

[Back to Article](#)[Send to Printer](#)[Flying](#)[Subscribe to RSS](#)[View all Articles](#)

How the U.S. Airspace System Works

By [Fred Simonds](#), Special to [Aviation.com](#)

posted: 12 August 2008 11:31 am ET

Since the genesis of powered flight with the Wright Brothers in 1903, the paramount objective of safety has driven evolutionary progress to organize and regulate airspace better. Other imperatives for the organization of airspace have been the need to make the best use of a finite medium and to make airspace usage convenient and logical for both pilots and controllers.

In recent years, the FAA has made U.S. airspace more consistent with international standards, so description of airspace organization in the United States is largely applicable anywhere in the world. Taken as a whole, today's airspace organization is the best it has ever been.

Fundamentally, today's airspace is designed to separate aircraft flying on instruments under what are called Instrument Flight Rules (IFR) from other IFR aircraft. Separating IFR aircraft from aircraft flying visually under Visual Flight Rules (VFR) comes second. Instrument aircraft can fly through clouds, whereas visual aircraft cannot. Almost without exception, airline traffic flies under the stricter instrument rules, whereas GA aircraft usually fly under visual rules — particularly those being flown recreationally.

Controlled airspace

Since IFR aircraft may be flying in clouds or in poor visibility where it is not possible for them to see or be seen by other aircraft, controlled or "Class E" airspace was created. In Class E airspace, air traffic control (ATC) becomes the eyes of instrument pilots.

Controlled airspace does not mean that all aircraft in that space are under ATC control. It means only that ATC is capable of separating instrument aircraft from other instrument and known visual aircraft within Class E airspace as depicted on aircraft charts.

Visual aircraft fly in Class E airspace legally all the time, subject to a defined set of visibility and cloud clearance requirements. These rules are designed to reduce the chance that an IFR airplane might emerge from a cloud and collide with an aircraft at the edge of the cloud.

The term 'controlled airspace' implies that there is also uncontrolled airspace. In uncontrolled or what pilots call "Class G" airspace, ATC has no responsibility to separate air traffic. Class G airspace is often close to the ground and hence below radar coverage, making separation via radar impossible. Flying under IFR as they mostly do, airliners rarely operate in Class G airspace.

Airliners, however, dominate the upper altitudes. Between 18,000 and 60,000 feet above mean sea level (MSL), all aircraft must be on IFR flight plans within what is called "Class A" airspace.

Once at altitude and cruising along, you are almost certainly within Class A airspace.

Airspace near airports with control towers gets extra attention: the more traffic, the more restrictive the airspace. Accordingly, there are three categories of airspace designed to suit the activity levels of large-, medium- and smaller-volume airports.

Class B airspace

The largest airports are surrounded by highly regulated "Class B" airspace. In the United States, "Bravo" airspace is established around the 12 busiest airports, such as Atlanta's Hartsfield and Chicago's O'Hare.

Whether airborne or on the ground at the primary airport, explicit ATC permission must be obtained to enter or leave Class B airspace. Furthermore, a private pilot license or higher pilot qualification is generally required to operate in this sacrosanct airspace. For everyone's safety, beginners should go elsewhere.

Woe betide the pilot who cuts a corner and enters Bravo airspace without permission. ATC can track an offending aircraft anywhere it might go, and the authorities will be waiting when he or she lands. The FAA takes airspace violations very seriously, and an airspace bust can earn a pilot a hefty 90-day suspension of his or her license. One story, possibly apocryphal, has it that New York controllers busted a pilot for being just 60 yards inside their Class B airspace.

Class C airspace and Mode C transponders

For some 123 airports not quite as busy, the FAA implemented "Class C" airspace. Similar in concept and form to Class Bravo, "Charlie" airspace extends to just 4,000 feet above the primary airport and reaches out just 10 miles.

A Mode C transponder — an avionics unit inside the aircraft that responds to ATC radar signals with a four-digit octal code (assigned by ATC) to identify the aircraft and another four-digit code to provide its pressure altitude — is required within the lateral limits of Class C airspace and upward to 10,000 feet MSL, but there is no "Mode C veil."

(A Mode C veil is a regulatory requirement associated with Class B airspace, requiring that all aircraft must be equipped with Mode C transponders while operating within airspace extending for a certain distance outside the Class B airspace itself. Another, more general, regulatory requirement is that all aircraft flying above 10,000 feet MSL must have Mode C transponders.)

Requirements to enter or leave Charlie airspace are also simpler than for Bravo. Permission to enter is automatic if the controller repeats your aircraft number back to you after your first call. Student pilots can operate legally within Charlie airspace.

The simplest class of airspace, "Class Delta," is effective at smaller airports with control towers, whenever their towers are operating. Extending five miles from the airport and up to 2,500 feet above it, permission is gained to enter the Delta upon pilot request. There are no minimum licensing or transponder requirements, and indeed many control towers don't have radar at all.

Special use airspace

"Special Use Airspace" consists of prohibited areas which aircraft may not enter. Famous examples include P-40, the airspace above the Presidential Retreat at Camp David and P-51, the airspace above the White House.

"Hot" Restricted Areas contain operations that do not mix well with aircraft — little things like artillery, guided missiles or aerial gunnery. ATC clearance is required to enter, but these areas are sometimes "cold," in which case there is no problem.

Temporary Flight Restrictions are put in place for events such as space shuttle operations, movements of the President or Vice President or disaster relief.

Since September 11, 2001, there has been a 30-mile circular Air Defense Identification Zone around Washington D.C., extending all the way up to Class A airspace at 18,000 feet.

While not required by law, pilots are asked not to fly near or "loiter" in the vicinity of nuclear power plants, power plants, dams, refineries, industrial complexes, military facilities and similar potentially sensitive facilities.

If you attend a major sporting event such as a major league baseball or football game or motor speedway event, you won't see any low-flying aircraft overhead. Pilots are asked to stay 3 miles away and above 3,000 feet from such events.

Alert readers may have noticed something missing: "Class F." While the designation exists, there is no Class F airspace in the U.S.

- [Image Gallery: Light Sport Aircraft](#)
- [The Latest Low Fares from Chicago O'Hare International Airport](#)
- [Video: Rocket Racing League Inaugural Flight](#)

[Home](#)
[First Class](#)
[Travel
Safety](#)
[Business
Community](#)
[Technology](#)
[Flying](#)









[Site Map](#) | [About Us](#) | [Contact Us](#) | [Privacy Policy](#) | [Terms and Conditions](#) | [Advertise with Us](#) | [DMCA/Copyright](#)

© Imaginova Corp. All rights reserved.