

Why do we need to know about airspace?

It's a rule, actually lots of rules.

§ 91.155 Basic VFR weather minimums.

(a) Except as provided in paragraph (b) of this section and § 91.157, no person may operate an aircraft under VFR when the flight visibility is less, or at a distance from clouds that is less, than that prescribed for the corresponding altitude and class of airspace in the following table:

CFR § 91 Subpart C—Equipment, Instrument, and Certificate Requirements

Transponder and ADSB requirements in Class C and within the Mode C Veil of Class B, radio communication equipment, and navigation equipment.

§ 91.126 - § 91.145 Operations in Airspace

When we need to talk to controllers—operating on or in the vicinity of some airports, in some controlled airspace, and in some TFRs.

§ 91.117 Aircraft speed.

We don't generally care about speed limits, but they do exist.

Airspace—Speed Limits

Airspace	Altitude	Speed Limit
All	Less than 10,000' MSL	250 kts
Within 4 nautical miles of the primary airport of a Class C or Class D	Below 2,500' AGL	200 kts
Class B	Below 10,000' MSL	250 kts
Class B	Above 10,000' MSL	Unlimited
Under Class B Shelf	All	200 kts
Class B VFR Corridor	All	200 kts
All airspace between 30 nm and 60 nm centered on 385134N/0770211W or the DCA VOR/DME	Less than 10,000' MSL	230 kts
Aircraft may operate at minimum safe speed—even if it is greater than the maximum in this section.		
ATC may authorize speeds greater 200 kts in Class C and D.		

Definitions

VFR, VMC

Visual Flight Rules (VFR) are the rules for aircraft equipment and pilot qualifications that apply when the pilot can remain in **Visual Meteorological Conditions (VMC)**—the visibility and distance from clouds required by § 91.155 Basic VFR weather minimums. VMC conditions vary by airspace classification.

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.

The rules for Visual Meteorological Conditions (VMC) in Class G airspace are a bit more complicated.

Airspace	Flight visibility	Distance from clouds
Class G:		
1,200 feet or less above the surface (regardless of MSL altitude)		
Day, except as provided in §91.155(b)	1 statute mile	Clear of clouds.
Night, except as provided in §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.

IFR, IMC

If a pilot cannot remain in Visual Meteorological Conditions (VMC) they will be in Instrument Meteorological Conditions (IMC). If a pilot gets permission from Air Traffic Control (ATC) (it's called an IFR clearance) they may fly in IMC as long as both the plane and pilot are capable of complying with Instrument Flight Rules (IFR).

The weather doesn't have to be below VMC minimums for pilots to fly under IFR. The airliners and most chartered airplanes fly under IFR because they fly in Class A airspace where only planes on an IFR flight plan are allowed. Many pilots opt to file an IFR flight plan if they are flying into Class B airspace or flying where there are Temporary Flight Restrictions (TFRs) such as when the President is visiting an area. An IFR flight will get a clearance that looks something like this.

N170EA, cleared to the Aspen airport as filed,
climb and maintain 8,000',
expect 16,000' 10 minutes after departure.
Departure frequency 126.1. Squawk 0204.

MSL altitude above mean sea level. This is the altitude that appears on your altimeter when you set the altimeter.

AGL is the altitude above the ground.

Flight Levels Altimeter reading when the altimeter is set to 29.92 in Class A.

ADSB Out Provides the location and altitude to ATC and other aircraft.

ADSB In Aircraft equipped with ADSB In can receive the location of nearby aircraft and get weather information.

Clearance Permission from ATC. Includes IFR route and altitude instructions; permission to taxi, take off, and land; and permission to enter Class B airspace.

ATC Air Traffic Control. Clearance Delivery provides clearances IFR clearances and instructions at some airports. Ground Control handles aircraft on taxiways. Tower handles aircraft landing and departing. Approach/Departure control handle aircraft entering or leaving the airport environment. Center handles aircraft enroute.

Class A

At or above 18,000' and below FL 600

Class A airspace is not shown on the charts because it overlies everything.

Altimeter Setting: When the aircraft passes through 18,000' the pilot sets the altimeter to 29.92". There are two reasons. First, the aircraft is flying so fast that they'd have to change the altimeter every 15 minutes or so. Second, there is nothing but other airplanes to hit up there. If everyone sets their altimeter to 29.92 then separation by altitude is assured.

Flight Levels: We refer to the altitude as flight level and pilots fly at even thousand flight levels. e.g. FL 220, FL 230.

IFR Required: Both the pilot and aircraft must be IFR capable and current.

Class G

Usually all airspace below 1,200' AGL

Class G airspace (uncontrolled) is that portion of airspace that has not been designated as Class A, Class B, Class C, Class D, or Class E airspace. AIM 3-3-1

Class G airspace is not usually shown on the charts because it underlies everything. There used to be a lot of Class G airspace above 1,200' AGL because of limited radar coverage, but I can't find any except off the coast and one spot in New Mexico.

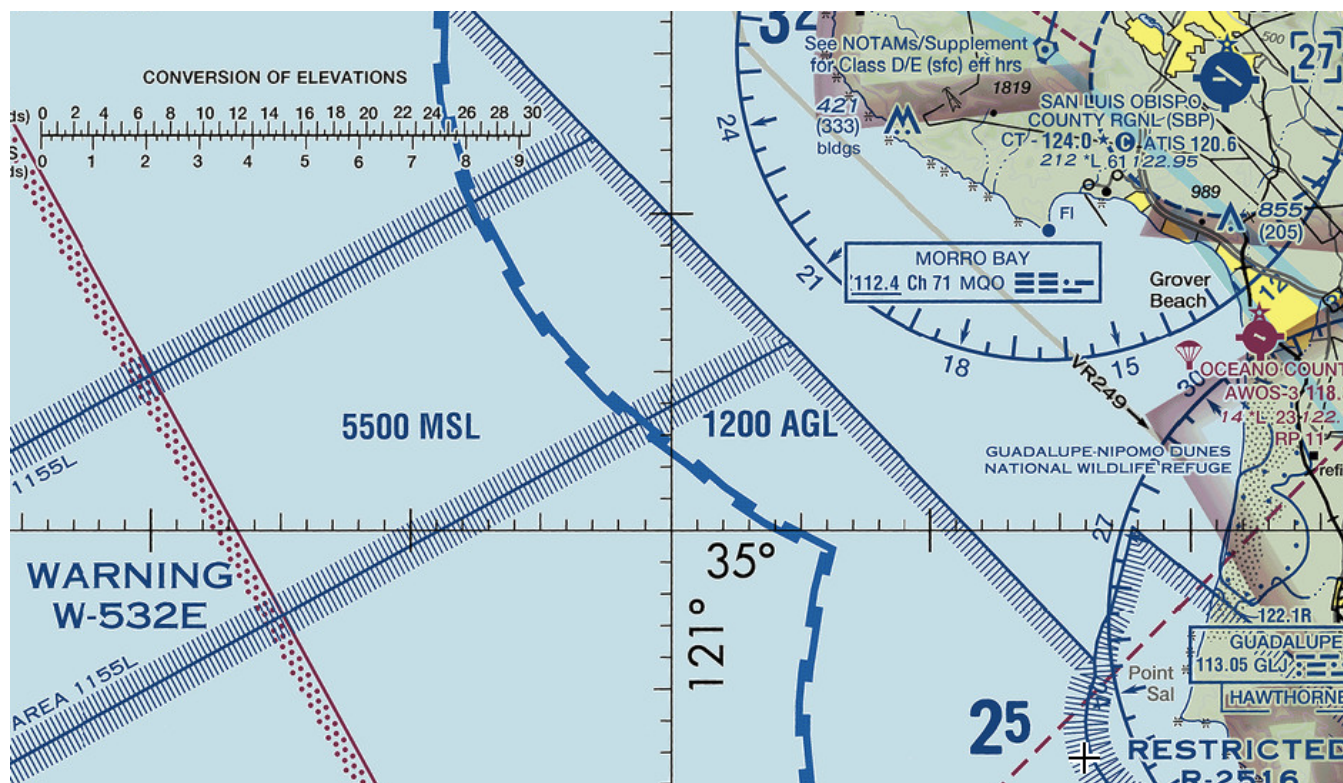
Class G airspace is usually from the surface to 700' or 1,200' Above Ground Level (AGL) depending on where the overlying Class E airspace starts.

Class G when the Tower is Closed: Many Class D airports have towers that close at night. They revert to either Class G or Class E airspace when the tower is closed. For Class E designation, aircraft must be able to maintain radio contact with ATC down to the surface and the airport must meet specific weather reporting requirements. Otherwise it is Class G.

KSMX and KSBP are Class G when the tower is closed.
Oceano, Lompoc, and Santa Ynez are always Class G.

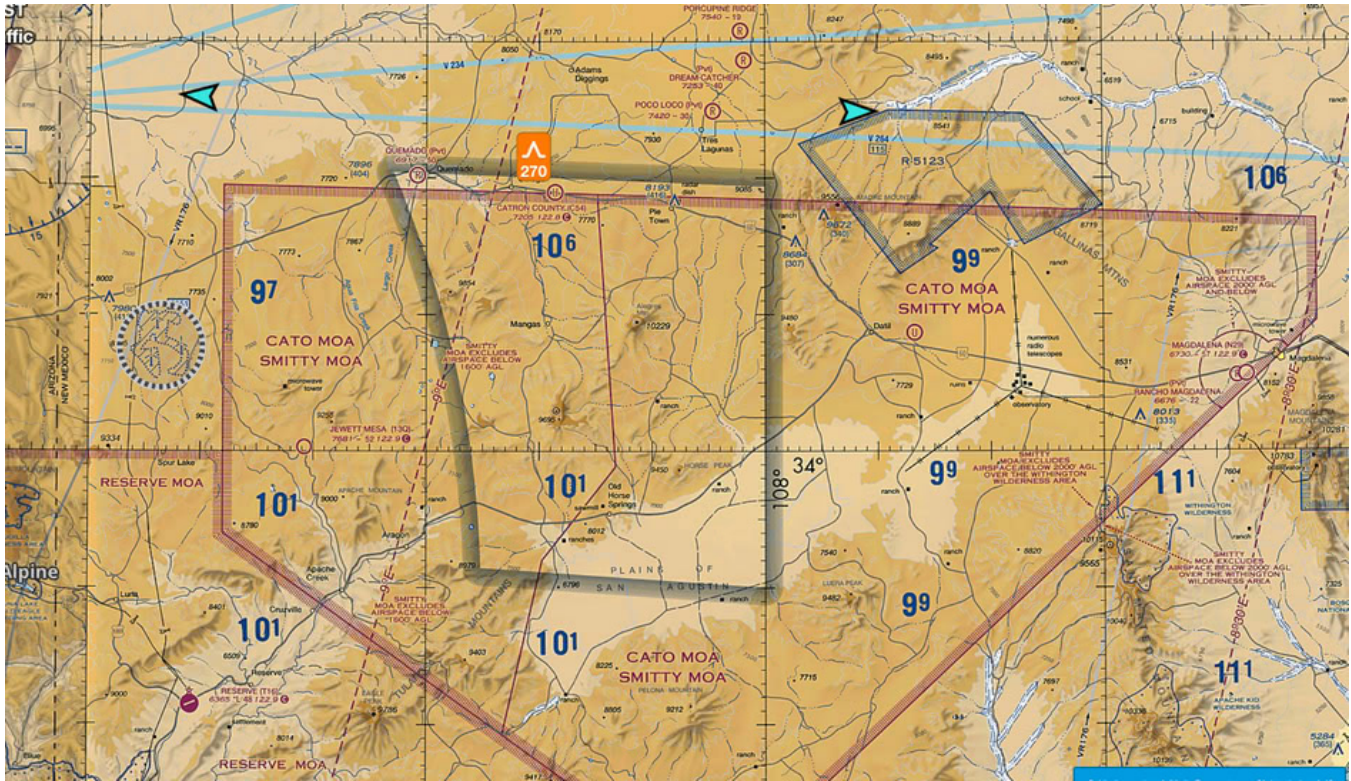
An Example of Class G on the Chart

The jagged blue line indicates that to the left Class G exists from the surface to 5,500' MSL (Feet above Mean Seal Level). To the right it exists from the surface to 1,200 AGL. Technically they indicate the floor of the Class E.



Another Example of Class G on the Chart

It's hard to find Class G over the ground. This example in New Mexico is the only one I can find in the lower 48. The Class G is the inside of the bluish vignette and goes from the surface to 14,500'. There used to be lots of Class G airspace in the southwest and in places like North Dakota and Wyoming but radar coverage has improved over the years and not this is the only space left.



Class E

The majority of the airspace we fly in is Class E.

Class E airspace is that portion of controlled airspace that has not been designated as Class A, Class B, Class C, or Class D.

Class E airspace is not usually shown on the charts because it overlies everything. The exceptions are extensions to airport surface areas to cover instrument approaches, airports that are designated as Class E, and Class E that is next to Class G that does not end at 1,200' AGL.

Requirements: There are no special requirements for aircraft or airmen in Class E airspace. Radios, transponders, and ADSB are not required except when at or above 10,000 feet msl, excluding airspace at and below 2,500 feet agl;

KPRB is a Class E airport. KSBA is Class E when the tower is closed.

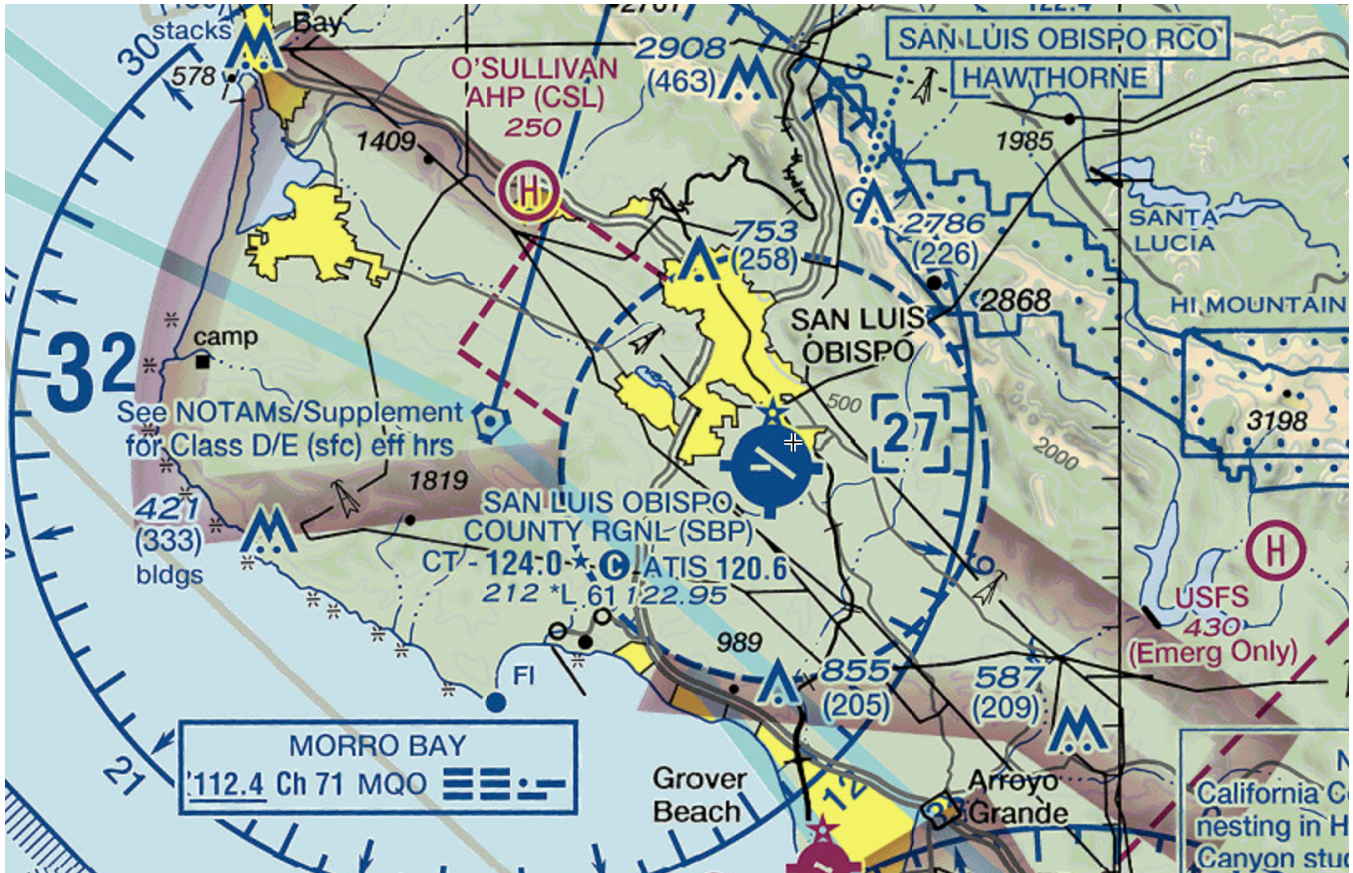
An Example of Class E Airport with Extension

The dashed magenta line indicates that Class E goes to the surface. The shaded magenta vignette indicates that class E goes to 700' and below that is Class G.



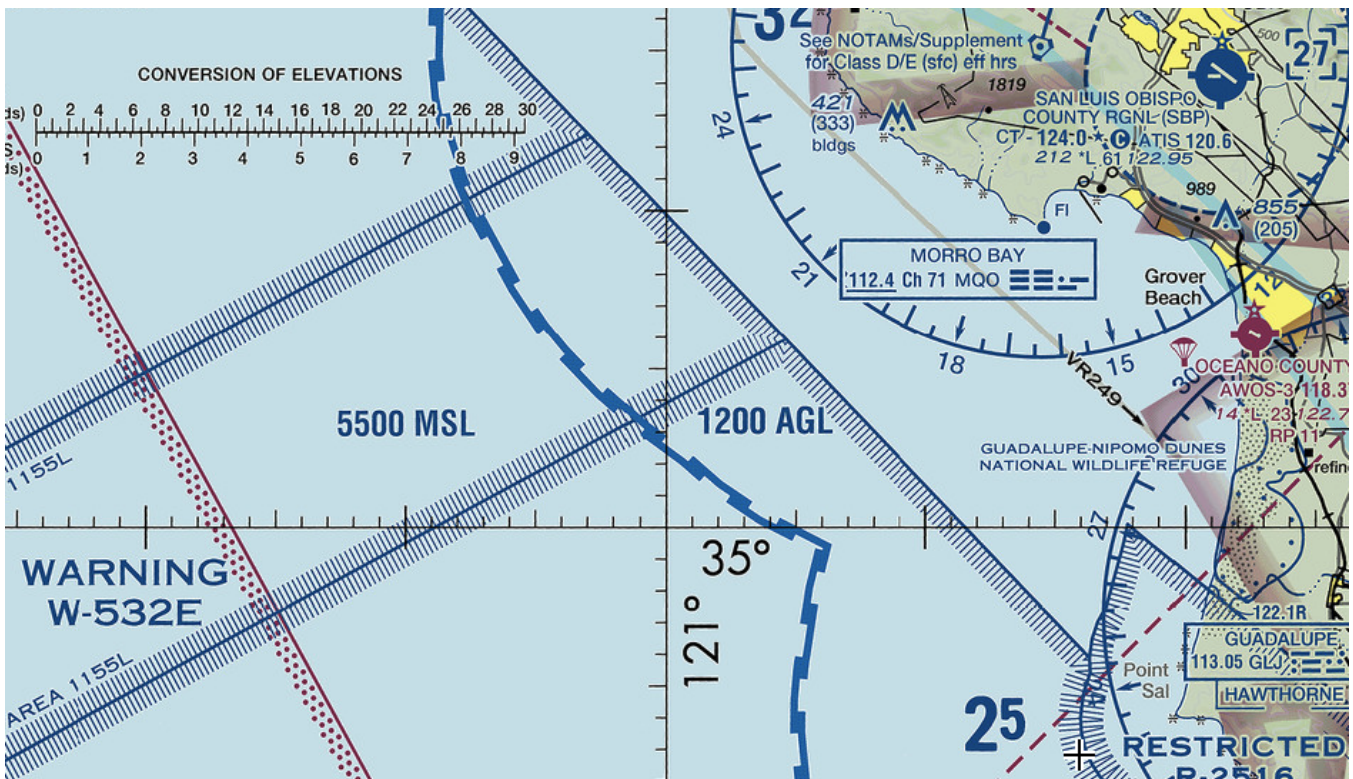
An Example of Class D Airport with Extensions

The dashed magenta line indicates that Class E goes to the surface. The shaded magenta vignette indicates that class E goes to 700' and below that is Class G.



Another Example of Class E on the Chart

The jagged blue line indicates that to the left Class E starts at 5,500' MSL (Feet above Mean Seal Level). To the right it starts normally at 1,200 AGL.



Class D

The majority of the airports in the US with control towers are Class D.

Generally, Class D airspace extends upward from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower.

Class D airspace can be very busy like Van Nuys (KVNY), Long Beach (KLBG), or Teterboro (KTEB) or with few operations like Santa Maria (KSMX) or Salinas (KSNS).

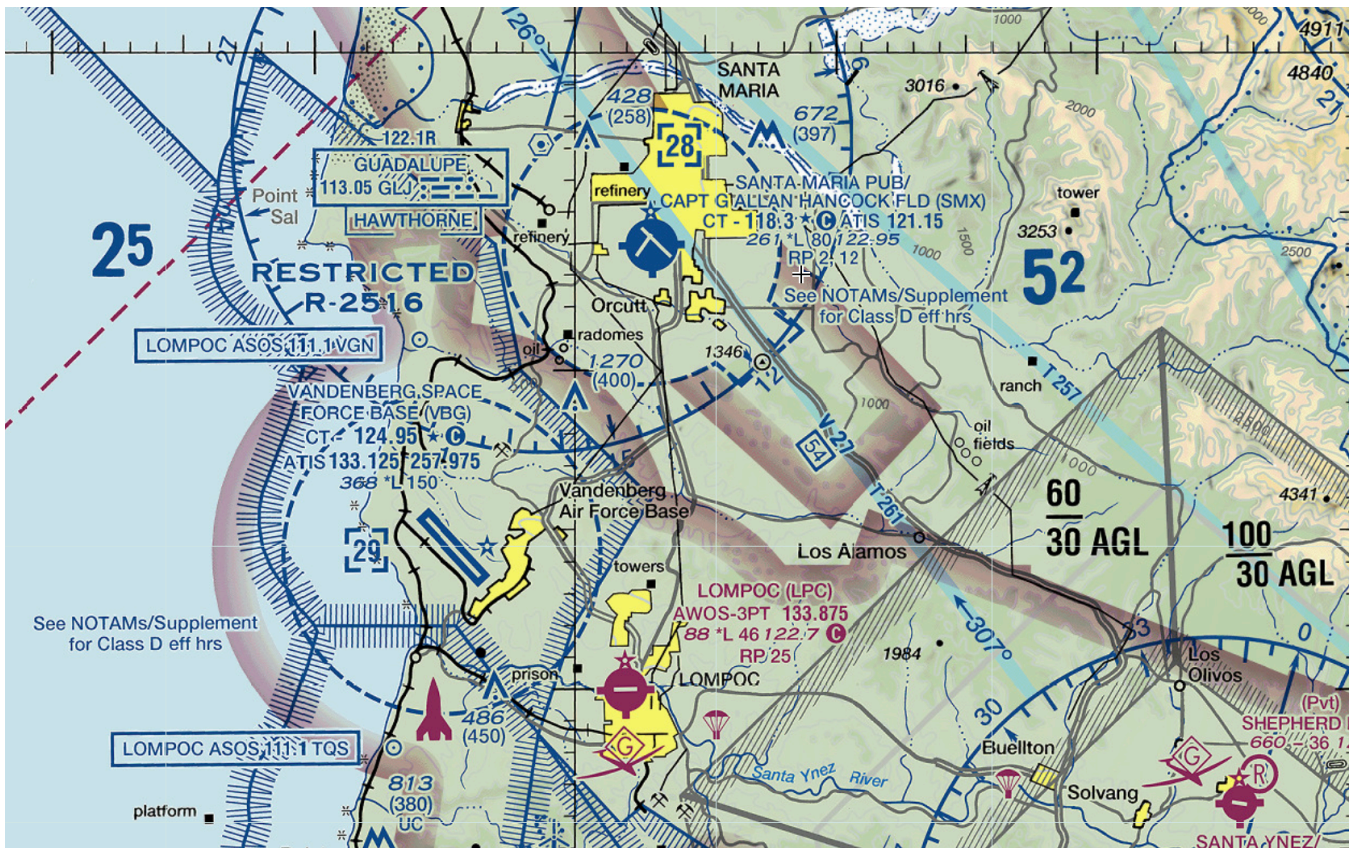
Requirements: All aircraft must establish communications with the tower before entering the airspace – preferably 10 nm out. Aircraft must contact Ground Control before taxiing. Controllers expect pilots to indicate that they have the current ATIS.

Transponders and ADSB are not required.

KSBP and KSMX are a Class D airports that revert to Class G when the tower is closed.

Examples of Class D on the Chart

Vandenberg and Santa Maria are both Class D airports as indicated by the blue symbols. The runway at Vandenberg is longer than 8,068' so it is shown to scale. Note the numbers in brackets in the circle [28] and [29]. They indicate the upper bound of the Class D in feet above sea level (MSL).



Class C

There are 120 Class C Airports in the US.

Generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. AIM 3-2-4

Class C airspace can be very busy like San Jose (KSJC) or Santa Ana (KSNA) or not at all stressful to fly into like Santa Barbara (KSBA) or Monterey (KMRV).

Requirements: All aircraft must establish communications with approach control 20 nm out. Controllers expect pilots to contact Clearance Delivery before taxiing to get taxi instructions, instructions for leaving the airspace and that they have the current ATIS. Pilots must contact Ground Control before taxiing.

Transponders and ADSB are required.

KSBA, KMRV, KSJC are a Class C airports that revert to Class E when the tower is closed. KSNA reverts to Class G when the tower is closed.

Example of Class C on the Chart

Indianapolis is a Class C airport as indicated by the magenta rings around the airport. The runways are longer than 8,068' so they are shown to scale. Note the magenta numbers over top of each other. They indicate the upper and lower bound of the Class C in feet above sea level (MSL) 48/21 and 48/SFC.



Another Example of Class C on the Chart

Santa Barbara is a Class C airport as indicated by the magenta rings around the airport. The ring in this case does not make a complete circle because of the mountains to the north. The runways are less than 8,068' so they are not shown to scale. Pilots must contact Approach Control on 125.4 if they are approaching from the east and 120.55 if they are approaching from the west.



Class B

There are 39 Class B Airports in the US.

Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements. AIM 3-2-3

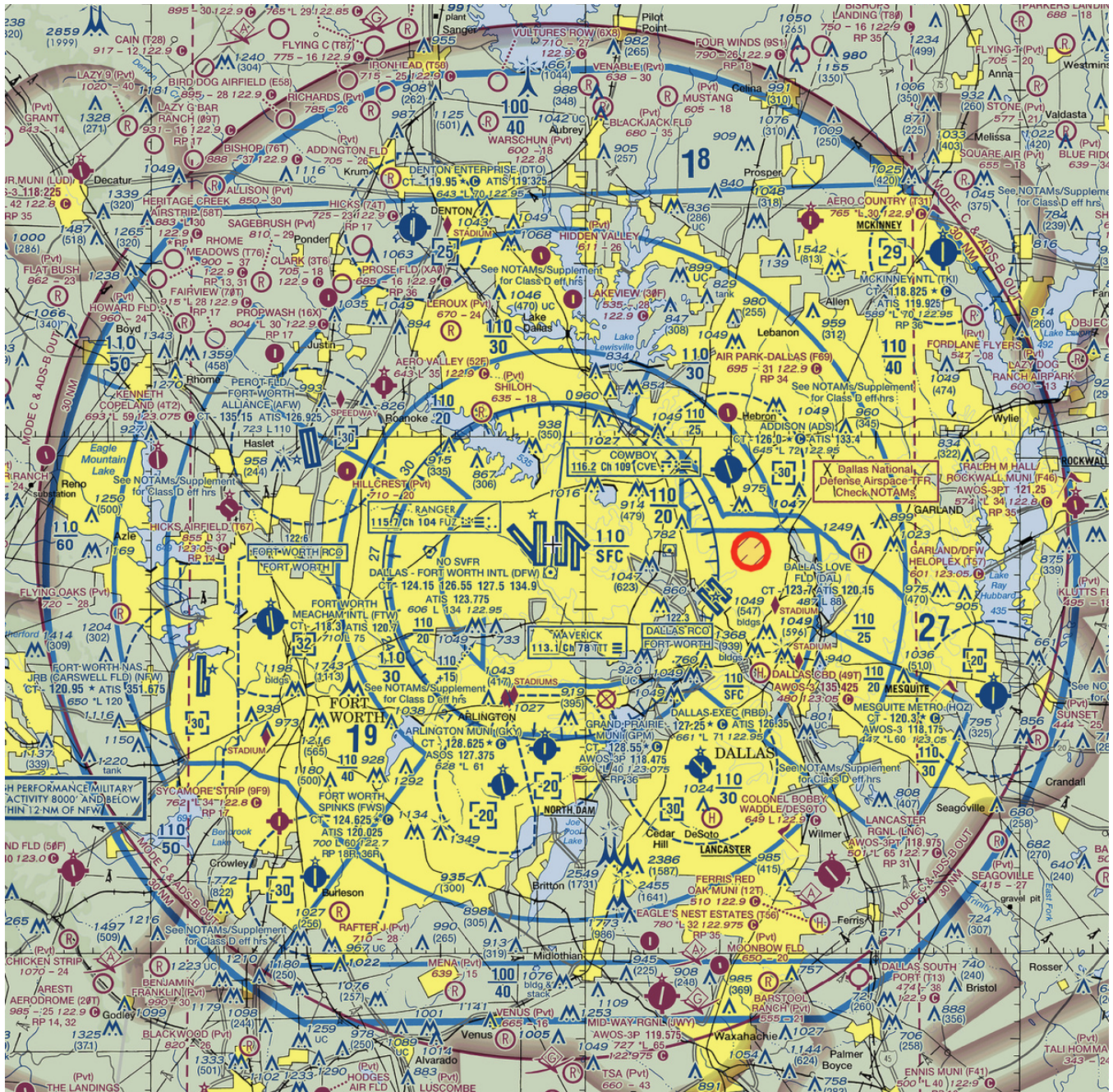
Class B airspace can be very busy with multiple Class B airports close by like New York/New Jersey (KJFK, KLGA, and KEWR) and DC with Reagan, Dulles, Andrews AFB, and Baltimore/Washington (KDCA, KIAD, KADW, KBWI). Or extremely busy with just one airport like Atlanta (KATL)—the world's busiest airport.

Requirements: All aircraft must receive clearance to enter the Class B airspace. communications with approach control 20 nm out. Controllers expect pilots to contact Clearance Delivery before taxiing to get taxi instructions, instructions for leaving the airspace, and that they have the current ATIS. Pilots must contact Ground Control before taxiing. Often there are different controllers for landing and departing aircraft.

Transponders and ADSB are required within 30 nm (Mode C Veil).

I believe that the towers in Class B airports never close, except for some military Class B airports.

Dallas-Fort Worth (KDFW) and Love Field (KDAL)



Atlanta KATL

Atlanta is a Class B airport as indicated by the blue rings around the airport and the Mode C veil. It is unusual in having rectangular inner areas instead of inner rings.



Visualizing Airspace Classes

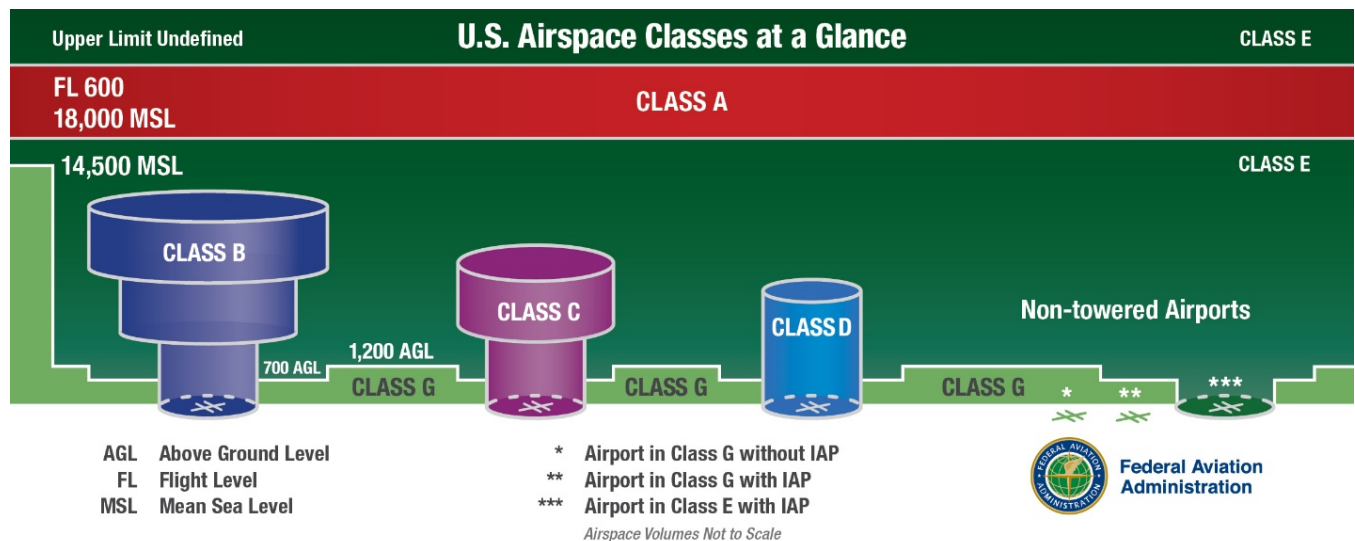
Very simplified way of looking at airspace.

Very few Class B and C airports like this mostly because they are usually in congested airspace, have runways that require different protected areas, or they have geography that makes the standard form unworkable. The canonical Class B goes from the surface to 10,000' MSL and is shaped like a wedding cake. There is a 30 nm ring around the central airport in the Class B where transponders and ADSB are required. The airspace is configured to enclose all of the instrument approaches to the airport.

The AIM 3-2-4 says that the airspace usually consists of a 5 NM radius core surface area that extends from the surface up to 4,000 feet above the airport elevation, and a 10 NM radius shelf area that extends no lower than 1,200 feet up to 4,000 feet above the airport elevation.

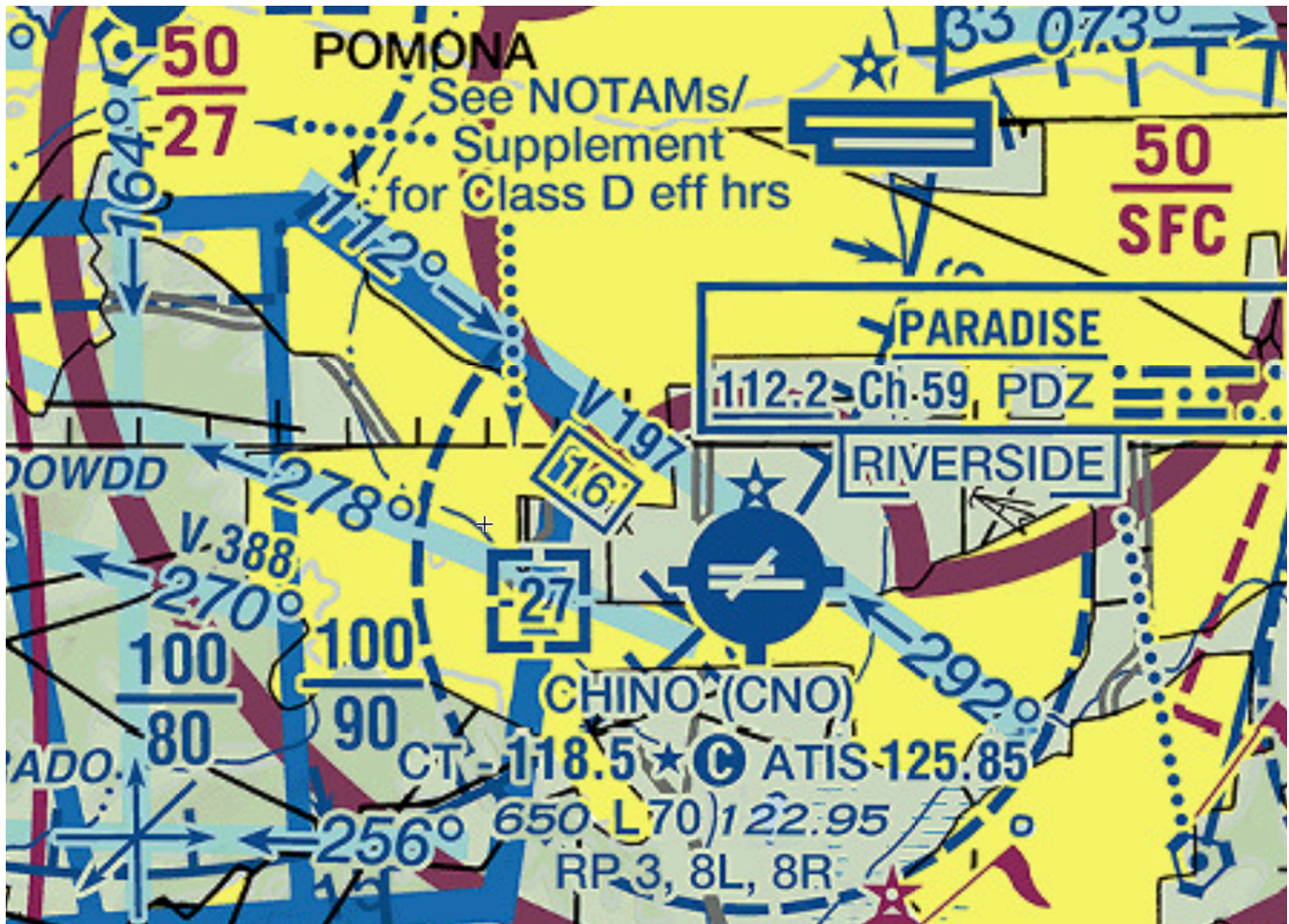
Lots of Class D are usually 4 nm in diameter and go to 2,500' above the surface.

Aircraft within 4 Nautical Miles (NM) of the primary airport in Class D and C and below 2,500 feet must maintain an Indicated Airspeed (IAS) of 200 knots or less.



Nerding Out On Airspace

On the west side of Chino, the Class D goes up to but not including 2,700' MSL. From 2,700' to 5,000' is Class C. Above that is Class E until 9,000'. Class B is from 9,000' to 10,000'. Class E then goes to 18,000' where Class A starts. Above FL 600 Class E starts again.



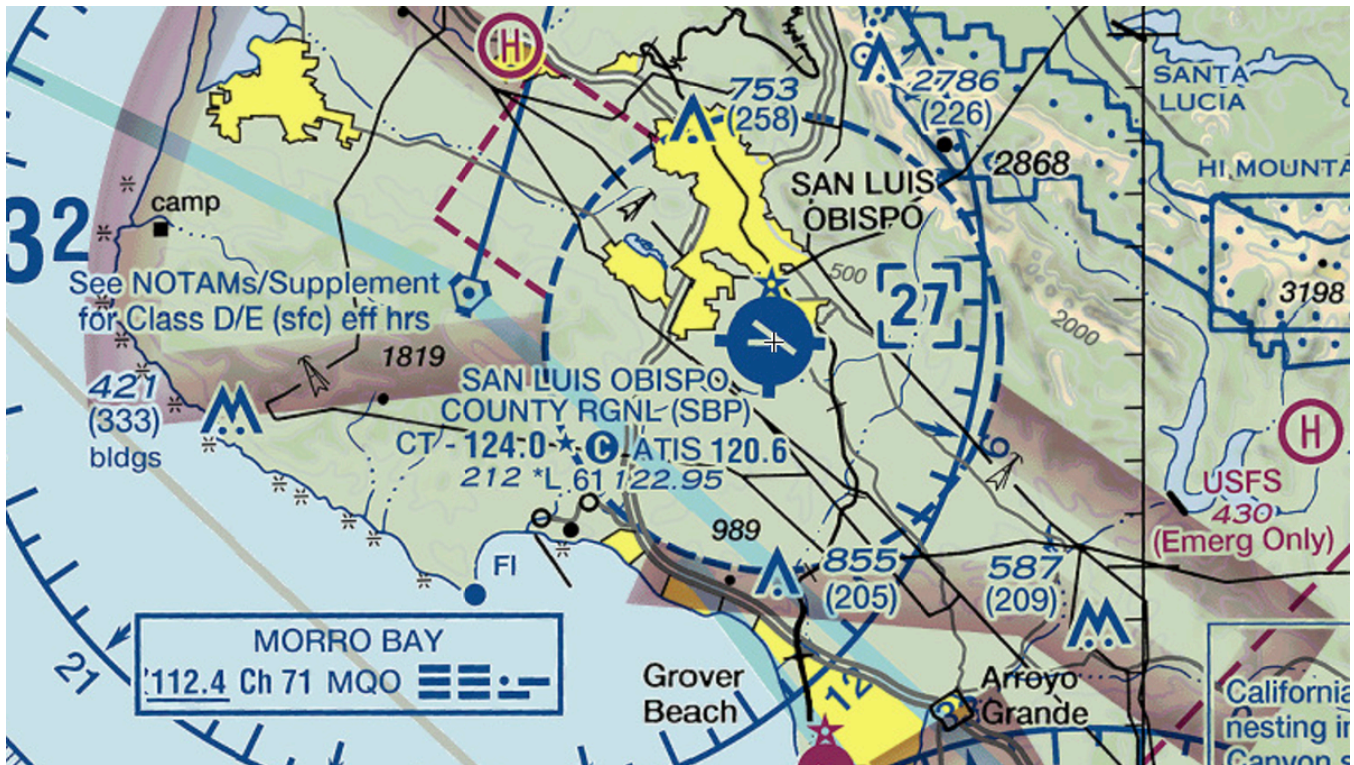
More Nerding Out On Airspace

On the west side of the Moffett runway by the star, the Class D goes up to but not including 2,500' MSL. From there to 4,000' is Class C. Above that is Class B to 10,000'. Class E then goes to 18,000' where Class A starts. Above FL 600 Class E starts again.



Airport Information on the Chart

Name, Tower and ATIS, elevation, lighting, runway length



The name of the airport is San Luis Obispo County Regional. The code is SBP.

There is a control tower, indicated by the blue airport circle enclosing the runways. The star on top of the circle indicates that there is a rotating beacon. The tower frequency is 124.0 and the star indicates that it is part time. The C says that when the tower is closed the Common Traffic Advisory Frequency is the same as the tower. ATIS is 120.6.

The elevation is 212' MSL. There is pilot controlled lighting * and the longest runway length is 6,100'. Services can be reached on 122.95.

Decoding Airport Information

The legend is on the back of the VFR charts.

Most airports do not have all of the elements.

AIRPORT DATA

Box indicates FAR 93
 Special Air Traffic Rules & Airport Traffic Patterns.

Runways with Right Traffic Patterns (public use)
 *RP Special conditions exist - see Supplement.

FSS - Flight Service Station
 NO SVFR - Fixed-wing special VFR flight is prohibited.
 CT - **118.3** - Control Tower (CT) - primary frequency
 ★ - Star indicates operation part-time. See tower frequencies tabulation for hours of operation.
 Ⓢ - Follows the Common Traffic Advisory Frequency (CTAF)
 ATIS **123.8** - Automatic Terminal Information Service

AFIS **135.2** - Automatic Flight Information Service (AK)
 ASOS/AWOS **135.42** - Automated Surface Weather Observing Systems (shown where full-time ATIS not available). Some ASOS/AWOS facilities may not be located at airports.
 UNICOM - Aeronautical advisory station
 VFR Advsy - VFR Advisory Service shown where full-time ATIS not available and frequency is other than primary CT frequency.

285 - Elevation in feet
L - Lighting in operation Sunset to Sunrise
 ***L** - Lighting limitations exist; refer to Supplement.
72 - Length of longest runway in hundreds of feet; usable length may be less.

When information is lacking, the respective character is replaced by a dash. Lighting codes refer to runway edge lights and may not represent the longest runway or full length lighting.

FSS
 NO SVFR
 (NAME) (NAM) (PNAM)
 CT - **118.3** ★ Ⓢ ATIS **123.8**
285 L **72** **122.95**
 RP 23, 34
 VFR Advsy **125.0** UNICOM
 WX CAM
 AOE

← FAR 91
 ← Location Identifier
 ← ICAO
 ← Location Indicator shown outside contiguous U.S.
 ← Weather Camera (AK)
 ← Airport of Entry

Airport Information on the Chart

Private and military airports also have information on the chart



The name of the airport in the center of the image is Paso Robles Municipal. The code is PRB. There is no control tower, indicated by the magenta airport circle enclosing the runways. The star on top of the circle indicates that there is a rotating beacon. The Common Traffic Advisory Frequency is 123.0. ATIS is 120.6.

The elevation is 839' MSL. There is pilot controlled lighting * (in this case it also controls the PAPI on Runways 19 and 31) and the longest runway length is 6,000'. Services can be reached on 122.95.

There is a heliport and airstrip at Camp Roberts and pilots should be aware of unmanned aircraft. There are several private airports in the area as well.

Special Use Airspace

Areas where flight is restricted.

Special use airspace (SUA) consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both. AIM 3-4-1

Prohibited: Like the name implies, aircraft are prohibited from flying in these areas. Permanent Prohibited areas exist over the White House and Capitol. Camp David is a Prohibited Area when the President is there.

Restricted: Restricted areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Some are only active when exercises are being conducted while others like Area 51 and the Vandenberg launch site are always active.

MOA: MOAs consist of airspace established for the purpose of separating certain military training activities from IFR traffic. Whenever a MOA is being used, nonparticipating IFR traffic may be cleared through a MOA if IFR separation can be provided by ATC. VFR traffic can transit a MOA without talking to ATC, however if you talk to them they will keep you out of the way of the exercises.

Restricted area and MOAs are depicted with hatched lines.



Active MOAs on ForeFlight

Active areas are in red, soon to be active in yellow.

The screenshot displays the ForeFlight mobile application interface. At the top, the status bar shows the time as 3:09 PM on Tuesday, March 4, with a 79% battery level. The app's navigation bar includes 'VFR & Category', 'FPL', and a search bar containing 'KPRB'. The main map area shows a detailed view of the Hunter Low MOA region, with several sub-areas outlined in red (active) and yellow (soon to be active). These include 'HUNTER LOW A & HIGH MOA', 'HUNTER LOW B & HIGH MOA', 'HUNTER LOW C & HIGH MOA', and 'HUNTER LOW E & HIGH MOA'. The map also shows various geographical features, airports, and flight paths. A 'Map Info' panel on the right provides details for the active areas:

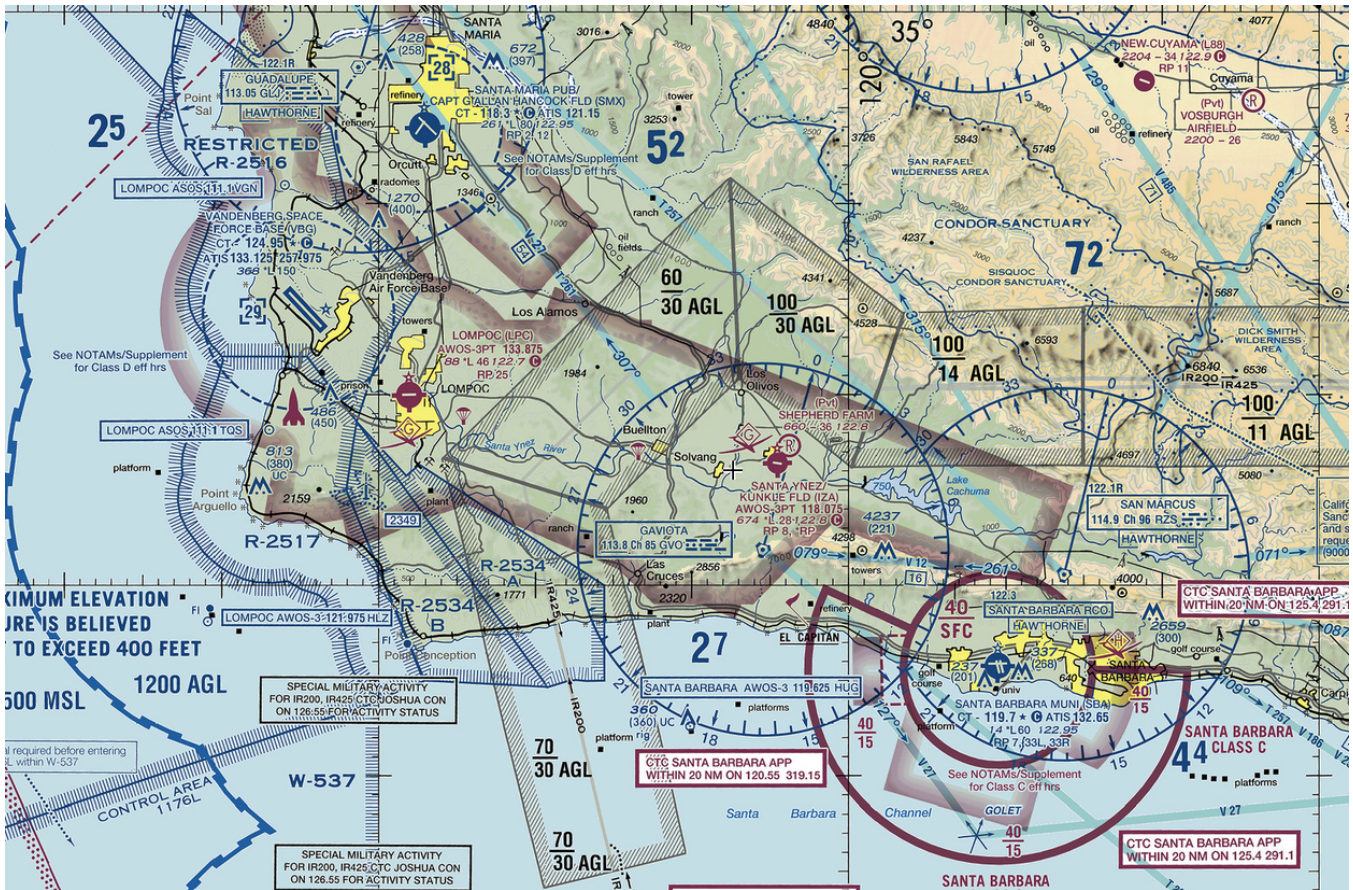
- HUNTER LA* Military Operating Area Activated**
Mar 4, 11:30 AM - 5:30 PM PST
Active, 200FT - 11000FT
- HUNTER HI* Military Operating Area Activated**
Mar 4, 11:30 AM - 5:30 PM PST
Active, 11000FT - FL180

The bottom navigation bar includes icons for 'Airports', 'Maps', 'Plates', 'Documents', 'Imagery', 'Flights', 'ScratchPads', 'Devices', 'Track Logs', and 'More'. A red banner at the bottom of the map area reads 'Glide: Altitude below 200'.

You can fly through MOAs without talking to ATC but there is often high-speed maneuvers going on so it's not wise. I have frequently flown through the Lemoore MOA when going to Fresno or Visalia and the controllers keep you away from the active aircraft. If you do fly through the MOA without talking to ATC you need to be aware of Restricted Areas that are often inside the MOA.

Restricted Areas

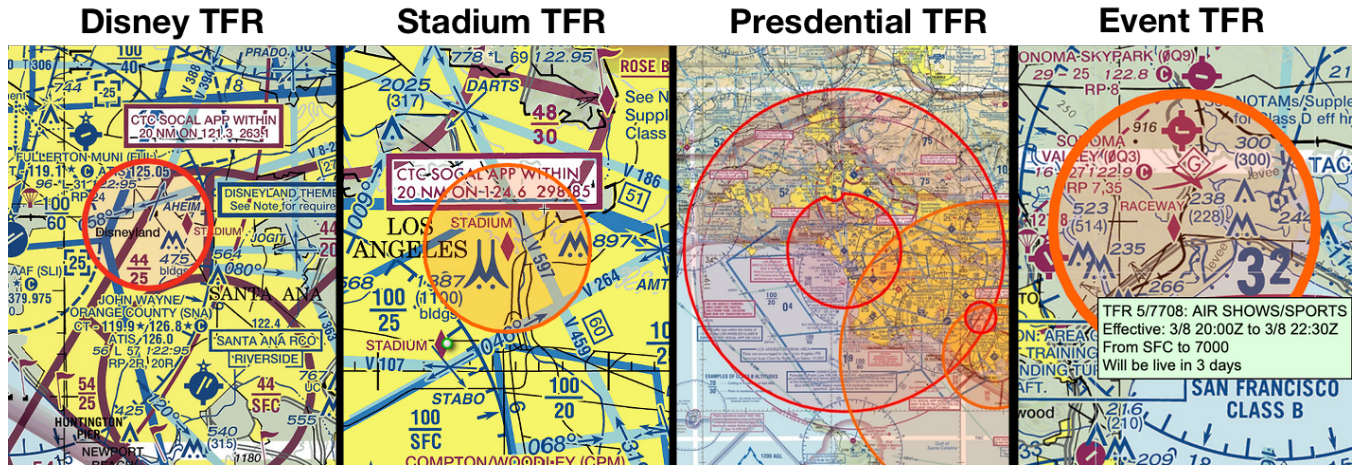
You can fly in some of them when they aren't active. Others, like R-2517, are always off limits. ForeFlight doesn't show when restricted areas are hot but you can ask ATC.



Temporary Flight Restrictions













Because they are temporary, they don't show up on charts, except Disneyland. We often see dozens of TFRs in fire season. TFRs are also in place around hurricanes, volcanic eruptions, sporting events, space launches, and airshows.

There are also TFRs when the President visits an area. Generally, they have two rings, an outer ring of 30 nm where you can fly if on a flight plan and talking to ATC and an inner ring where airliners can fly, but not us little guys.



Finding TFRs if you don't have an EFB

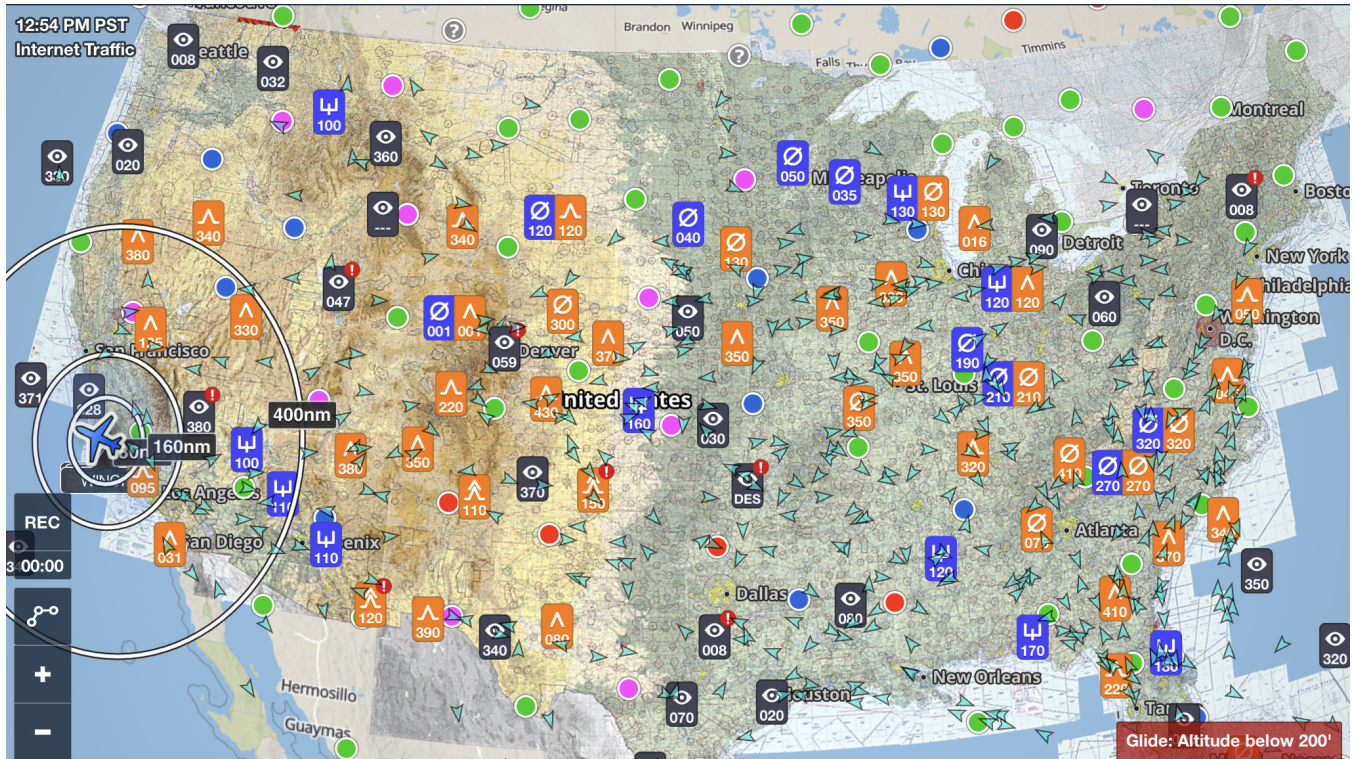
They are listed on the FAA website, and you can click on the magnifying glass to see where they are. <https://tfr.faa.gov>

Date	NOTAM	Facility	State	Type	Description	Zoom
03/04/2025	5/9292	ZLA	CA	HAZARDS	BOULDER OAKS, CA, Tuesday, March 11, 2025 UTC New	 
03/04/2025	5/9272	ZTL	SC	HAZARDS	26NM W OF EASLEY, SC, Friday, March 7, 2025 through Sunday, March 9, 2025 UTC New	 
03/04/2025	5/9237	ZDC	WV	HAZARDS	mathias, WV, Tuesday, March 4, 2025 through Tuesday, March 4, 2025 Local New	 
03/04/2025	5/9134	ZHU	TX	HAZARDS	KATY, TX, Tuesday, June 24, 2025 through Wednesday, June 25, 2025 UTC New	 
03/04/2025	5/9126	ZHU	TX	HAZARDS	HOUSTON, TX, Tuesday, June 24, 2025 through Wednesday, June 25, 2025 UTC New	 
03/04/2025	5/9052	ZFW	TX	SECURITY	SAN ANGELO, TX, Sunday, March 9, 2025 through Sunday, November 2, 2025 Local New	 

Pireps

Reports by pilots of icing, turbulence, wind shear, and unexpected nice weather.

This wasn't a good day to be flying anywhere in the US.



Miscellaneous Features

Find this area on your charts. How many items can you identify?

