Provide a safe environment for the operation of disaster relief aircraft.
- Prevent an unsafe congestion of aircraft above an event.
- Protect declared national disasters for humanitarian reasons.
- Protect the President, Vice President, or other public figures.
- Provide a safe environment for space agency operations.

Parachute Jump Areas are published in the Airport/Facility Directory. Sites that are used frequently are depicted on sectional charts.

Published VFR Routes

Published VFR routes are for transitioning around, under, or through some complex airspace. Terms such as VFR flyway, VFR corridor, VFR transition route and terminal area VFR route are applied to such routes. These routes are generally found on the back of VFR Terminal Area Charts.

Terminal Radar Service Areas (TRSA) are areas where participating pilots can receive additional radar services. The purpose of the service is to provide separation between all IFR operations and participating VFR aircraft. The primary airport within the TRSA is Class D airspace. The remaining portion of the TRSA overlies other controlled airspace, which is normally Class E airspace beginning at 700 or 1,200 feet and established to transition to/from the en route terminal environment. TRSAs are depicted on VFR sectional charts and terminal area charts with a solid black line and altitudes for each segment. The Class D portion is charted with a blue segmented line. Participation in TRSA services is voluntary; however, pilots operating under VFR are encouraged to contact the radar approach control and take advantage of TRSA service.

National Security Areas consist of airspace of defined vertical and lateral dimensions established at locations where there is a requirement for increased security and safety of ground facilities. Pilots are requested to voluntarily avoid flying through these depicted areas. When necessary, flight may be temporarily prohibited.

AIR DEFENSE IDENTIFICATION ZONE (Contiguous U.S. ADIZ)

The ADIZ surrounds the nation's eastern, southern, and western borders. The requirements for passage are to have an IFR or DVFR (Defense VFR) flight plan and to be on a discrete transponder code. The DVFR aircraft must make position reports prior to entering the ADIZ.

Pilots should review interception procedures prior to flying in the vicinity of an ADIZ.

SPECIAL CONSERVATION AREA

These surround many national parks, wildlife refuges, etc. Pilots are requested to avoid flight below 2,000 feet AGL in these areas. The areas are denoted by a solid thin blue line with blue dots along the inside of the line.

VFR CLOUD CLEARANCES

The "see and avoid" rule, FAR Part 91.113(b) is backed up by many other regulations in the General Operating and Flight Rules of Part 91. All of these regulations stem from the same basic principle which is in order to avoid another aircraft, you have to see it.

CFR 91.113(b) states, *"When weather conditions permit, regardless of whether an operation is conducted under instrument flight rules or visual flight rules, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft."*

For now, focus on the aircraft operating under visual flight rules (VFR). CFR 91.155 sets forth the "Basic VFR weather minimums" that a pilot must have before conducting a flight under VFR. Three weather phenomena must be considered in determining whether a flight may be conducted under VFR below 10,000 feet mean sea level: visibility, cloud clearance, and ceiling.

VISIBILITY: In Classes B, C, D, and E airspace, a pilot needs a minimum of three statute miles visibility to operate under VFR day or night. In Class G airspace, a pilot must have at least one statute mile visibility during the day and three statute miles at night. However, the rule allows an exception to the Class G night visibility requirement if the visibility is at least one statute mile, the pilot stays in the airport traffic pattern within one-half mile of the runway, and remains clear of clouds.

Ground visibility is defined in CFR Part 1 as "the prevailing horizontal visibility near the earth's surface as reported by the United States National Weather Service or an accredited observer." If an airport within controlled airspace officially reports weather, a pilot taking off, landing, or entering the traffic pattern at that airport is bound by the official ground visibility. Otherwise, he may use "flight visibility," which is defined as the average forward visibility observed by the pilot from the cockpit. So, an aircraft transiting controlled airspace, but not operating at the airport, must maintain the proper flight visibility but is not bound by the reported ground visibility.

CLOUD CLEARANCES: In Class B airspace, day and night, a pilot must remain clear of clouds. In Classes C, D, and E airspace, day and night, the pilot must stay at least 500 feet below, 1,000 feet above, and 2,000 feet horizontally from any cloud. It is in Class G airspace that the cloud clearance limits change, depending on how far above the surface you are and whether it is day or night. Below 1,200 feet above the surface in Class G, the pilot must remain clear of clouds during the day. At night, the minimum separation is 500 feet below, 1,000 feet above, and 2,000 feet horizontally. Above 1,200 feet AGL (above ground level), day and night, the pilot must remain 500 feet below, 1,000 feet above, and 2,000 feet horizontally from any cloud.

CEILING: The ceiling minimum applies only to airports in controlled airspace. The rule states that "no person may operate an aircraft beneath the ceiling under VFR within the lateral boundaries of controlled airspace designated to the surface for an airport when the ceiling is less than 1,000 feet." This restriction does not apply to flights in uncontrolled airspace. Note that an aircraft may operate VFR above a reported ceiling, "on top," even while passing right over the airport.

For flights above 10,000 feet MSL (mean sea level), the limits for VFR flight are fairly standard. In Class E airspace, a pilot must have flight visibility of at least five statute miles and remain at least 1,000 feet below, 1,000 feet above, and one statute mile horizontally from any cloud. Similarly, in Class G airspace more than 1,200 feet above the surface, a pilot must have flight visibility of at least five statute miles and remain at least 1,000 feet below, 1,000 feet above, and one statute mile horizontally from any cloud.

It takes a lot of practice to be able to rattle off all of the different VFR cloud clearance, ceiling, and visibility limits. However, there is one set of minimums that you can remember that will keep you in compliance with CFR 91.155 for all airspace below 10,000 feet: Visibility of at least three statute miles; cloud clearance of at least 500 feet below, 1,000 feet above, and 2,000 feet horizontally; and a ceiling of at least 1,000 feet above the surface.

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	500 feet below 1,000 feet above 2,000 feet horizontal
Class D	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
Class E Less than 10,000 feet MSL	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
At or above 10,000 feet MSL	5 statute miles	1,000 feet below 1,000 feet above 1 statute mile 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	500 feet below 1,000 feet above 2,000 feet horizontal
More than 1,200 feet above the surface but less than 10,000 feet MSL. Day	1 statute mile	500 feet below 1,000 feet above 2,000 feet horizontal
Night	3 statute miles	500 feet below 1,000 feet above 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 below 1,000 feet above 1 statute mile horizontal

The following chart is a summary of the requirements for the various types of controlled airspace.

Class Airspace	Entry Requirements	Equipment	Minimum Pilot Certificate
A	ATC Clearance	IFR Equipped	Instrument Rating
B	ATC Clearance	Two-Way Radio, Transponder with Altitude Reporting Capability	Private—Except a student or recreational pilot may operate at other than the primary airport if seeking private pilot certification and if regulatory requirements are met.
C	Two-Way Radio Communications Prior to Entry	Two-Way Radio, Transponder with Altitude Reporting Capability	No Specific Requirement
D	Two-Way Radio Communications Prior to Entry	Two-Way Radio	No Specific Requirement
E	None for VFR	No Specific Requirement	No Specific Requirement
G	None	No Specific Requirement	No Specific Requirement