Airspace

For Everyone

The airspace above the United States can seem as complex and convoluted as a soap opera plot. With a little study, however, it does make sense.

In this Safety Advisor, we will examine the airspace structure and how pilots are expected (and required by the Federal Aviation Regulations) to operate within it.

Throughout this Safety Advisor, we will be talking about VFR and IFR operations within different classes of airspace. VFR pilots need to know more about airspace than IFR pilots, because most airspace was designed to separate VFR and IFR operations. The simple act of being on an IFR flight plan means that a clearance through controlled airspace has already been granted. Of course, pilots who are studying for FAA knowledge or practical tests will need to know everything — so bone up.

Distilled to the basics, there are two kinds of airspace: uncontrolled and controlled.

Uncontrolled Airspace

In the early days of aviation, all airspace was uncontrolled, what we today call Class G airspace. Way back when, there were few airplanes, and none had the instruments necessary to fly in clouds. Even at the busiest of airports, traffic density was very low, and the airplanes flew slowly. Although there were no standards for weather conditions that aircraft could fly in, it was generally agreed that if you remained clear of clouds and had at least one-mile visibility, you could see other airplanes and terrain in time to avoid a collision. This was called see and avoid. It formed the basis for VFR flight and remains critical to preventing collisions.

As the aviation population gained experience flying in marginal weather, pilots learned that because vision faded at night and at altitude, better weather conditions were necessary to see and avoid other traffic. This is the reason why higher weather minimums exist at night and at altitude.

Minimum cloud clearance limits and flight visibilities worked well for a time, but the aviation industry was booming, and things were about to change.

Except when flying in clouds, the pilot in command is responsible at all times for aircraft separation, even when operating in a radar environment or on an IFR flight plan.

Many pilots do not know that IFR flight without a clearence is permitted in uncontrolled airspace, provided that the pilot is instrument-rated and the aircraft is equipped for instrument flight.

Controlled Airspace
The Beginning

With the advent of inexpensive gyroscopic flight instruments, travel through the clouds became possible. See and avoid was useless in the soup, so procedures to ensure aircraft separation were needed. This led to the creation of air traffic control (ATC) and controlled, or Class E, airspace. The government established a system of airways, each eight-nautical miles wide with base altitudes of 1,200 feet above ground level (agl), and designated the airspace within them as controlled airspace. The airway system was defined by a network of radio beacons, many of which were located on airports.

More stringent weather minimums for VFR operations were established for this controlled airspace to further separate air traffic. In poor weather conditions, pilots and aircraft had to be qualified and equipped for IFR flight, file IFR flight plans, and coordinate their positions with ATC. When weather conditions were good, pilots could still fly on IFR flight plans, if they chose, but were responsible to see and avoid other aircraft.

Some parcels of airspace contained many airways, so in those areas, controlled airspace was established at 1,200 feet agl to coincide with the airways, whether on an airway or not. When VOR airways arrived in the 1950s, they were (and still are) known as “Victor” airways. Figure 1 shows how the airspace looked in those days.

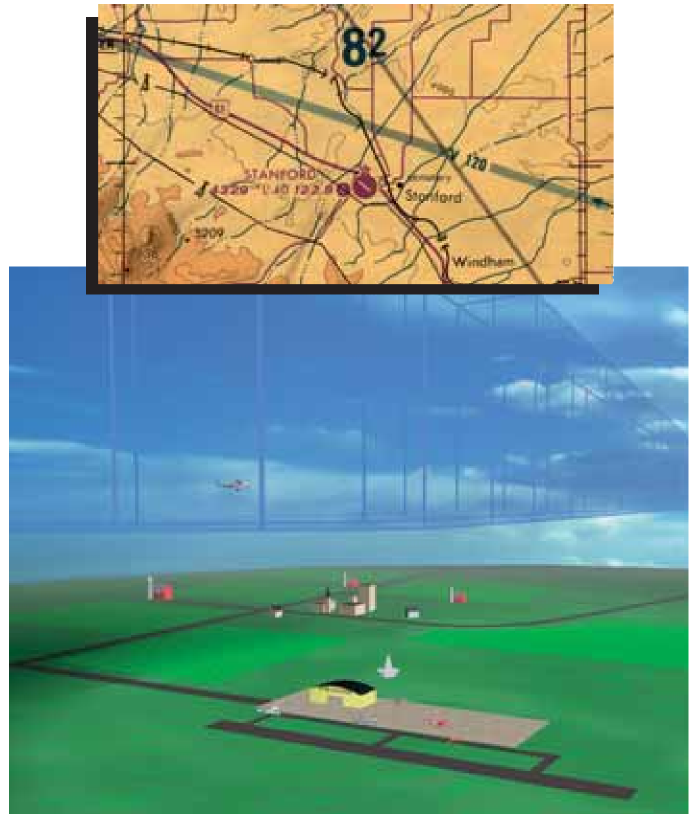


Figure 1. Victor Airway

Contrary to what many pilots believe, controlled airspace does not mean that all flight within it is controlled. It means that IFR services are available to qualified pilots who choose to use them. Pilots operating under VFR may fly freely in controlled airspace as long as weather conditions meet current regulatory requirements for that airspace.

Begin the Approaches

Airport-based radio navigation facilities made instrument approaches possible, greatly improving the utility of aircraft, while also creating some traffic-separation challenges. Close encounters between IFR airplanes on approach to airports and VFR airplanes flying under the weather led to the creation of transition areas.

Transition areas surrounded airports with instrument approaches and brought Class E airspace to within 700 feet of the surface. This move was intended to protect approaching IFR pilots. Pilots flying under VFR could operate in the transition areas as long as they had VFR weather minimums (Figure 2 on the next page shows the magenta tint used to depict transition areas).

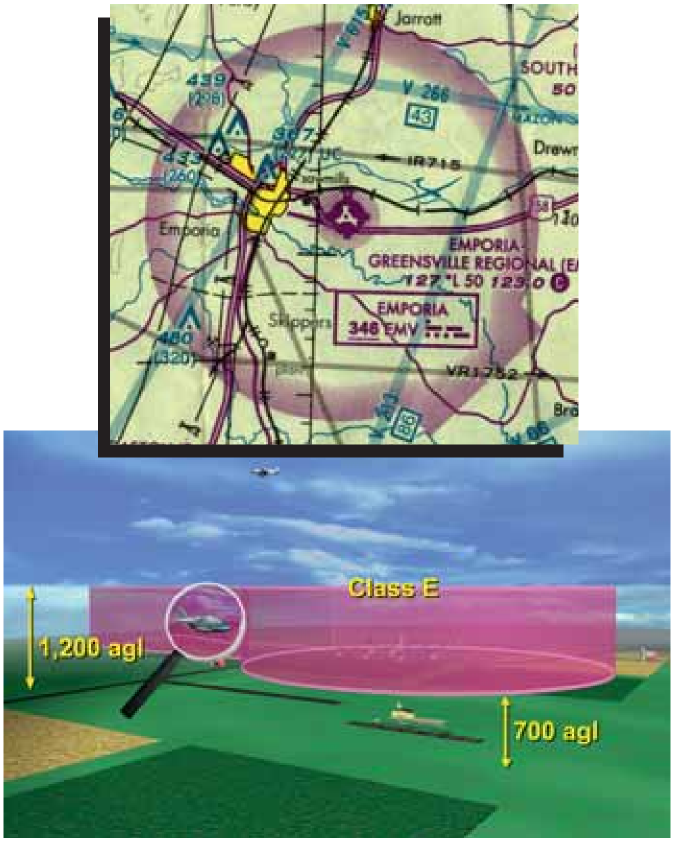


Figure 2. Transition Area

At first, the only approaches were of the nonprecision variety. That is, they provided no vertical guidance. Pilots would fly to or from a navaid and, at the appropriate distance or time, would descend to predetermined altitudes. Depending upon the speed of the airplane and the height of obstacles surrounding the airport, a nonprecision approach might or might not be sufficient to get below the clouds and onto the runway.

Most approaches in the United States are nonprecision. New nonprecision Global Positioning System (GPS) approaches are being added.

To help pave the way for all-weather utility, the instrument landing system (ILS) was invented, providing vertical guidance in the form of an electronic glideslope. It remains the predominant precision approach system today.

The ILS systems brought airplanes to within 200 feet of the ground, and that caused some problems with VFR flight around airports with precision approaches. The solution was to bring Class E, or controlled airspace, to the surface and to raise the weather minimums so that VFR traffic would not get in the way of IFR traffic during poor weather.

VFR minimums for surface-based Class E airspace are: a 1,000-foot ceiling and 3-statute miles visibility. When the weather is at least that good, VFR and IFR traffic can legally mix within surface-based Class E (see Figure 3).

Currently, Wide-Area Augmentation System (WAAS) approaches are being established. These even more accurate GPS-based approaches can provide ILS-like minimums, but they fall into a new classification of approaches called "approach with vertical guidance" (APV).

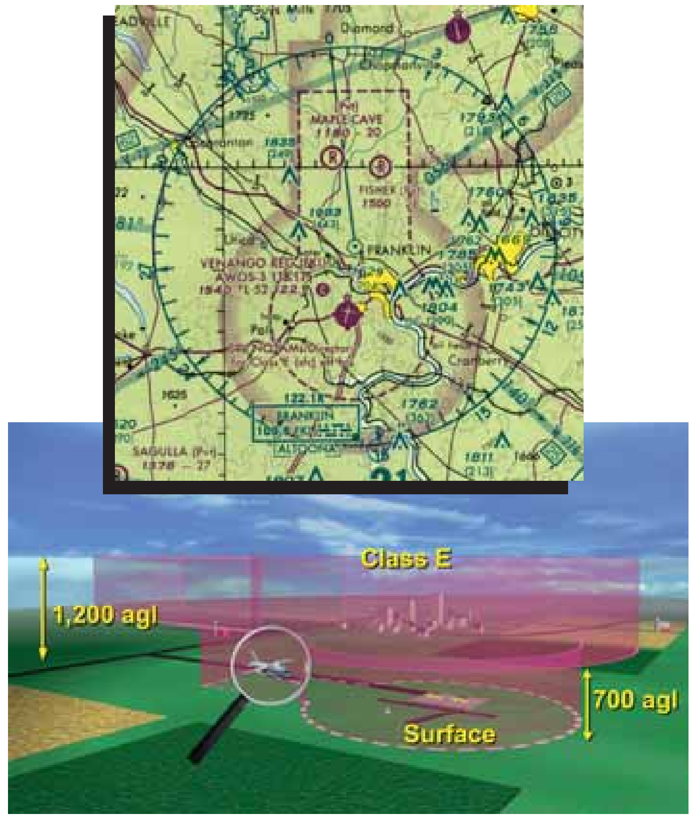


Figure 3. Surface-Based Class E

A weather observer or automated weather observation equipment (ASOS or AWOS) must be available at airports surrounded by surface-based Class E. If weather information is not available, the airspace reverts to Class G with a Class E transition area, as shown in Figure 3.

View From the Tower

As traffic increased at major airports, the need for control towers became apparent. Controllers in the tower were — and still are — responsible for sequencing arriving and departing airborne traffic and keeping order on the ground. Class D airspace was established around towered airports, and all pilots operating within it were required to communicate with the tower, regardless of weather conditions. The same weather minimums as those in surface-based Class E applied to Class D. Figure 4 shows how Class D airspace is charted.

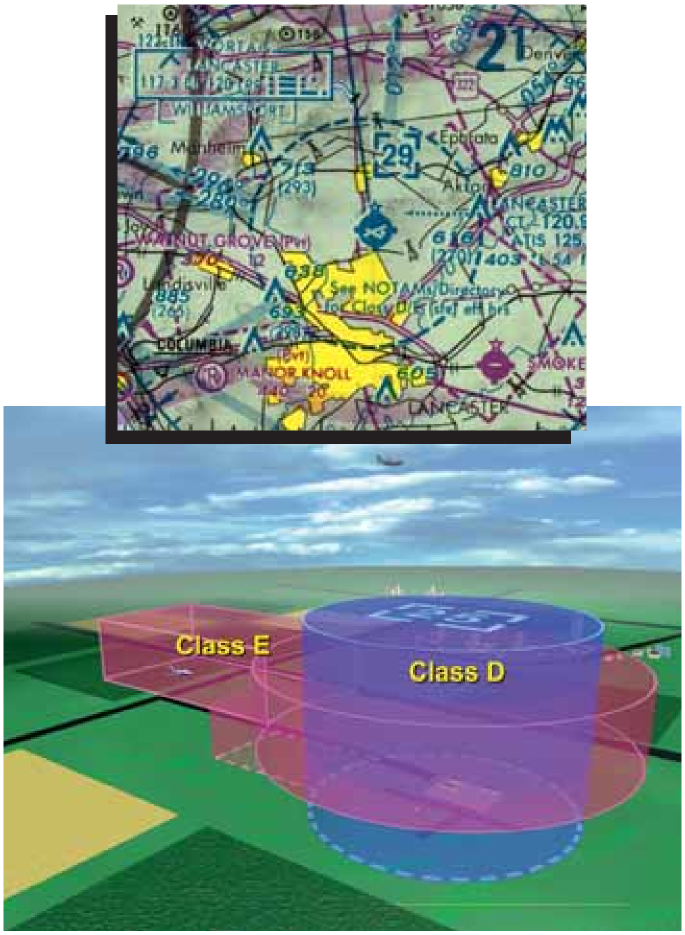
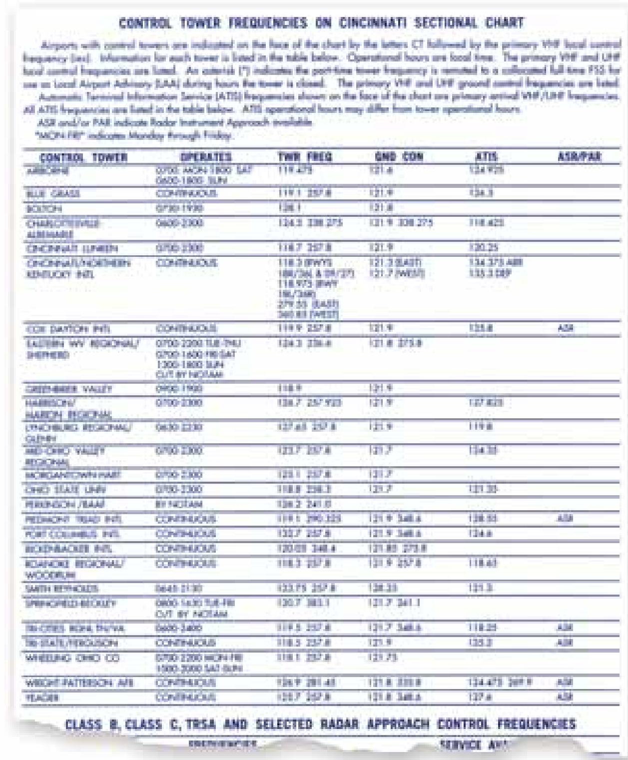


Figure 4. Class D

When arriving, departing, or passing through Class D airspace, communications must be established with the tower. Communications must also be established when operating to or from an outlying field within the Class D airspace. When the tower is not operating but weather information is available, the airspace reverts to surface-based Class E (Figure 3) — that is, during periods of below-VFR weather, aircraft must be operating under IFR. If weather information is not available, the airspace reverts to Class G as shown in Figure 2.

Part-time control towers' hours of operation are published in the *Airport/Facilities Directory*, as well as on sectional charts (see Figure 5 above, right).



CONTROL TOWER FREQUENCIES ON CINCINNATI SECTIONAL CHART

Airports with control towers are indicated on the face of the chart by the letters CT followed by the primary VHF local control frequency (ies). Information for each tower is listed in the table below. Operational hours are local time. The primary VHF and UHF local control frequencies are listed. An asterisk (*) indicates the part-time tower frequency is remoted to a collocated full-time FSS for use as Local Airport Advisory (LAA) during hours the tower is closed. The primary VHF and UHF ground control frequencies are listed.

Automatic Terminal Information Service (ATIS) frequencies shown on the face of the chart are primary arrival VHF/UHF frequencies. All ATIS frequencies are listed in the table below. ATIS operational hours may differ from tower operational hours.

ASR and/or PAR indicate Radar Instrument Approach available.

"MON-FRI" indicates Monday through Friday.

CONTROL TOWER	OPERATES	TWR FREQ	GND CON	ATIS	ASR/PAR
AIRBORNE	0700-MON-1800 SAT 0600-1800 SUN	119.475	121.6	124.925	
BLUE GRASS	CONTINUOUS	119.1 257.8	121.9	126.3	
BOLTON	0730-1930	128.1	121.8		
CHARLOTTESVILLE-ALBEMARLE	0600-2300	124.5 338.275	121.9 338.275	118.425	
CINCINNATI LUNKEN	0700-2300	118.7 257.8	121.9	120.25	
CINCINNATI/NORTHERN KENTUCKY INTL	CONTINUOUS	118.3 (RWYS 18R/36L & 09/27) 118.975 (RWY 18L/36R) 279.55 (EAST) 360.83 (WEST)	121.3 (EAST) 121.7 (WEST)	134.375 ARR 135.3 DEP	
COX DAYTON INTL	CONTINUOUS	119.9 257.8	121.9	125.8	ASR
EASTERN WV REGIONAL/SHEPHERD	0700-2200 TUE-THU 0700-1600 FRI-SAT 1300-1800 SUN O/T BY NOTAM	124.3 236.6	121.8 275.8		
GREENBRIER VALLEY	0900-1900	118.9	121.9		
HARRISON/MARION REGIONAL	0700-2300	126.7 257.925	121.9	127.825	
LYNCHBURG REGIONAL/GLENN	0630-2230	127.65 257.8	121.9	119.8	
MID-OHIO VALLEY REGIONAL	0700-2300	123.7 257.8	121.7	124.55	
MORGANTOWN HART	0700-2300	125.1 257.8	121.7		
OHIO STATE UNIV	0700-2300	118.8 258.3	121.7	121.35	
PERKINSON /BAAF	BY NOTAM	128.2 241.0			
PIEDMONT TRIAD INTL	CONTINUOUS	119.1 290.325	121.9 348.6	128.55	ASR
PORT COLUMBUS INTL	CONTINUOUS	132.7 257.8	121.9 348.6	124.6	
RICKENBACKER INTL	CONTINUOUS	120.05 348.4	121.85 275.8		
ROANOKE REGIONAL/WOODRUM	CONTINUOUS	118.3 257.8	121.9 257.8	118.65	
SMITH REYNOLDS	0645-2130	123.75 257.8	128.35	121.3	
SPRINGFIELD-BECKLEY	0800-1630 TUE-FRI O/T BY NOTAM	120.7 383.1	121.7 241.1		
TRI-CITIES RGNL TN/VA	0600-2400	119.5 257.8	121.7 348.6	118.25	ASR
TRI-STATE/FERGUSON	CONTINUOUS	118.5 257.8	121.9	125.2	ASR
WHEELING OHIO CO	0700-2200 MON-FRI 1500-2000 SAT-SUN	118.1 257.8	121.75		
WRIGHT-PATTERSON AFB	CONTINUOUS	126.9 281.45	121.8 335.8	124.475 269.9	ASR
YEAGER	CONTINUOUS	125.7 257.8	121.8 348.6	127.6	ASR

CLASS B, CLASS C, TRSA AND SELECTED RADAR APPROACH CONTROL FREQUENCIES

Figure 5. Control Tower Hours of Operation

To help separate fast and slow traffic, there is also a speed limit of 200 knots indicated airspeed below 2,500 feet agl within four-nautical miles (nm) of the primary Class D airport.

The Radar Age

Ground-based surveillance radar was introduced to aid ATC in separating aircraft. It exists in many forms and areas of coverage. Today, it's known mainly by two components, air route traffic control centers (or just "center") and terminal radar approach control (Tracon, or "approach").

With radar surveillance to separate aircraft, ATC can reduce the distance between participating aircraft. Intended mainly to separate IFR traffic, ATC may assist VFR traffic by providing flight following. This service allows VFR pilots to receive traffic advisories, but does not relieve them of see and avoid responsibility.

Flight following is available from ATC on a workload-permitting basis.

Airspace Restrictions for Traffic Separation

Air travel continued to expand, and the mixture of fast transport-category aircraft and general aviation aircraft around major airports was thought to be a safety risk.

The FAA hastened the development of radar and ATC following a midair collision between a Lockheed Constellation and a Douglas DC-6 over the Grand Canyon in the 1950s. Similarly, the FAA accelerated its plans for more stringent traffic separation and expanded use of controlled airspace after a midair collision between a Boeing 727 and a Cessna 172 in San Diego in 1978.

As radar became commonplace, the FAA designed new classes of airspace solely to separate IFR and VFR flights in areas of high traffic. These classes of airspace include terminal radar service areas (TRSAs), Class C, and Class B.

Airspace in Detail: The TRSA

In some Class D airspace, traffic sequencing is handled by radar approach together with the tower. In these areas, radar assists the tower outside its Class D airspace. These areas are depicted on sectional charts and are called TRSAs, as shown in Figures 6a and 6b. TRSA radar only assists the tower in Class D airspace; the two function independently. Radio participation in the TRSA is voluntary, though recommended, and the airspace within the TRSA maintains its original class designation. TRSAs are simply Class D airspace surrounded by airspace in which radar coverage is provided.

Figure 6a. TRSA

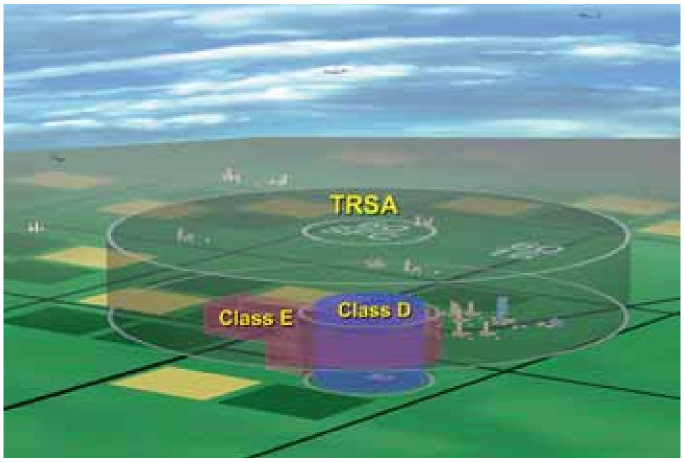


Figure 6b. TRSA

A TRSA is airspace that does not fit the requirements of Class C airspace, but is too busy to be just Class D airspace.

Airspace in Detail: Class C

Class C airspace (see Figures 7a and 7b), has a mandatory communication requirement. Note the differences and similarities between Class C airspace and Class D airspace. Controlled airspace weather minimums are the same for Class C and Class D airspace.

To operate inside or above Class C airspace, all aircraft are required to have a Mode C transponder (up to 10,000 feet msl). In addition, two-way radio communication must be established when operating within Class C. Any aircraft wishing to depart or return to a satellite airport located within Class C airspace must contact ATC approach control prior to entering Class C.

Figure 7a. Class C

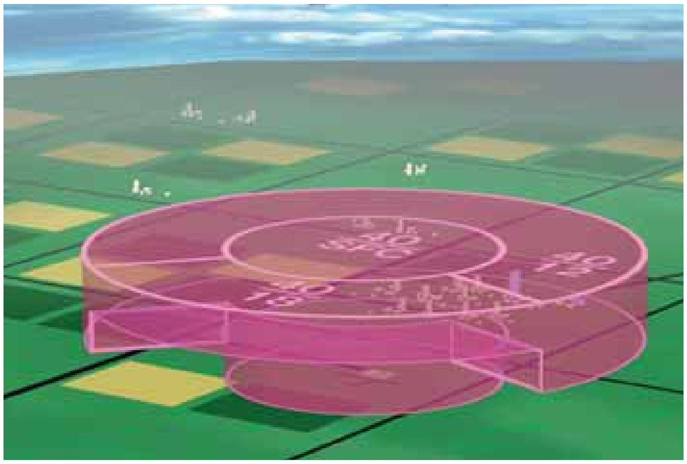


Figure 7b. Class C

Speed is also restricted in Class C airspace to 200 knots below 2,500 feet agl within four nm of the primary airport.

The communication requirement needed to enter Class C and Class D airspace is fulfilled as soon as ATC repeats the **call sign**. However, once communication is established, pilots must comply with *all* ATC instructions or advise otherwise.

Airspace in Detail: Class B

If you imagine Class C airspace as the small town that grew into a large community, then Class B is that same community a decade later. In order to sequence high-speed traffic into heavily used airports — such as in Los Angeles, Dallas-Fort Worth, or New York — ATC needed to guarantee separation of traffic farther from the airport. This meant that all aircraft would have to be positively controlled.

Class B airspace provides for positive control of both VFR and IFR traffic. By enlarging the area of radar coverage, Class B airspace is able to provide separation for all aircraft through a mandatory communication requirement. Due to this increase in radar coverage and mandatory participation by all aircraft, cloud clearances are reduced to clear of clouds with three-miles visibility. Class B airspace can be seen in Figure 8.

To operate in Class B you must receive a clearance; i.e., "**Cleared** into Class Bravo airspace." Unlike other airspace, receipt of a heading, altitude or transponder code does **not** constitute a clearance to enter Class B airspace.

Figure 8. Class B

A Mode C transponder is required within 30 nm of the primary Class B airport, up to 10,000 feet msl. This is called the Mode C veil, which exists even outside the normal boundaries of the Class B airspace proper. Special aeronautical charts, known as terminal area charts (TACs), are published specifically for Class B airspace.

A 250-knot speed limit is imposed within the Class B airspace (just like the rest of the country under 10,000 feet msl), unless you are operating in airspace to an airport underneath the floor of Class B airspace or within a VFR corridor, in which case the speed limit is 200 knots (VFR corridors will be discussed later). Certain Class B primary airports are prohibited for student pilot operations.

Restrictions

Certain activities are prohibited in controlled airspace. Aerobatics are prohibited in Class B, C, D, surface-based Class E airspace and on Victor airways.

Ultralight vehicles and unmanned free balloons above

2,000 feet agl are prohibited in Class B, C, D, and surface-based Class E airspace unless prior permission is granted by ATC.

Transition Routes

Many types of published VFR and IFR routes permit transitions around, under, and through busy and complex airspace. Some require a clearance from ATC, and others do not. There are three general types of VFR routes, described below:

- **VFR flyways** are depicted on VFR terminal area charts and provide the pilot a route in which to transition under Class B airspace in an organized manner. Although these routes do not require a clearance, communication must be established and maintained with any other classes of airspace to be entered — Class C or D, for example. Caution must be exercised because other VFR traffic is likely to be flying the route also.

- **VFR corridors** are "holes" in Class B airspace, with specific horizontal and vertical boundaries through which pilots may transition the airspace without obtaining a clearance or maintaining communication with ATC (see Figure 9). Pilots should be vigilant in looking outside the airplane because VFR traffic tends to cluster in these corridors.

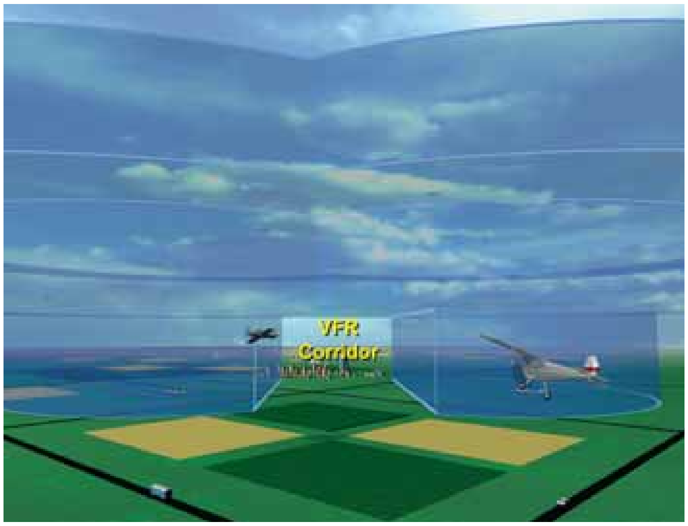


Figure 9. VFR Corridor

- **Class B airspace VFR transition routes** are used to accommodate VFR traffic through certain Class B airspace. These routes are defined on VFR terminal area charts and require a clearance as well as ATC-assigned altitudes. Their purpose is to minimize controller work load by allowing pilots to navigate on a published route through congested airspace. Pilots may receive ATC clearance by advising their position, altitude, route name desired, and direction of flight. Once clearance is received, strict adherence to the route and ATC instructions is required. These routes may not always be available due to traffic flow into or out of the primary airport.

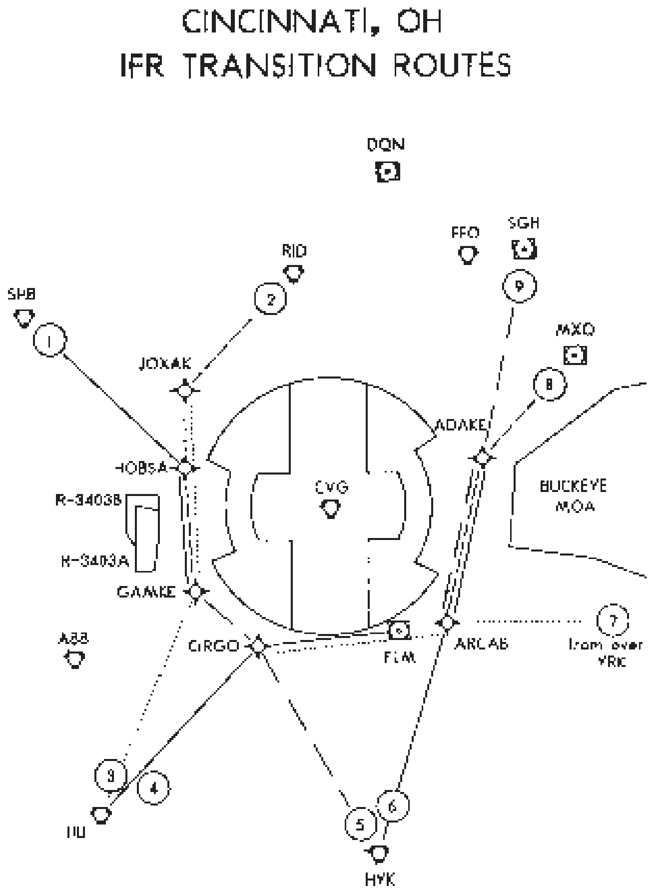


Figure 10. RNAV IFR Terminal Transition Routes

- **RNAV IFR Terminal Transition Routes (RITTRs)** are being added to expedite the handling of IFR traffic through Class B and terminal airspace. These RNAV routes are published in the Airport/Facility Directory. The FAA plans on publishing these routes on IFR en route low altitude charts during the summer of 2005.

It's good practice to read back clearances to ensure that there are no misunderstandings between you and ATC.

Airspace in Detail: Class A

Because most aircraft that fly above 18,000 feet are capable of IFR, Class A airspace was designed to control them. Class A begins at 18,000 feet and goes to 60,000 feet (see Figure 10). IFR clearances are required for all aircraft in Class A airspace, so there are no VFR weather minimums.

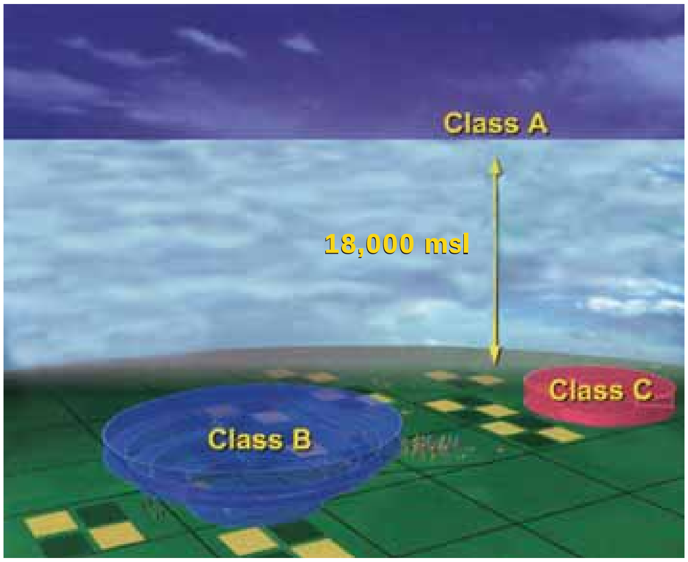


Figure 10. Class A

Aerobatics are prohibited in Class A airspace. Ultralight vehicles and parachute jumps are also prohibited within Class A airspace without prior permission from ATC.

Special VFR

A Special VFR (SVFR) clearance is one that permits take-offs and landings in conditions below basic VFR weather minimums (1,000-foot ceiling and 3-sm visibility). It can be granted within the surface boundaries of Class B, C, D, and E airspace, unless there is a "NO SVFR" noted in the airport information block on the sectional or terminal area chart.

SVFR requires at least one-mile ground or flight visibility and the ability to remain clear of clouds. At night, a SVFR clearance requires that the pilot be instrument-rated and the airplane be equipped for instrument flight. An SVFR clearance only permits the pilot to operate in substandard VFR weather minimums in the selected airspace. Once clear of that airspace, standard weather minimums apply.

But Wait, There's More

Now that you know where you can go, it's time to learn where you cannot. Beyond the two basic types of air-space discussed earlier (controlled and uncontrolled), there are two other types of airspace.

Special Use Airspace

Special use airspace (SUA) was developed to advise pilots of an activity or surface area that dictates special rules or notices and may possibly be hazardous. The scheduled hours of operations for a particular SUA can be obtained from an FSS or a VFR sectional (Figure 11). There are five main types:

SPECIAL USE AIRSPACE ON CINCINNATI SECTIONAL CHART

U.S. P-PROHIBITED, R-RESTRICTED, A-ALERT, W-WARNING, MOA-MILITARY OPERATIONS AREA

NUMBER	LOCATION	ALTITUDE	TIME OF USE	CONTROLLING AGENCY**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

MOA NAME	ALTITUDE OF USE*	TIME OF USE†	CONTROLLING AGENCY**
[illegible]	[illegible]	[illegible]	[illegible]

Figure 11. SUA Scheduled Hours of Operation

- **Prohibited areas** are established for security reasons or for national welfare and are identified on aviation charts by a defined area marked with the letter "P," followed by a number. Prohibited areas are permanently "off limits". An example of a prohibited area is the White House, or Camp David, as shown in Figure 12. Although these areas are charted, it is imperative to check notices to airmen (notams) before you fly. Some prohibited areas such as P-40 (Camp David in Thurmont, MD) may change often.

A pilot flying "GPS-direct" from Frederick, MD to Hagerstown, MD was intercepted by fighter aircraft after penetrating P-40's expanded prohibited area. Pilots must be prepared to divert from normal flight operations to avoid prohibited areas. Check notams, even for local flights.

- **Restricted areas**, shown in Figure 13, though not entirely prohibited to flight activity, are areas in which unauthorized penetration is not only illegal, but also extremely dangerous. Restricted areas are identified on aeronautical charts by a defined area marked with the letter "R," followed by a number. Altitudes and times differ for each restricted area and can be determined by consulting sectional chart legends. Restricted areas generally contain operations that do not mix well with aircraft such as artillery firing, guided missiles, or aerial gunnery. Permission to fly in restricted areas can be given by ATC.

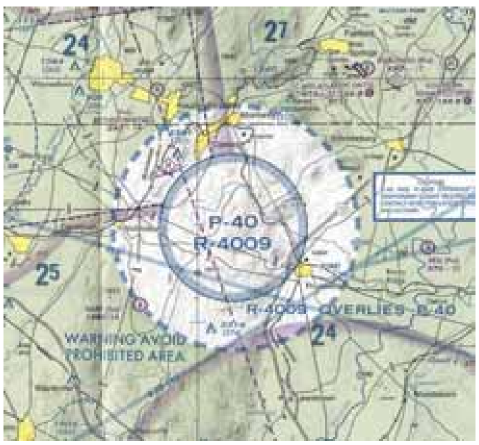


Figure 12. Prohibited Area

Figure 13. Restricted Areas

- **A warning area** is airspace over domestic or international waters that extends from 3 nm beyond shore. Warning areas are advisory in nature and alert pilots that they may be entering areas of hazardous activity (see Figure 14).

- **Military operations areas (MOAs)**, depicted in Figure 15, separate high-speed military traffic from IFR traffic. These areas are identified on aviation charts by a defined area marked with "MOA," preceded by the MOA's name. MOA altitudes differ for each individual area and can be determined by consulting sectional chart legends. Although VFR pilots are not prohibited from entering MOAs, they are cautioned to keep a watchful eye out for military operations such as aerial refueling, air combat training, and formation flying.

Recently, the U.S. Air Force was granted permission to conduct nighttime lights-out training in certain MOAs across the country. During lights-out training, military pilots fly using night-vision goggles (NVGs) and all exterior aircraft lighting is turned off. While GA aircraft are still permitted to fly in these MOAs, pilots should be sure to contact the controlling agency for traffic advisories. To learn more about military lights-out operations please take the AOPA Air Safety Foundation's free online course *Mission: Possible - Navigating Today's Special Use Airspace* **(www.aopa.org/asf/online_courses/mission_possible/)**.

Figure 14. Warning Area

Figure 15. Military Operations Area

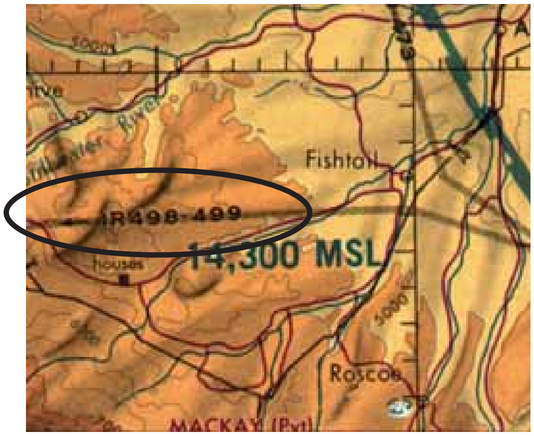


Figure 16. Military Training Route

• **Alert areas** are airspace in which an unusual type of aerial activity or dense pilot training takes place. They advise pilots of possible aerial conflicts, but have no special rules. Alert areas are identified on sectional charts by areas marked with the letter "A," followed by a number. Alert area altitudes differ for each area and can be determined by consulting sectional chart legends.

Airspace Odds and Ends

• **National security areas (NSAs)** are established by notam over areas that require increased security. Pilots may be asked to voluntarily avoid flying over certain areas, or flights within NSAs may be forbidden by temporary flight restrictions (TFRs).

• **Military training routes (MTRs)**, as shown in Figure 16, are one-way high-speed routes for military traffic. They are depicted on sectional charts and are of two types: IR (IFR) and VR (VFR). Routes without a segment above 1,500 feet agl are charted with a four-number identifier, and routes with at least one segment above 1,500 feet agl are charted with a three-number identifier. MTRs can vary in width from four to 16 miles.

Military aircraft are not confined to MTRs, MOAs, and restricted areas. They may be encountered anywhere civil traffic flies. Rest assured, military traffic in or outside of specially designated airspace must adhere to all Federal Aviation Regulations.

In November of 2000, a Cessna 172 and an Air Force F-16 fighter collided south of Tampa, Florida, just outside of the Tampa Class B airspace and near the beginning of a low-altitude military training route. The pilot of the Cessna, a 57-year-old flight instructor and charter pilot, was killed. The F-16 pilot ejected safely.

The Cessna pilot had been receiving VFR traffic advisories from the Tampa TRACON. The F-16 had just been cleared onto a visual MTR and was not communicating with ATC at the time of the accident.

Military aircraft are permitted to exceed the 250-knot speed limit below 10,000 feet msl when cleared onto an MTR. Pilots should be aware that they can encounter high-speed military aircraft at low altitudes outside of MOAs and restricted areas.

• **Air defense identification zones (ADIZ)** exist over the coastal waters of the United States and along the U.S border with Mexico (contiguous ADIZ) and over some land areas (domestic or land-based ADIZ).

Aircraft flying within or through the contiguous ADIZ must be on a flight plan (either IFR or defense VFR, known as DVFR), establish and maintain two-way radio communications with ATC, and squawk a discrete transponder code. Pilots flying through or within the contiguous ADIZ must give an estimated time of ADIZ entry to the FSS. If on an IFR flight plan, ATC will be advised of your position. If on a VFR flight plan, pilots must file their estimated time of ADIZ penetration with the FSS and update this time if it changes by more than 15 minutes. If you do not update this time and your actual ADIZ penetration time differs from the estimated time by more than 15 minutes expect a military interception.

Currently, one land-based ADIZ is charted. This ADIZ is around the Washington, D.C. area and roughly covers the lateral limits of the Baltimore-Washington Class B airspace from the surface to 18,000 feet msl except where it extends to the south. Inside a land-based ADIZ, all aircraft are required to be on a flight plan (file "ADIZ flight plan" in the remarks section), squawk a discrete transponder code, and have two-way communications with ATC. Additional land-based ADIZs may be established by notam.

• **Local airport advisory areas** overlie airports where no control tower is in operation but an FSS is operating. Although they are not charted, they extend 10 sm from the airport. Within the airport advisory area, the FSS gives advisory service to arriving and departing traffic.

• **Parachute jump areas** are published locations where parachuting operations occur. They are found in the Airport/Facility Directory and on sectional charts (see Figure 17). Pilots should take care to remain clear of these areas. Aside from spotting jumpers visually, you can learn when jumpers are in the air by monitoring the appropriate ATC frequency found on instrument en route, approach charts, sectionals and terminal area charts. When in the air, flight following is an excellent and quick source of jump information. Many jump operators also broadcast jump alerts on the common traffic advisory frequency (CTAF) for airports where parachute landing areas are located.

VFR charts also depict glider, hang glider, and ultralight operations areas with symbology as shown in Figure 17.

• **Temporary Flight Restrictions (TFRs)** may be imposed to keep aircraft from entering certain areas. TFRs are often issued on very short notice, for a variety of reasons, and have become more prevalent since September 11, 2001. TFRs are issued by notams (see FAR 91.137).

Because of the last-minute nature of many TFRs, all pilots must use extra caution. Know where you are at all times, and obtain at least a standard preflight briefing from an FSS and request notams before your flight. As pilot in command, it is your responsibility to avoid all TFRs.

TFRs are established for a variety of reasons including:

- Protection of persons and property when low flying aircraft would increase a hazard over a ground incident.
- Providing a safe environment for disaster relief.
- Preventing unsafe congestion of sightseeing aircraft above an incident or event with a high degree of public interest.

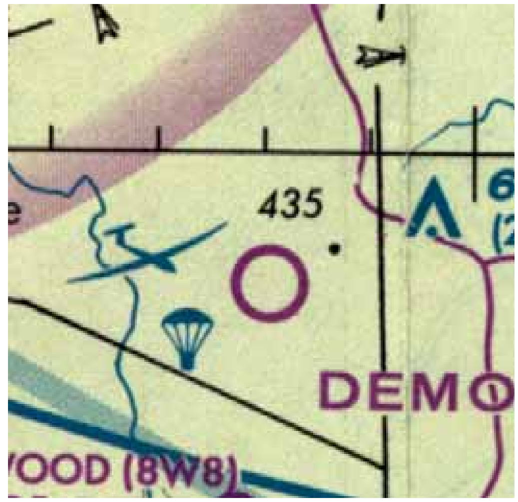


Figure 17. Glider and Parachute Jump Areas

- Protecting the President, Vice President, or other public figures.
- Providing a safe environment for space agency operations.

For more information on TFRs, visit http://www.faa.gov/ATS/ATA/ai/TFR_AC_91-63C.pdf

A pilot was flying in the vicinity of Washington, D.C. when he diverted to avoid flying into weather. He was not in radio contact with ATC, so he remained clear of the Class B airspace. However, in doing so, he inadvertently penetrated the ADIZ around Washington, DC. He was intercepted and escorted to a nearby aiport by fighter aircraft.

The following is an example of a TFR notam:

FLIGHT RESTRICTIONS ST. MARYS, GA. EFFECTIVE IMMEDIATELY UNTIL FURTHER NOTICE. PURSUANT TO 14 CFR SECTION 99.7 SPECIAL SECURITY INSTRUCTIONS. FLIGHT RESTRICTIONS ARE IN EFFECT DUE TO NATIONAL SECURITY. EXCEPT FOR RELIEF AIRCRAFT OPERATIONS UNDER DIRECTION OF THE COMMANDER, KING BAY NAVAL BASE. ALL OPERATIONS ARE PROHIBITED WITHIN THE AIRSPACE FROM THE SURFACE UP TO BUT NOT INCLUDING 3000 FEET MSL WITHIN A 2 NAUTICAL MILE RADIUS OF 3048N/08131W AND THE CRAIG/CRG/ VORTAC 002 DEGREE RADIAL AT 27 NAUTICAL MILES. JACKSONVILLE TRACON 904-741-0767 IS IN CHARGE OF THE OPERATION. MACON/MCN/ AFSS 478-784-1155 IS THE FAA COORDINATION FACILITY.

- **Blanket notams** are issued for a group of restrictions or a change of operations.

Examples of blanket notams include:

- Voluntary avoidance of airspace near nuclear power plants, power plants, dams, refineries, industrial complexes, military facilities and other similar potentially sensitive facilities.

- Restrictions below 3,000 feet agl within a three-nm radius of any stadium having a seating capacity of 30,000 or more people in which a major league baseball, national football league, NCAA Division I football, or a major motor speedway event is occurring. These restrictions begin one hour before the scheduled start time of the event and expire one hour after the end of the event.

- A requirement for all pilots, if capable, to maintain a listening watch on the 121.5 emergency frequency and review intercept procedures as published in the Aeronautical Information Manual (see page 13).

Know Before You Go Checklist

Educate yourself about security-related airspace using free AOPA Air Safety Foundation online courses!

- Know Before You Go
  www.aopa.org/asf/online_courses/know_before/

- Mission: Possible - Navigating Today's Special Use Airspace
  www.aopa.org/asf/online_courses/mission_possible/

- ADIZ Interactive Presentation
  www.aopa.org/adiz/adiz.html

Graphical TFR Depictions

- AOPA's Real-Time Flight Planner
  www.aopa.org/flight_planner/intro.html

- FAA's TFR Web site
  http://tfr.faa.gov/tfr/jsp/list.jsp

Special Use Airspace

- AOPA's Special Use Airspace Web site
  www.aopa.org/members/airports/sua.cfm

- FAA's Special Use Airspace Web site
  www.sua.faa.gov

For more FREE information on these and other aviation safety topics, visit:

AIR SAFETY AOPA FOUNDATION

ONLINE**SAFETY**CENTER
www.aopa.org/safetycenter

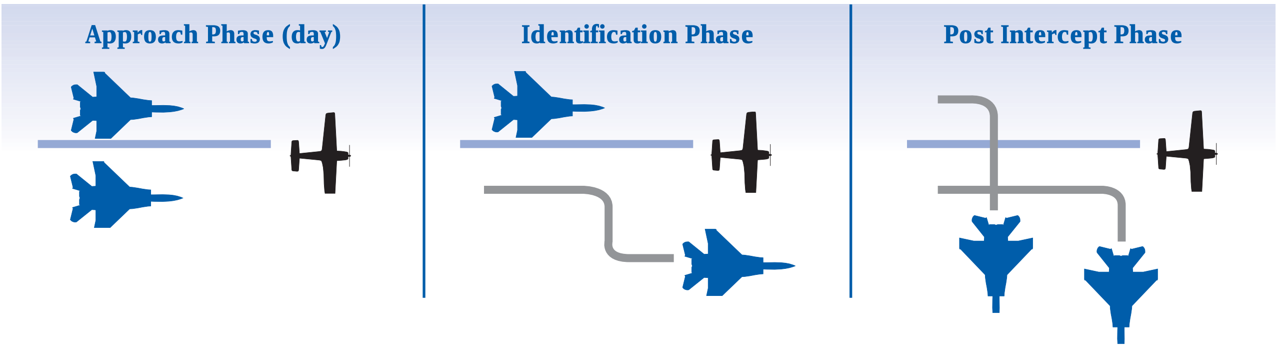
IN-FLIGHT INTERCEPT PROCEDURES

Law Enforcement Aircraft	Meaning	Intercepted Aircraft	Meaning
Rocks wings. After acknowledgement initiates a slow level turn, normally to the left, onto the desired heading.	You have been intercepted. Follow me.	Rocks wings and follows. (Also, at night flash navigational lights.)	I understand and will comply.
Performs an abrupt breakaway maneuver consisting of a climbing 90-degree turn, or more, without crossing the intercepted aircraft's flight path.	You may proceed.	Rocks wings.	I understand and will comply.
Circles airport, lowers landing gear, and overflies runway in the direction of landing.	Land at this airport.	Lowers landing gear, follows the law enforcement aircraft and lands if the runway is considered safe. (Also, at night turn the landing lights on.)	I understand and will comply.

Intercepted Aircraft	Meaning	Law Enforcement Aircraft	Meaning
Raises landing gear while flying over runway between 1,000' and 2,000', and continues to circle the airport.	This airport is inadequate.	If the intercepted aircraft is requested to go to an alternate airport, the law enforcement aircraft raises its landing gear and uses the intercept procedures.	Understood, follow me.
The pilot switches on and off all available lights at regular intervals.	Cannot comply.	Performs the breakaway maneuver.	Understood.
The pilot switches on and off all available lights at irregular intervals.	In distress.	Performs the breakaway maneuver.	Understood.

If you are intercepted by a U.S. Military or law enforcement aircraft, immediately:

1. Follow the instructions given by the intercepting aircraft. (See chart above.)
2. Notify ATC, if possible.
3. Attempt to communicate with the intercepting aircraft and/or ATC on the emergency frequency **121.5 MHz**, giving the identity and position of your aircraft and the nature of the flight.
4. If equipped with a transponder, squawk 7700, unless otherwise instructed by ATC. If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual or radio signals, request clarification while continuing to comply with the instructions given by the intercepting aircraft.



Cut-out and retain for reference.

Communication Requirements and Weather Minimums

Features	Class A	Class B	Class C	Class D	Class E	Class G
Entry Prerequisites	ATC Clearance	ATC Clearance	IFR: Clearance VFR: Radio Contact	IFR: Clearance VFR: Radio Contact	IFR: Clearance and Radio Contact	None
Minimum Pilot Qualifications	Instrument Rating	Private Cert./ Endorsed Student Cert.*	Student Cert.	Student Cert.	Student Cert.	Student Cert.
Two-way Radio Communication	Yes	Yes	Yes	Yes	IFR Only	No
VFR Min. Vis. Below 10,000 MSL	N/A	3 miles	3 miles	3 miles	3 miles	Day-1 mile Night-3 miles
VFR Min. Vis. 10,000 MSL and above	N/A	3-miles	3 miles	3 miles	5 miles	5 miles
VFR Cloud Clearance Below 10,000 MSL	N/A	Clear of clouds	500 below 1,000 above 2,000 horiz.	500 below 1,000 above 2,000 horiz.	500 below 1,000 above 2,000 horiz.	500 below 1,000 above 2,000 horiz.**
VFR Cloud Clearance 10,000 MSL and Above	N/A	Clear of clouds	500 below 1,000 above 2,000 horiz.	500 below 1,000 above 2,000 horiz.	1,000 below 1,000 above 1 mile horiz.	1,000 below 1,000 above 1 mile horiz.

* Student pilot operations at some Class B airports are prohibited.
** Day—1,200 AGL and below—Clear of Clouds

Cut-out and retain for reference.

Got notams?

Form Approved OMB NO. 2120-0026

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

FLIGHT PLAN

(FAA USE ONLY) ☐ PILOT ☐ VNR ☐ STOPOVER

TIME STARTED | SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
VFR					PROPOSED (Z)	ACTUAL (Z)	
IFR			KTS				
DVFR							

8. ROUTE OF FLIGHT

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES		17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	

16. COLOR OF AIRCRAFT

CIVIL AIRCRAFT PILOTS. FAR Part 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed $1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.

FAA Form 7233-1 (8-82)

CLOSE VFR FLIGHT PLAN WITH ____________________ FSS ON ARRIVAL

1-800-WX-BRIEF

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