

Private Pilot (ASEL) Ground School Course

Lesson 20 | National Airspace System

Chester County
Aviation



Lesson Overview

Lesson Objectives:

- Develop knowledge of the national airspace system.
- Develop an understanding of how to safely operate aircraft in each airspace considering ATC, equipment/surveillance, and weather minimums.

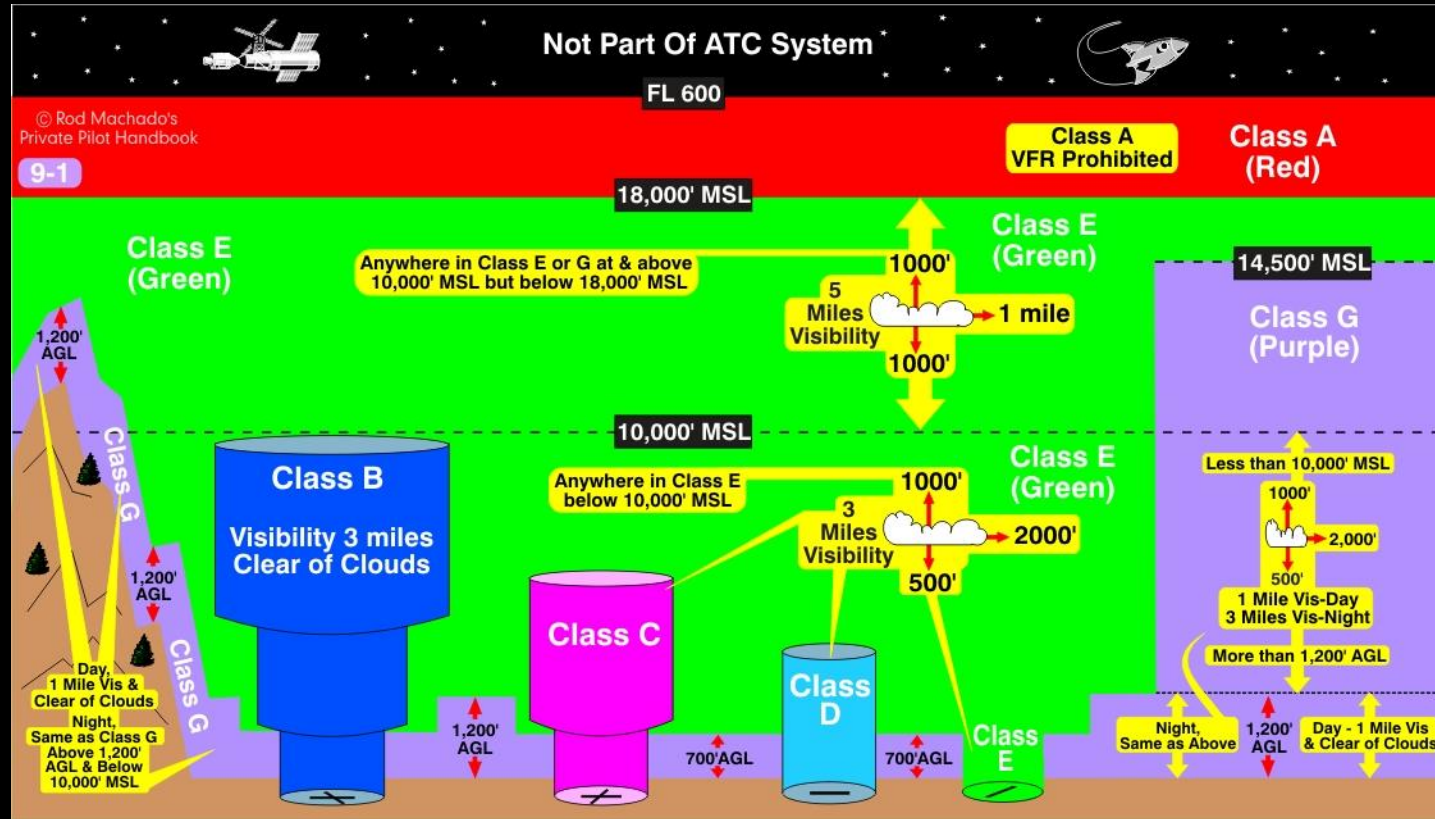
Lesson Completion Standards:

- Student demonstrates satisfactory knowledge of the NAS by answering questions and actively participating in classroom discussions.

National Airspace System

- The NAS is designed in accordance with ICAO and for the user's efficiency and safety
- Airspace does vary from country to country
- Who is the user?
 - You

National Airspace System



Controlled Airspace

National Airspace System

Controlled vs. Uncontrolled Airspace

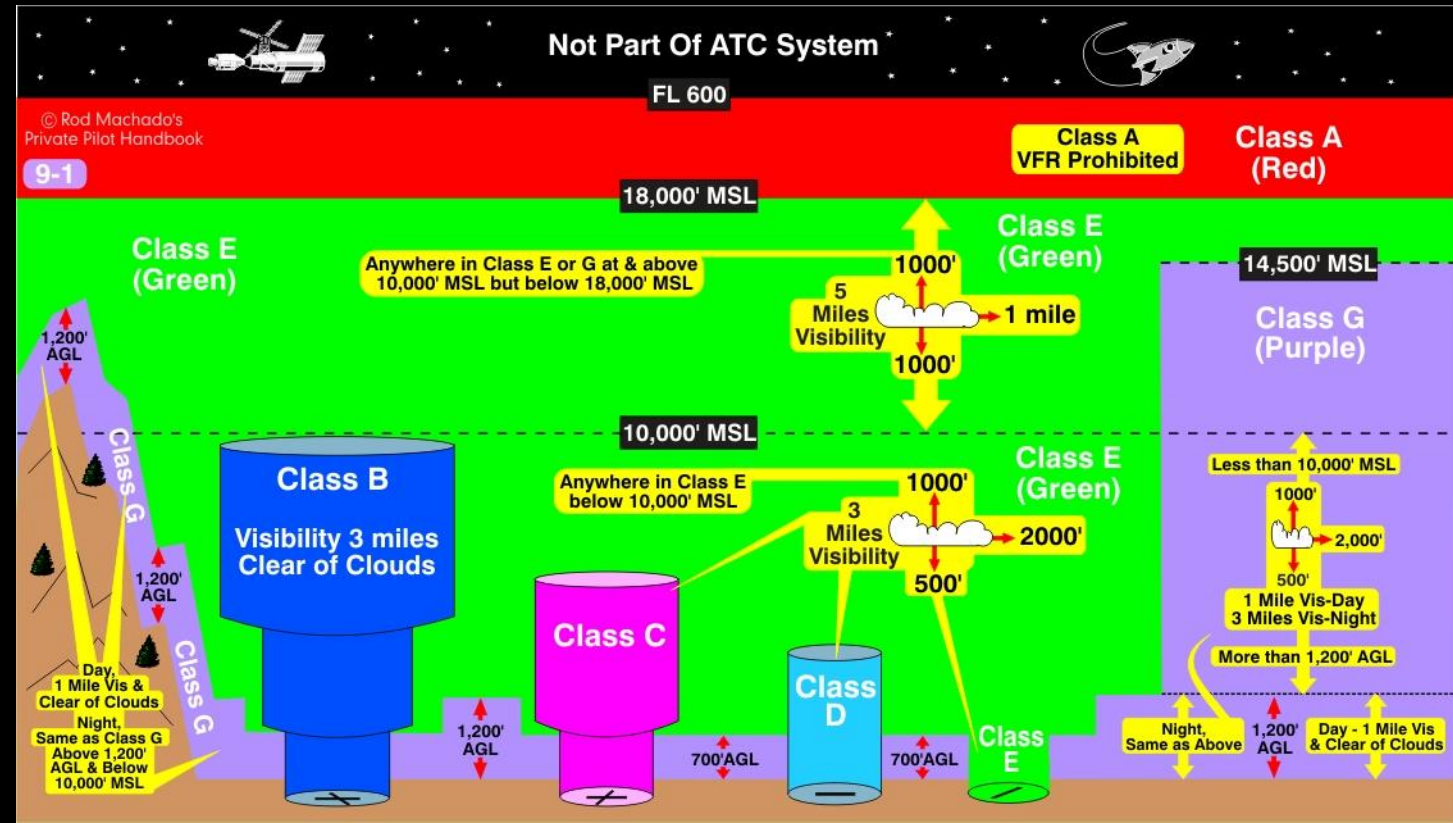
- Controlled airspace:
 - Likely to be used by more aircraft (IFR) than uncontrolled airspace
 - Typically has greater cloud distance and flight visibility requirements than uncontrolled airspace
- Uncontrolled airspace:
 - Is less active
 - Normally found close to the surface, away from busy airports and in areas devoid of airways
 - Has lower flight visibility and cloud distance minimums

Controlled vs. Uncontrolled Airspace

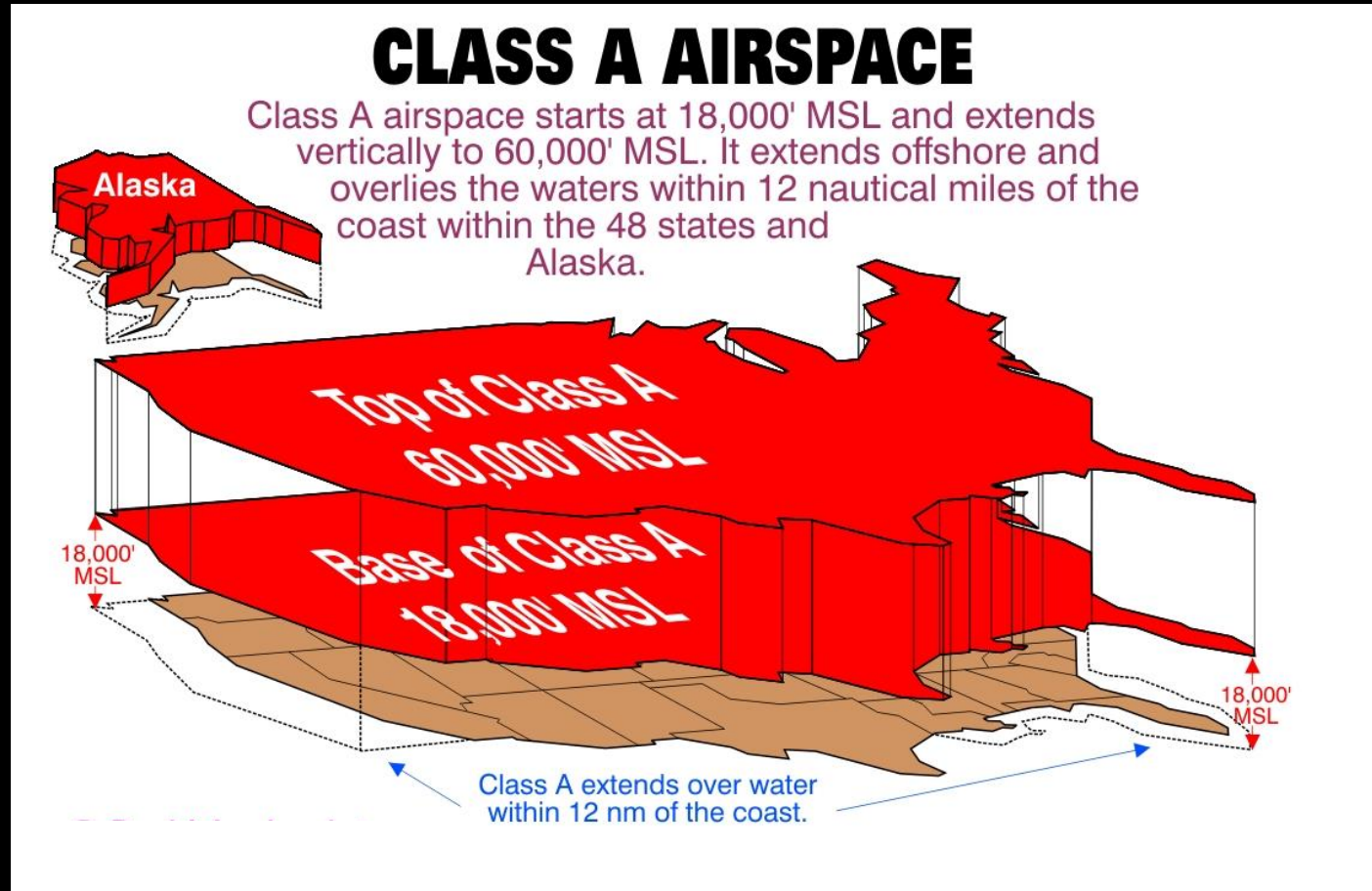
- Class A, B, C, D and E is controlled airspace
- The U.S. does not use ICAO Class F airspace
- Class G is uncontrolled airspace
- Your job is to know for each class of airspace the:
 - Minimum flight visibility / cloud distance
 - Aircraft equipment requirements
 - Entry requirements
 - Pilot qualifications

Class A Airspace

- Overlies Class E airspace which in turn overlies Class G airspace



Class A Airspace



Class A Airspace

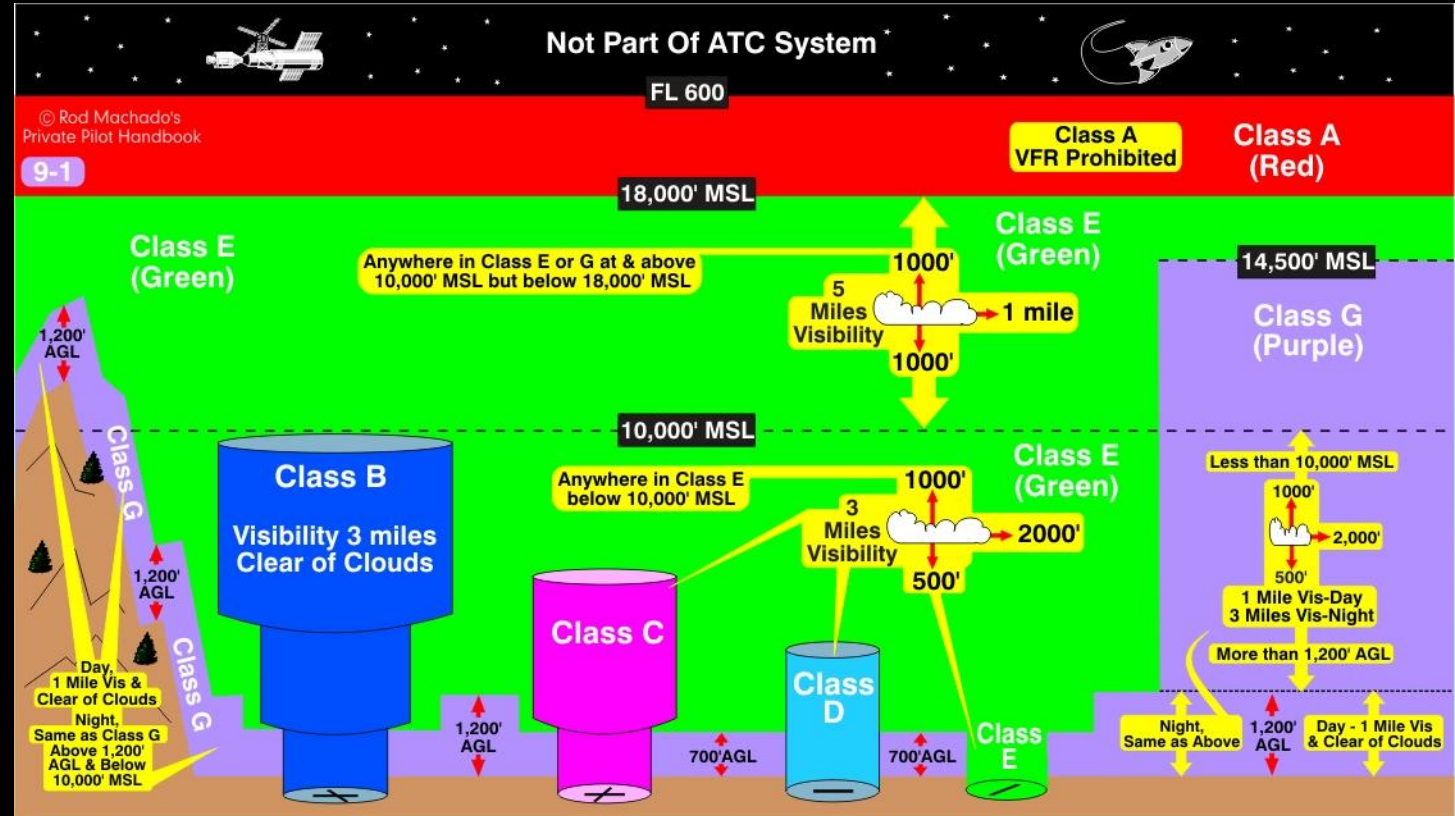
- Requires that you have an instrument rating *and* be on an IFR flight plan
- All pilots in Class A airspace set their altimeters to 29.92 hg climbing thru 18,000 feet, then revert back to local station pressure when below 18,000 feet
- Everyone operating at and above 18,000 feet MSL is flying by the same altitude reference (Flight levels)

Class A Airspace

- Not designated on any aeronautical chart
- Only way you know you're in Class A airspace is when your altimeter indicates 18,000 feet or higher
- At or above FL240, DME required unless equipped with suitable RNAV

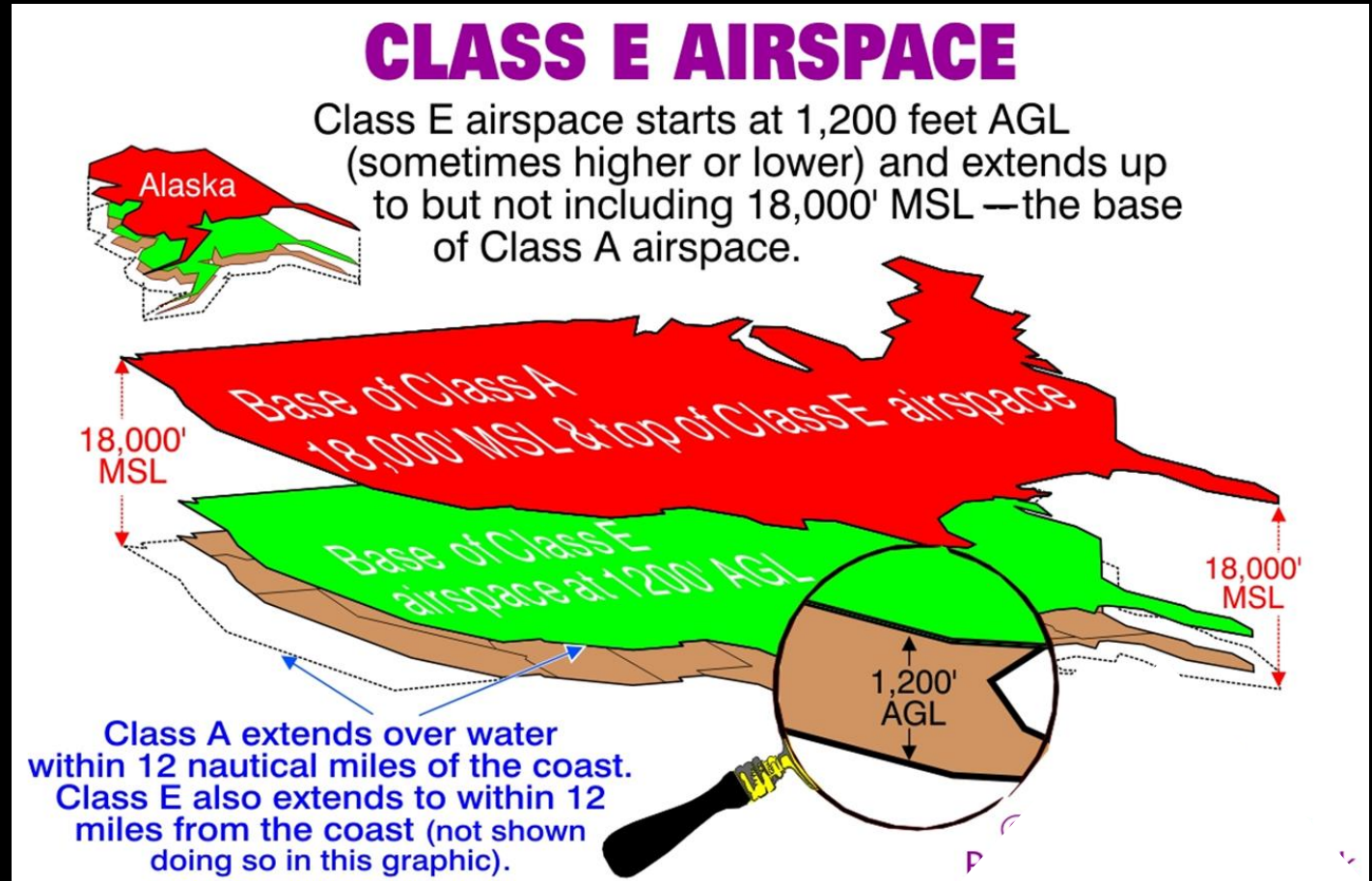
Class E Airspace

- The airspace lying directly below Class A airspace is Class E airspace



Class E Airspace

- Class E airspace is *controlled* airspace
- Made up of airways, commonly flown routes, and those areas between busy airports

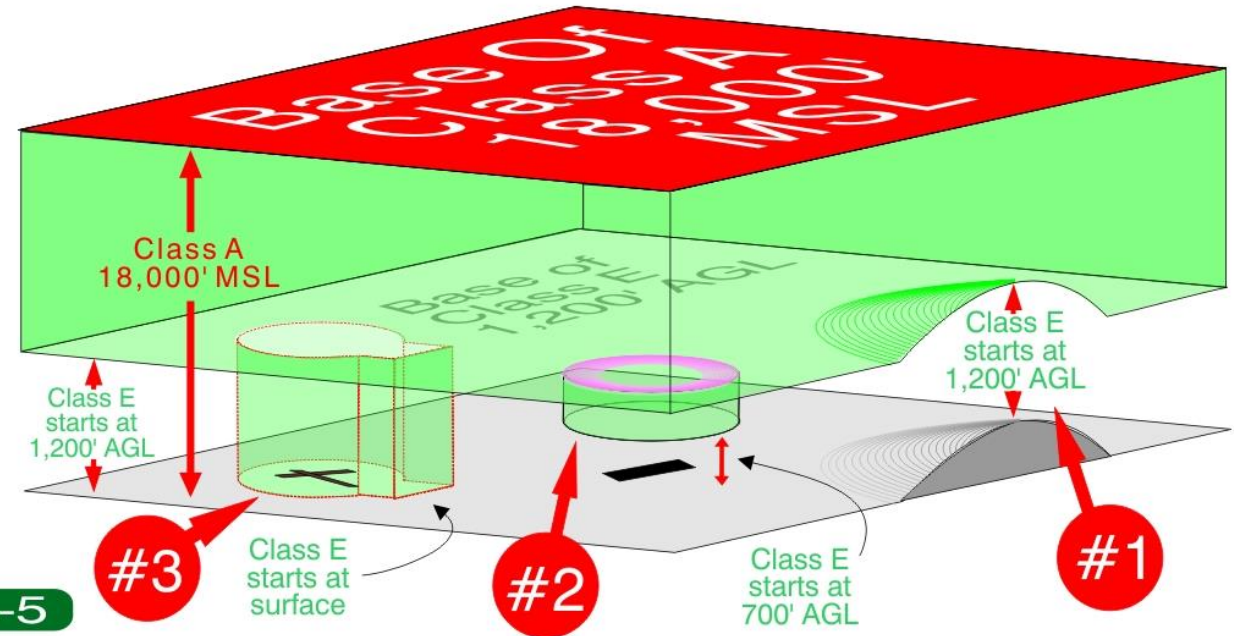


Class E Airspace

- 1. 1,200 feet AGL
- 2. 700 feet AGL
- 3. Surface based
- 4. Other

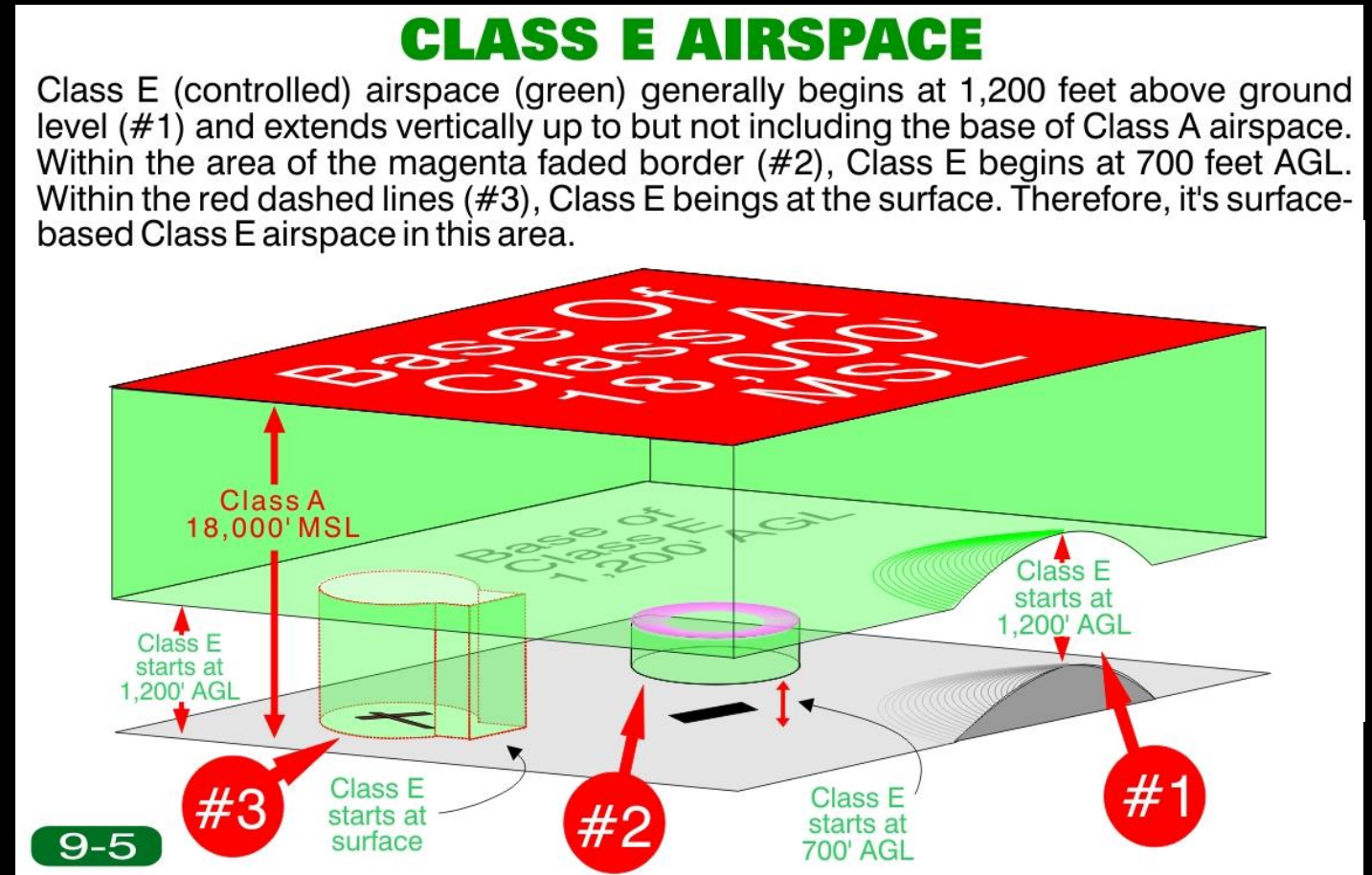
CLASS E AIRSPACE

Class E (controlled) airspace (green) generally begins at 1,200 feet above ground level (#1) and extends vertically up to but not including the base of Class A airspace. Within the area of the magenta faded border (#2), Class E begins at 700 feet AGL. Within the red dashed lines (#3), Class E begins at the surface. Therefore, it's surface-based Class E airspace in this area.



Class E Airspace at 700' AGL

- When Class E airspace starts at 700 AGL, it will be surrounded by a magenta faded line
- Anywhere within this magenta faded area, controlled airspace starts at 700 feet AGL
- A *Transition Area* is Class E airspace starting from 700 feet or more above the surface when designated in conjunction with an airport for which an instrument approach procedure has been prescribed
- May include extensions



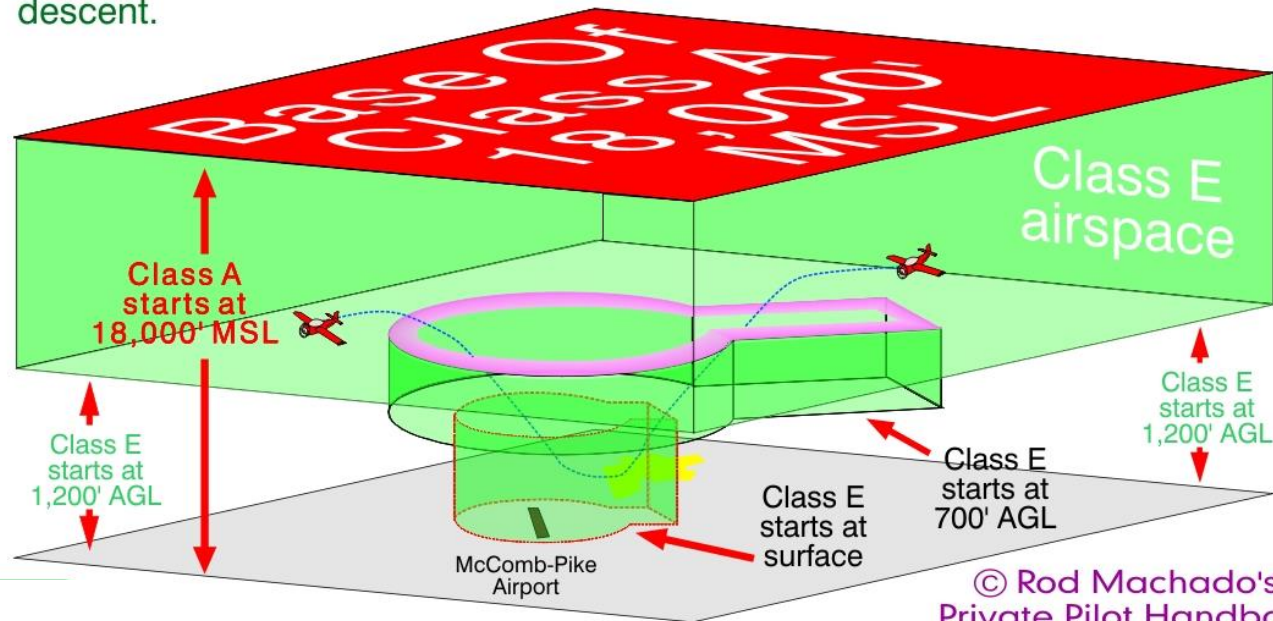
Class E at 700' AGL



Class E at the Surface

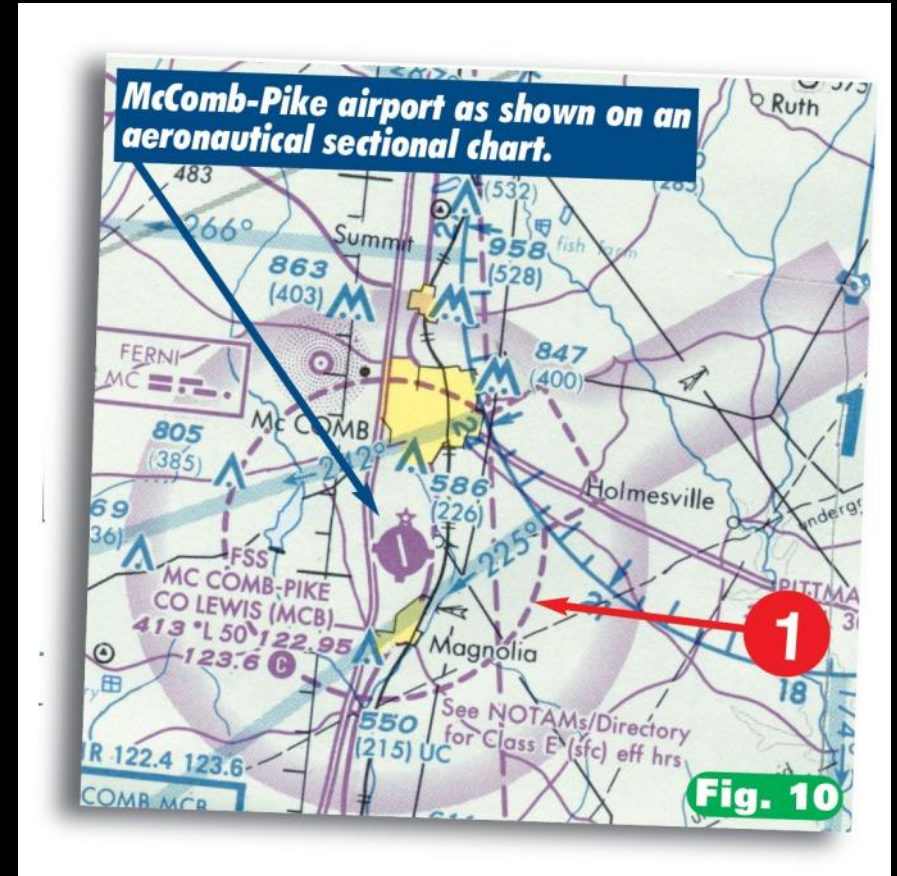
CLASS E AIRSPACE AT THE SURFACE

Within the borders of the magenta (red) dashed line, Class E airspace descends all the way to the surface surrounding McComb-Pike airport. Since some instrument approaches bring pilots real close to the surface of an airport, this lower Class E surface area keeps them in controlled airspace during their descent.



Class E at the Surface

- Airports without air traffic control towers use a magenta dashed line to represent surface-based Class E airspace

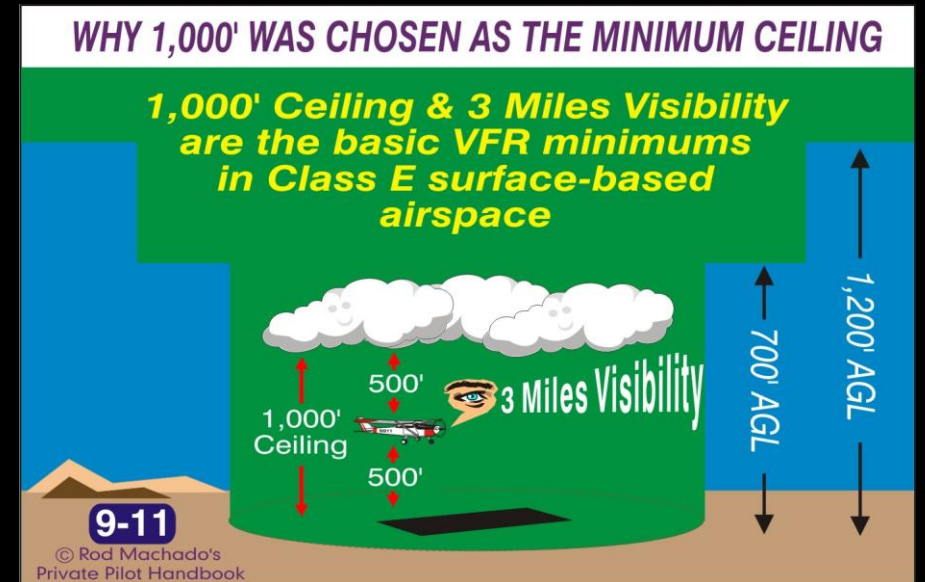


Additional Requirements In Surface-Based Controlled Airspace

- 1. The reported ground visibility at the airport must be at least 3 SM
If the ground visibility isn't reported, then the flight visibility during takeoff, landing or when operating in the traffic pattern must be at least 3 SM
- 2. If a ceiling exists at that airport, it can be no lower than 1,000 feet AGL to operate beneath it
To takeoff, land or operate in the traffic pattern, the ceiling must be at least 1,000 feet AGL or more
- *A ceiling is defined as the height above the earth's surface of the lowest layer of clouds reported as broken or overcast, or any reported vertical visibility into obscuring phenomena*

Class E Surface Ceiling & Visibility

- Regulations also require that you remain at least 500 feet above the surface over a non-congested area



Class E at the Surface

- Just because Class E airspace exists at the surface of an airport doesn't mean it stays that way 24 hours a day
- The surface-based portion of that controlled airspace can revert back to Class E airspace starting at 700 or 1,200 feet AGL
- Normally, any type of *surface based* controlled airspace requires a federally certificated weather observer or weather-observing system be present to make visibility and cloud height determinations
- These weather observations can be tower controllers, FSS personnel, licensed weather observers, or AWOS-3
- Some means of pilot-to-ATC communication is also required

Chart Supplement

- The official weather observer's hours of operation normally coincide with the hours during which the surface-based controlled airspace exists
- The actual hours that surface-based controlled airspace exists are shown in the Chart Supplement

The Chart Supplement indicates that McComb-Pike's Class E surface area operates continuously.

Mc COMB-PIKE CO-JOHN E LEWIS FLD (MCB) 4 S UTC-6(-5DT) NEW ORLEANS
H-5C, L-17D
IAP

N31°10.71' W90°28.31'

413 B S4 FUEL 100LL, JET A

RWY 15-33: H5000X100 (ASPH) S-25, D-30, DT-60 MIRL

RWY 15: PAPI(P2L)—GA 3.0° TCH 38'. Trees. RWY 33: PAPI(P2L)—GA 3.0° TCH 46'. Trees.

AIRPORT REMARKS: Attended 1400Z†-dusk. For attendant and fuel after hours call 601-684-7070 or ctc FSS.
ACTIVATE MIRL Rwy 15-33—CTAF. For MALSF Rwy 15 ctc FSS. Ground drops abruptly both ends Rwy 15-33 starting 200' from thld.

COMMUNICATIONS: CTAF 123.6 UNICOM 122.95

Mc COMB FSS (MCB) on arpt. 123.6 122.4 122.2 122.1R. LC 684-7070 NOTAM FILE MCB.

® HOUSTON CENTER APP/DEP CON 133.5

AIRSPACE: CLASS E svc effective continuously.

RADIO AIDS TO NAVIGATION: NOTAM FILE MCB.

(H) VORTAC 116.7 MCB Chan 114 N31°18.26' W90°15.49' 233° 13.3 NM to fld. 440/03E. HIWAS

FERNI NDB (MHW/LOM) 413 MC N31°15.27' W90°30.63' 153° 5 NM to fld.

ILS 109.1 I-MCB Rwy 15. LOM FERNI NDB. LOC unusable byd 25 degrees E of course.

Fig. 12

Airspace Boundaries on Sectional Chart

WHICH WAY DOES THE MAGENTA AND BLUE FADE?

To learn about this non-faded area, see page 16.

The blue faded border (often seen in the western part of the US), indicates controlled (Class E) airspace begins at 1,200 feet AGL in the direction of the blue fade (the same direction my blue arrows point).

If you see only a magenta fade and no blue fade, just assume the area on the other side of the magenta faded border is Class E airspace starting at 1,200 feet AGL.

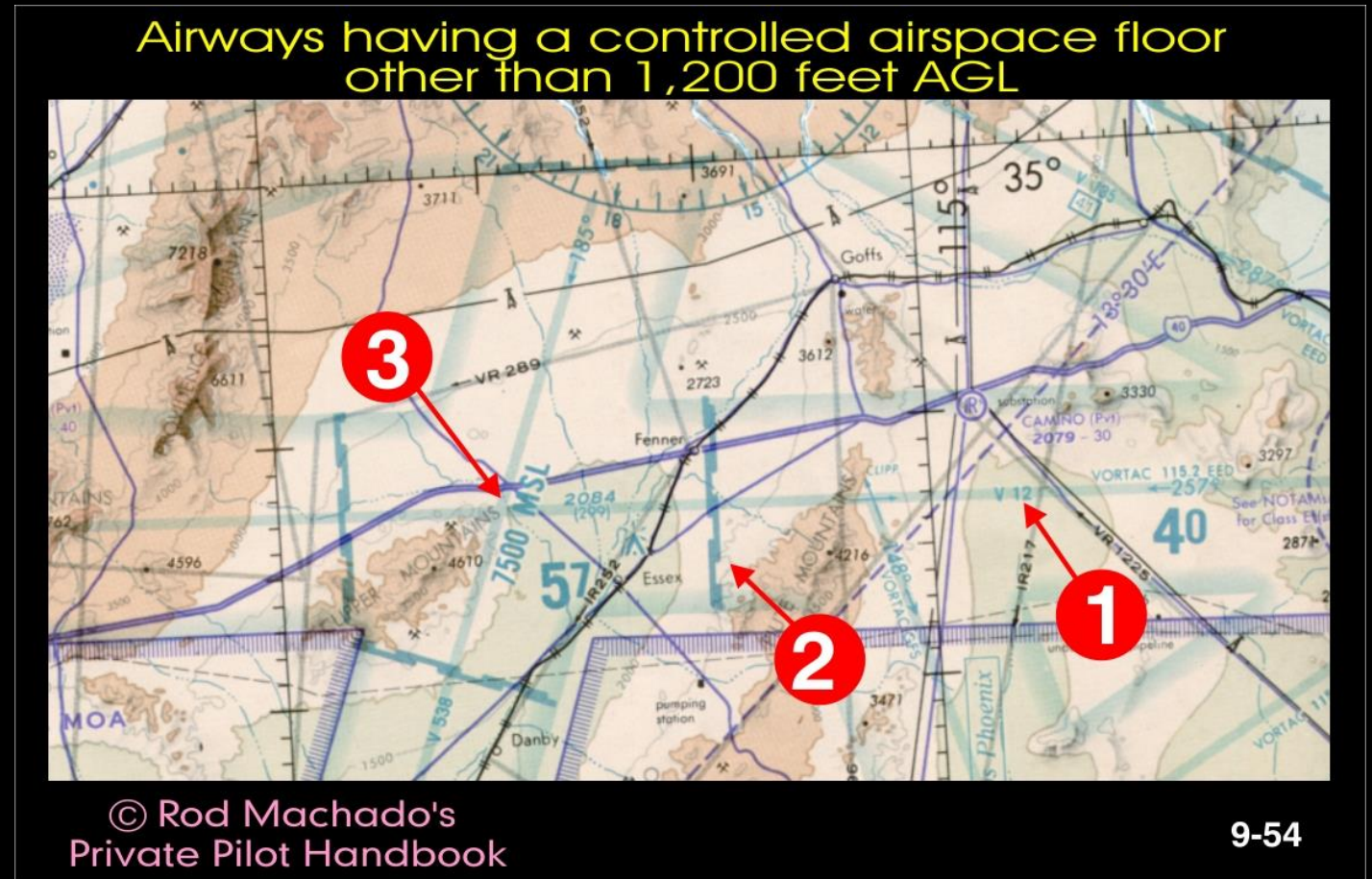
The magenta fades in the direction of the red arrows, indicating controlled (Class E) airspace starts at 700 AGL within the faded border areas.

Class E airspace begins at the surface within the magenta dashed lines.

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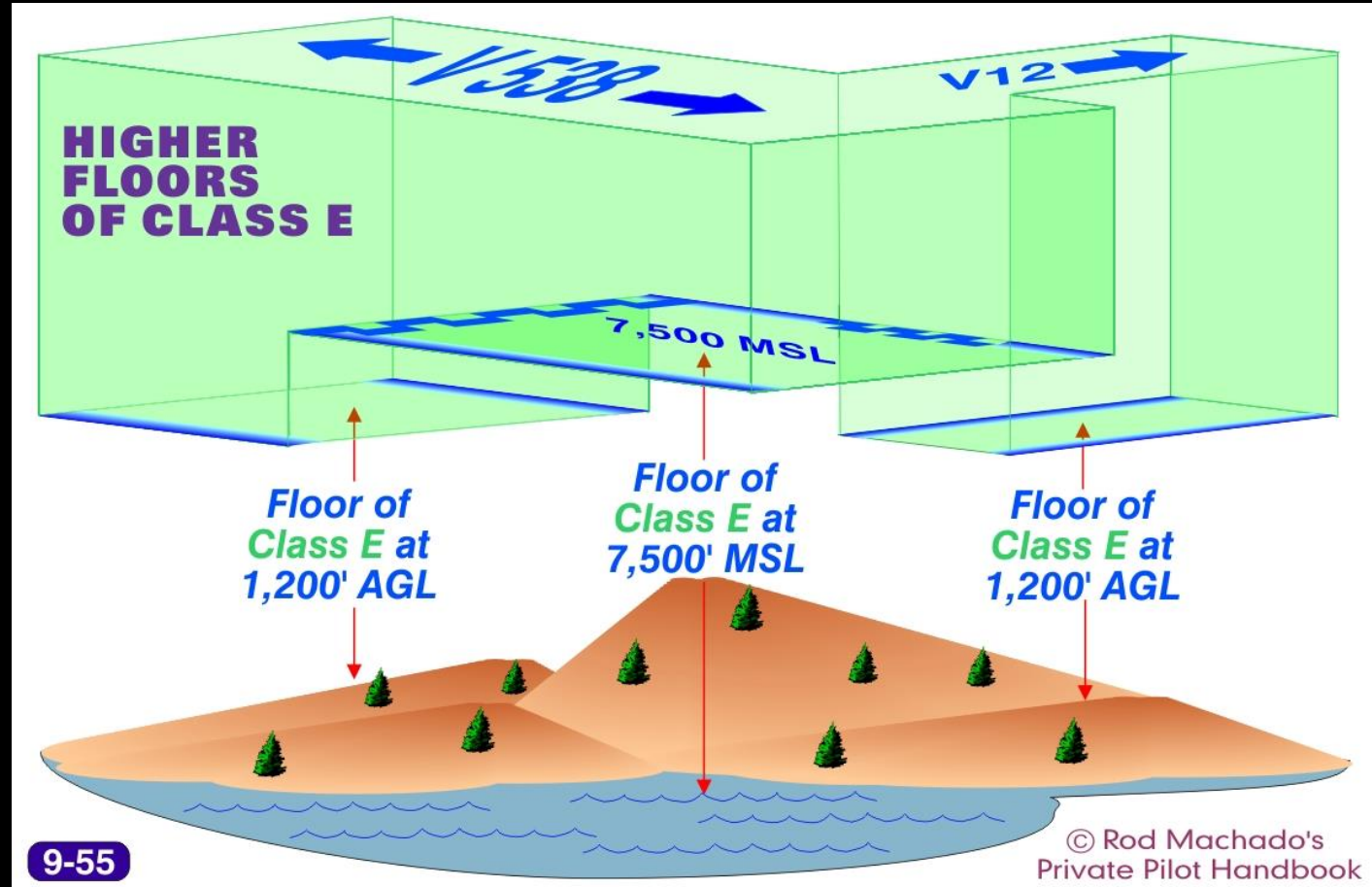
Variable Floors Of Class E Airspace

- Federal Low Altitude airways and are identified by a V (Victor) followed by a number
- Low altitude airways are normally 8 nm wide and begin at the base of the Class E airspace (1,200 AGL), up to but not including 18,000 feet MSL
- The solid blue serrated symbols indicate the floor of controlled airspace (Class E) has changed within these symbols (Note: MSL)
- Class G below



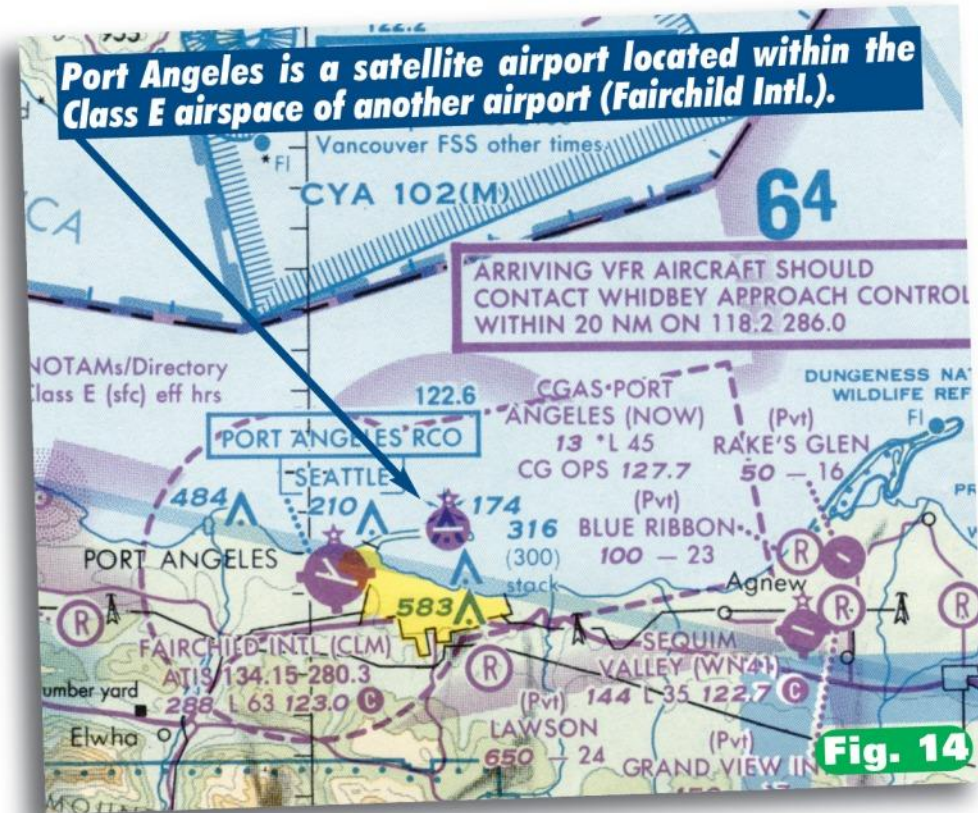
Higher Floors of Class E Airspace

- The blue serrated figure indicates the base of Class E airspace has changed
- Within the borders of two or more serrated figures is an altitude value (shown in blue)
- This altitude (normally an MSL altitude) is the base of controlled airspace for that area
- The Class E airspace under Victor airway 538, is a section with a base of 7,500' MSL
- A large mountain is responsible for raising the base of this airspace



Satellite Airports

- Surface-based controlled airspace is established for a specific airport called the primary airport
- Sometimes other airports lie within the boundaries of the primary airport's surface based controlled airspace
- These are called satellite airports

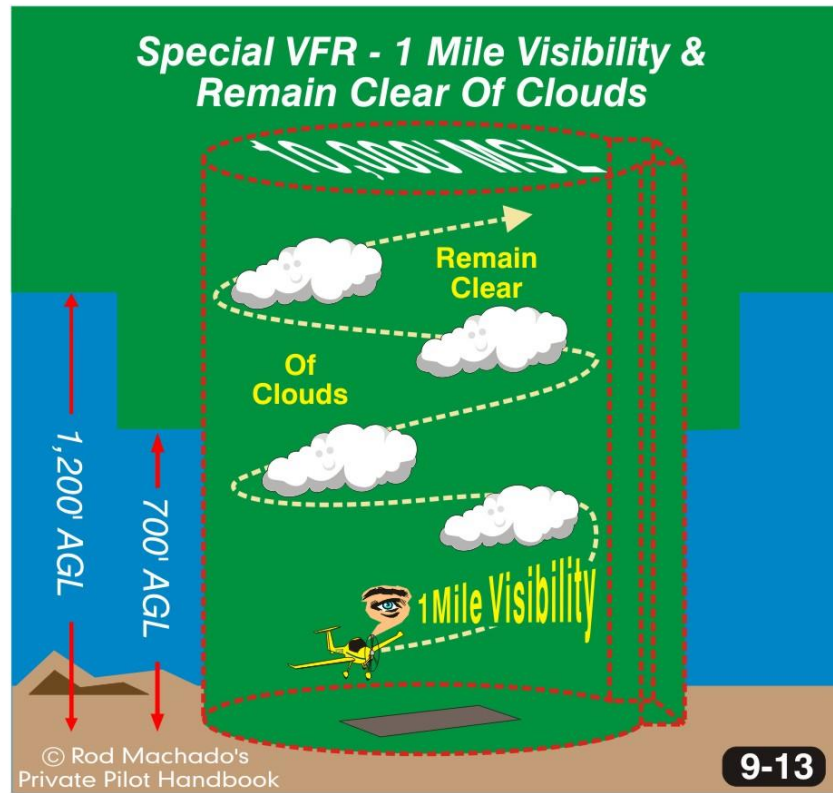


Aircraft Speed Limits

- No aircraft speed restriction at and above 10,000 feet MSL
- Jets and other fast flying aircraft typically move at or near their top speed
- 250 knot speed restriction below 10,000 feet MSL
- Other restrictions in Class B,C, and D airspace

Special VFR in *Surface* Based Airspace (B,C,D,E)

- Pilot must have clearance from ATC (tower, FSS, approach or departure control)
- No pilot can obtain an SVFR clearance from sunset to sunrise unless they have an instrument rating *and* an airplane equipped for instrument flight




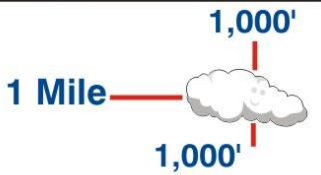

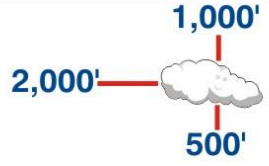

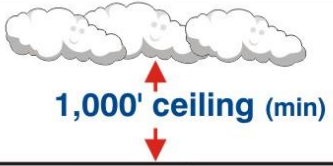

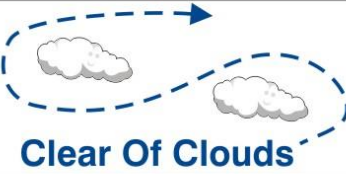
The diagram illustrates the Special VFR (SVFR) airspace. It shows a cylindrical volume of air extending from 700 feet Above Ground Level (AGL) to 1,200 feet AGL. The top of the cylinder is at 1,200' AGL, and the bottom is at 700' AGL. The cylinder is labeled "Special VFR - 1 Mile Visibility & Remain Clear Of Clouds". Inside the cylinder, there are clouds and a pilot flying a small airplane. The text "Remain Clear Of Clouds" is written in yellow, and "1 Mile Visibility" is written in green. The diagram is set against a green background representing the sky and a blue background representing the ground. The text "© Rod Machado's Private Pilot Handbook" is at the bottom left, and "9-13" is in a black box at the bottom right.

SPECIAL VFR

A special VFR clearance applies only within the lateral limits of the Class E surface area (B,C & D also) below 10,000 feet MSL. It allows you to fly with 1 mile visibility while remaining clear of clouds. The purpose of SVFR is to allow you to depart toward VFR weather or to land when the weather is less than basic VFR.

Class E Weather Minimums

SUMMARY OF VFR WEATHER MINIMUMS FOR CLASS E AIRSPACE

Airspace/Altitude	Visibility	Cloud Clearance
Class E airspace at & above 10,000' MSL	5 Miles Visibility 	1,000' 1 Mile  1,000'
Class E airspace below 10,000' MSL	3 Miles Visibility 	1,000' 2,000'  500'
Basic VFR in Class E surface area	3 Miles Visibility 	 1,000' ceiling (min)
Special VFR in Class E surface area	1 Mile Visibility 	 Clear Of Clouds

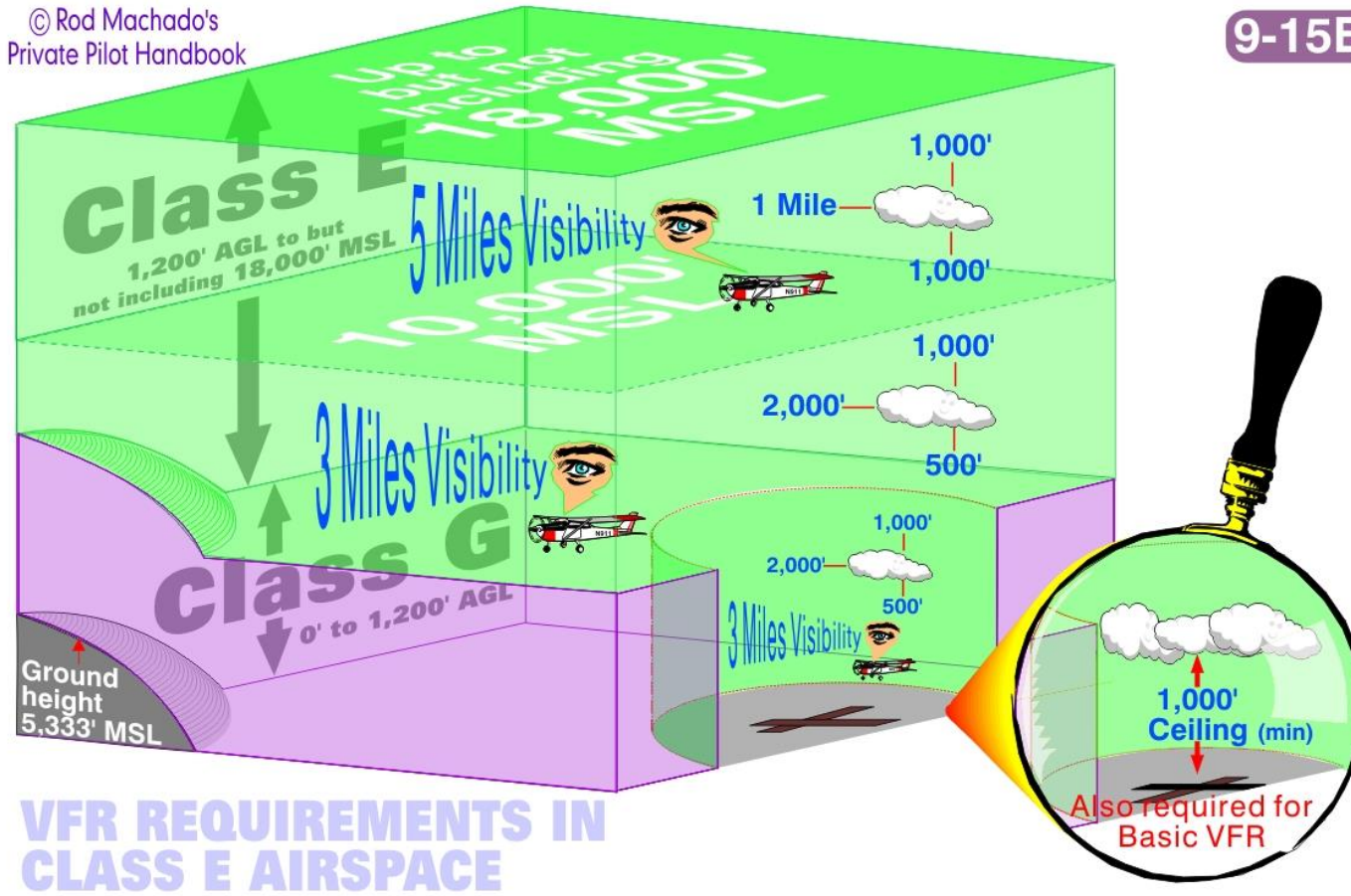
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9-15a

Class E Weather Minimums

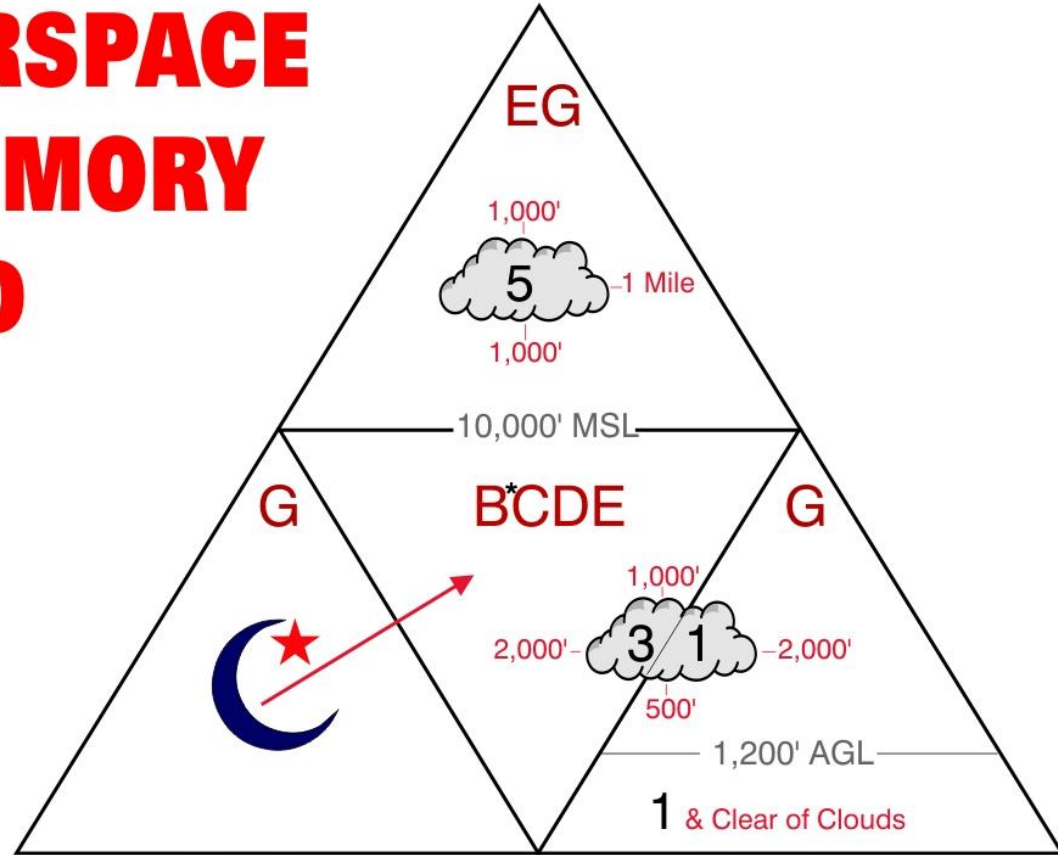
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Airspace Visibility and Cloud Clearance Memory Aid *Class E*

AIRSPACE MEMORY AID

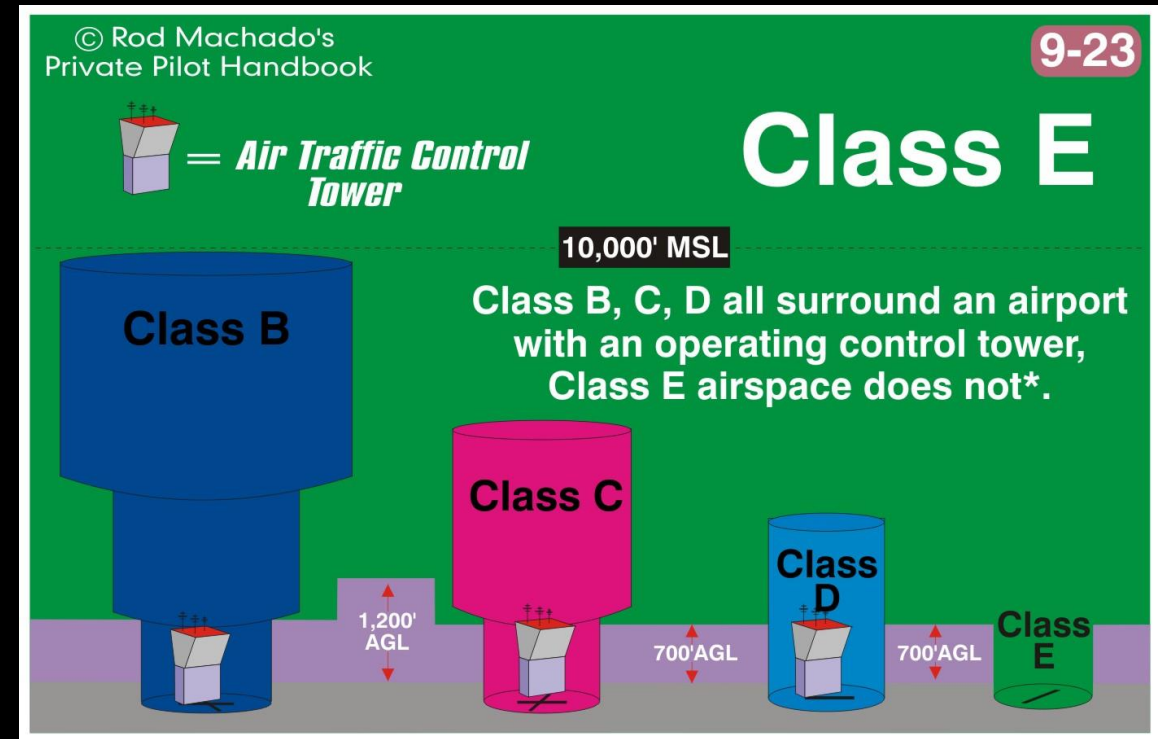


*Class B airspace requires you to remain clear of clouds

9-56

Class B, C and D Airspace

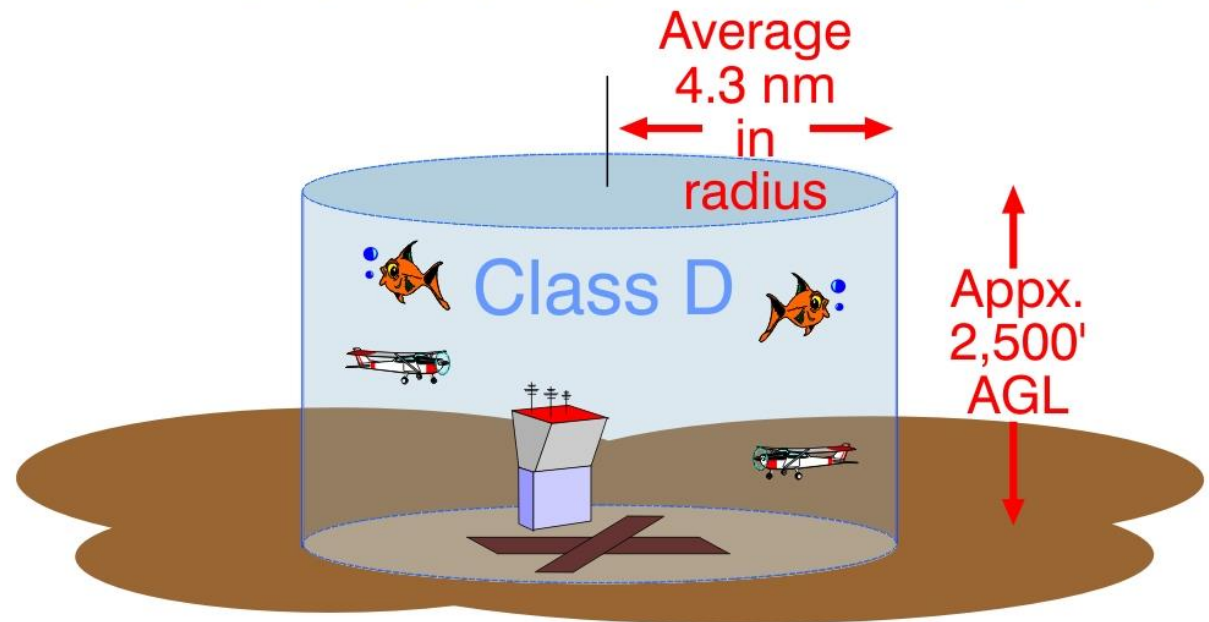
- All three types of airspace start at the surface and surround those airports that have an operating control tower
- Each class of airspace serves the single purpose of coordinating takeoffs and landings between individual aircraft
- The Class of airspace depends on several factors: how busy the airport is, the types of airplanes using the airport, the number of IFR flights, the facilities available at the airport, etc.



Class D Airspace

- Controlled airspace starting at the surface of airports having an operating air traffic control tower
- Established to help air traffic controllers provide an orderly flow of traffic taking off or landing at airports within this airspace
- While controllers don't provide separation between aircraft, they do provide sequencing as well as information about known air traffic

DIMENSIONS OF CLASS D AIRSPACE

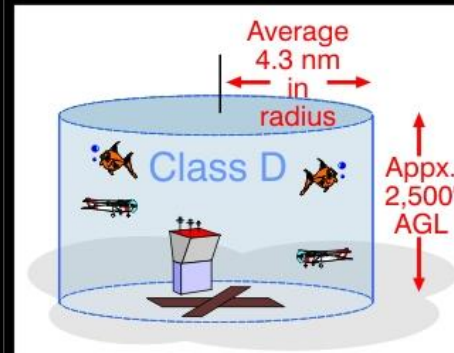


Operating anywhere within the boundaries of Class D airspace requires that you establish and maintain communication with the Air Traffic Control tower prior to entering this airspace.

Class D Airspace

- Airports shown in blue have a control tower
- The blue dashed line surrounding airport represents the lateral dimensions of Class D airspace
- Radius varies with individual airports and is individually tailored to instrument approaches
- Averages 4.3 nm (5 sm)
- Top of the airspace cylinder extends to approximately 2,500 feet AGL
- Height also varies depending on local needs

Class D airspace at Chico



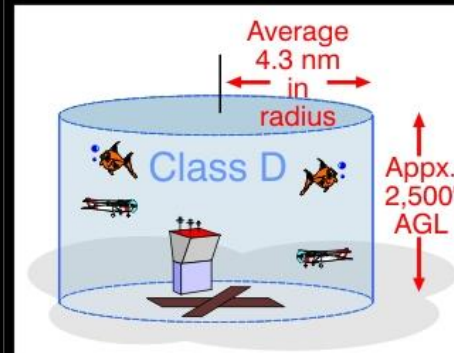
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Class D Airspace

- All aircraft operating within Class D airspace are required to establish and maintain two-way radio communication prior to entering and when operating within this airspace
- You must talk to the control tower before taking off, landing, or flying through this airspace
- If you overfly Class D airspace or operate beyond the lateral limits of the blue dashed line, you're not in Class D airspace and no communication is required

Class D airspace at Chico



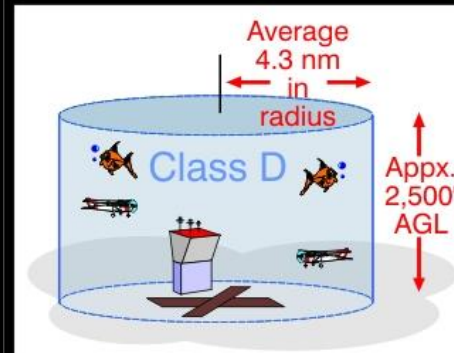
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Class D Airspace

- Chico airport is solid blue in color, which identifies the airport as having a control tower
- Communication with the air traffic controller is made on the tower frequency of 121.0 MHz shown next to the symbol CT
- Class D airspace only exists when the control tower is operating
- * indicates part-time operation
- When the tower shuts down, the airport is treated like a non-tower (uncontrolled) airport

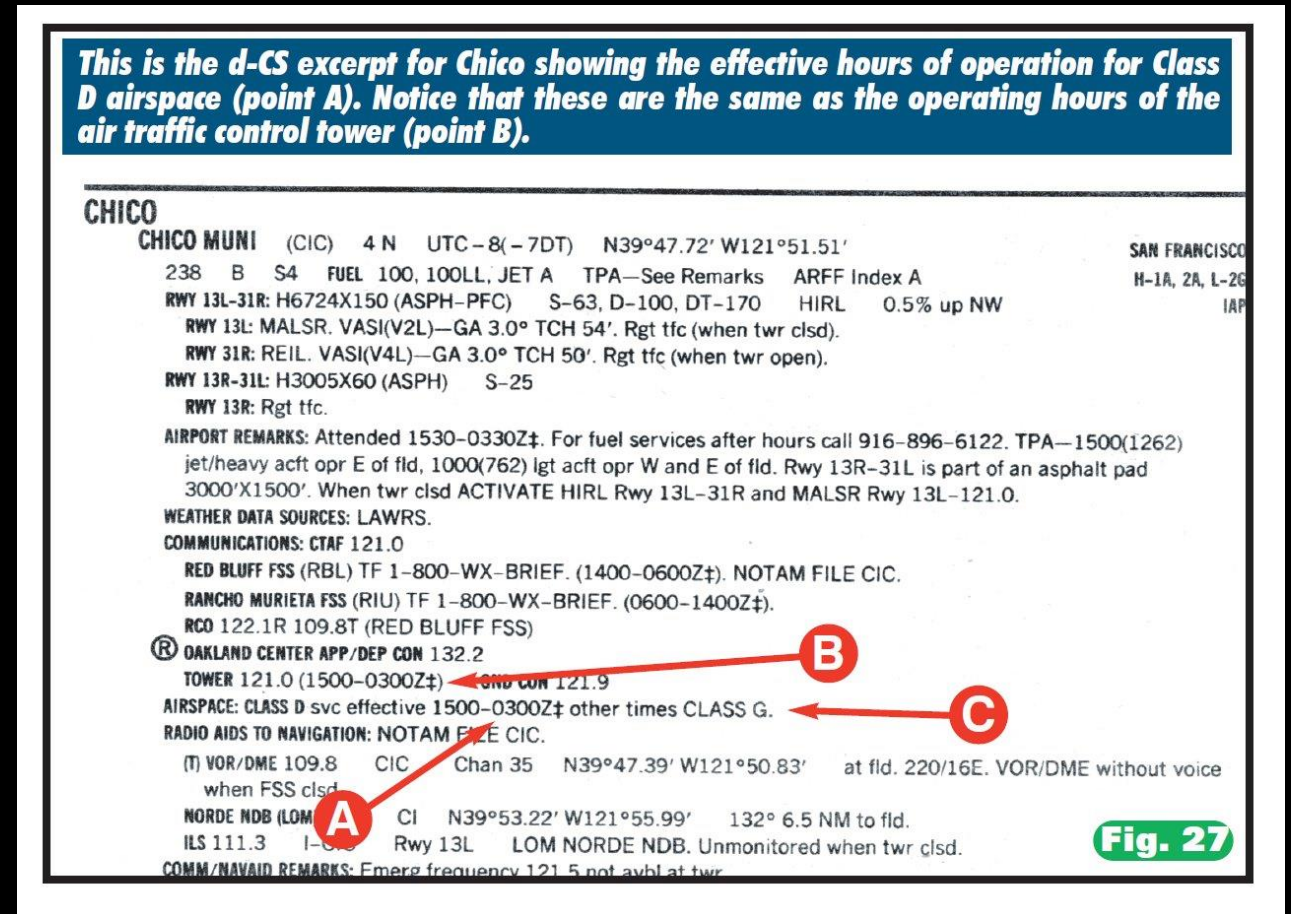
Class D airspace at Chico



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Chart Supplement

- Class D airspace is effective from 1500 to 0300 UTC
- This is the same as the operating hours of Chico's control tower (0700 to 1900 local time)
- When Class D airspace is not in effect, the airspace reverts to Class G airspace



Tower Frequencies on Sectional Tab

- Operating hours of Chico's control tower (0700 to 1900 local time)

CONTROL TOWER FREQUENCIES ON THE SECTIONAL'S TAB

The operating hours of an air traffic control tower (Chico in this instance), are also found on the sectional chart's frequency tab.

CONTROL TOWER FREQUENCIES ON SAN FRANCISCO SECTIONAL CHART

Airports which have control towers are indicated on this chart by the letters CT followed by the primary VHF local control frequency. Selected transmitting frequencies for each control tower are tabulated in the adjoining spaces, the low or medium transmitting frequency is listed first followed by a VHF local control frequency, and the primary VHF and UHF military frequencies, when these frequencies are available. An asterisk (*) follows the part-time tower frequency removed to the collocated full-time FSS for use as Local Airport Advisory (LAA) during hours tower is closed. Hours shown are local time. Ground control frequencies listed are the primary ground control frequencies.

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

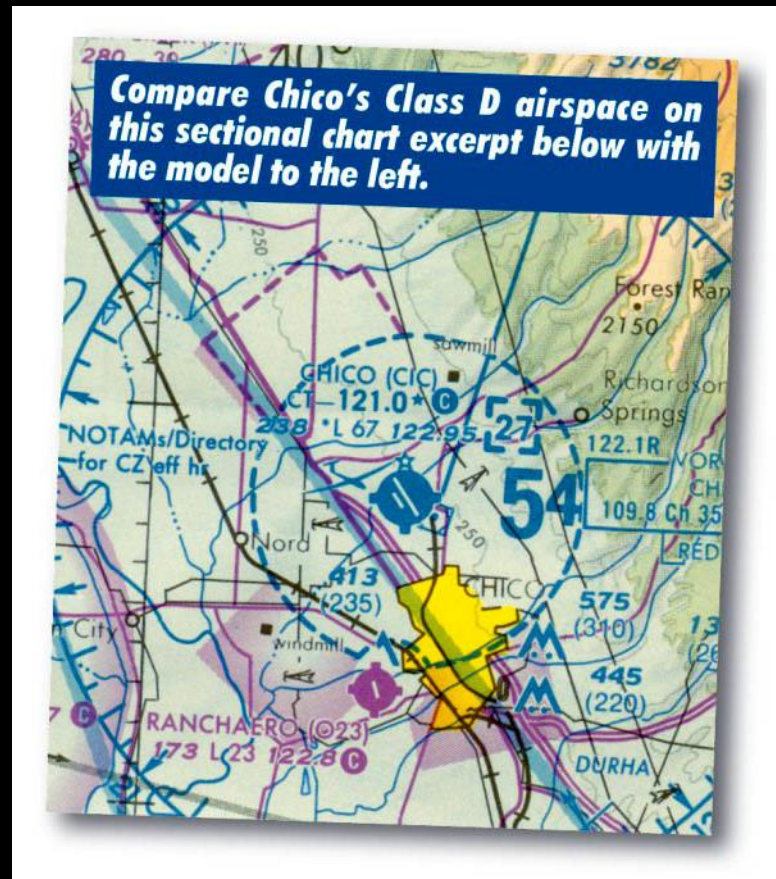
ASR and/or PAR indicates Radar Instrument Approach available.

"MON-FRI" indicates Monday thru Friday.

CONTROL TOWER	OPERATES	TWR FREQ	GND CON	ATIS	ASR/PAR
NAS ALAMEDA	CONTINUOUS	127.05 384.4	121.65 352.4	284.2	ASR/PAR
BEALE AFB	CONTINUOUS	119.4 276.15	121.6 228.4	273.5	ASR/PAR
BUCHANAN	0600-2200	119.7 123.9 257.8	121.9	124.7	
CHICO	0700-1900	121.0 239.3	121.9		
NALF CROWS LANDING	MON-FRI AS SKED	125.05 328.1			

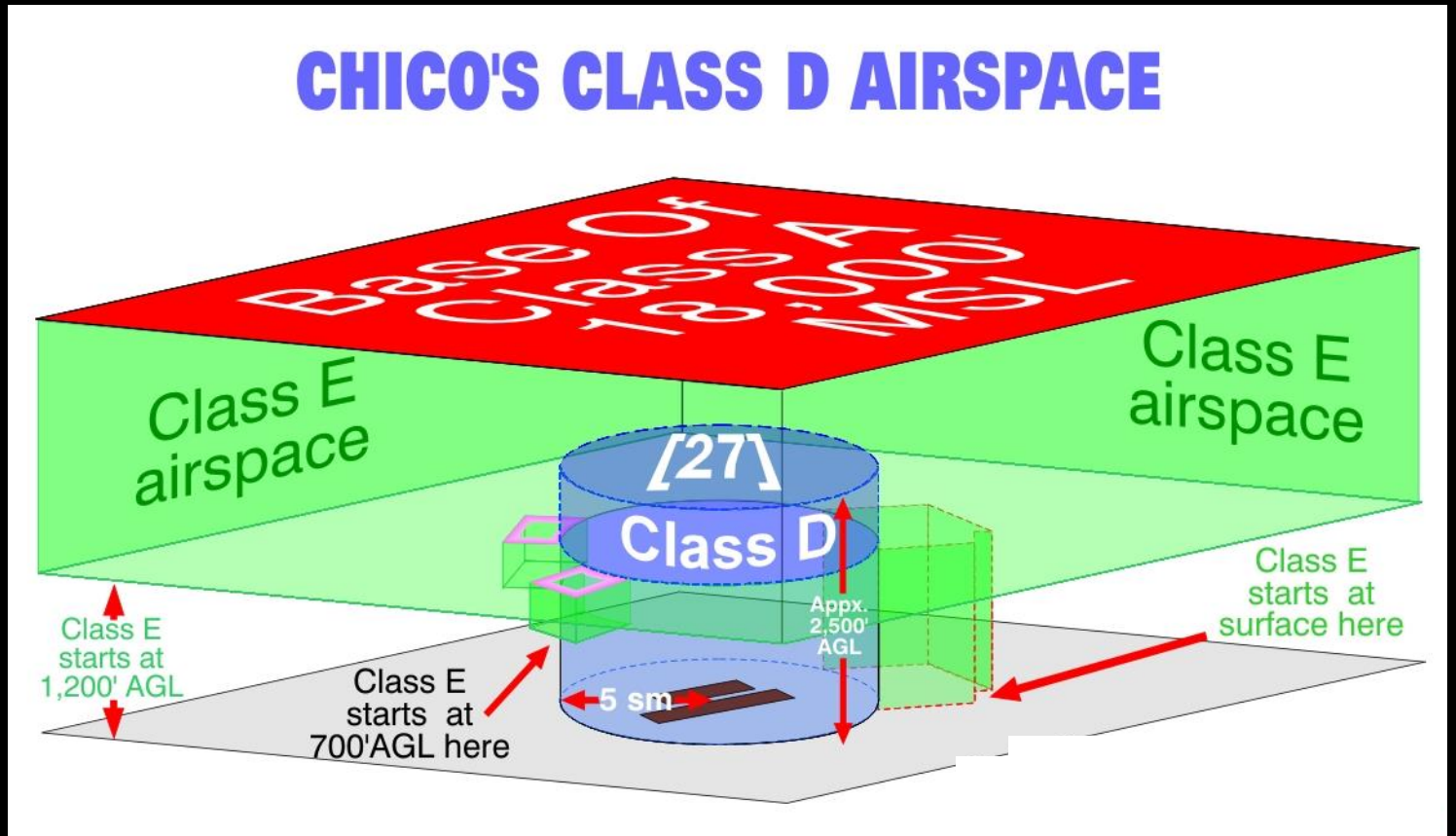
Fig. 28

Class E Airspace Extensions to Class D



Class E Airspace Extensions to Class D

- Class E airspace extensions added onto Class D airspace
- Extensions of Class E airspace are added when it's necessary to keep IFR airplanes in controlled airspace during their instrument approaches



Weather Minimums For Class D Airspace

- The weather minimums for Class D airspace are the same as they are for Class E airspace below 10,000 feet MSL
- 3 sm visibility, 1,000 feet above any clouds, 500 feet below clouds, 2,000 feet laterally from clouds (while airborne)
- Class D airspace is surface-based controlled airspace

Weather Minimums For Class D Airspace

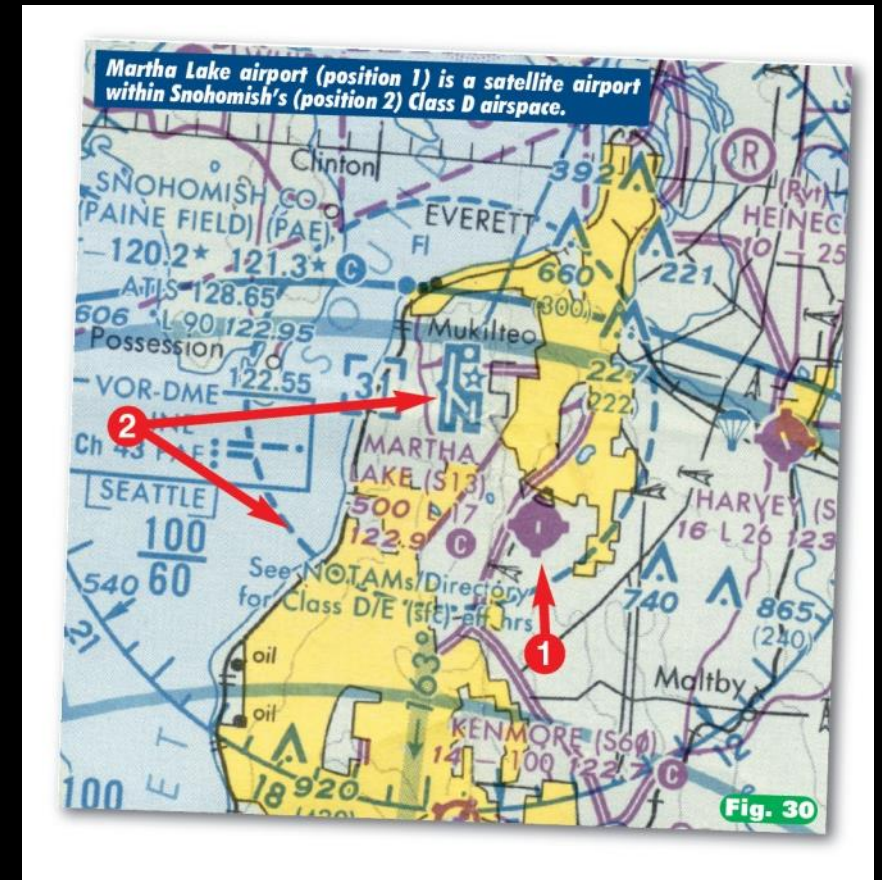
- Taking off, landing or operating in the traffic pattern of an airport having any type of surface-based controlled airspace established for it requires a minimum of 3 sm visibility and 1000-foot ceiling
- This is reported *ground visibility*
- When it's not reported, the pilot must maintain at least 3 sm *flight visibility*
- If weather conditions are less than 3 sm reported ground visibility or less than a 1,000-foot ceiling (if a ceiling exists), an SVFR clearance is required before taking off, landing, or entering the traffic pattern within the surface-based portion of Class D airspace (and its Class E extension)

Towered Airport Rotating Beacon

- During the day if the primary airport is below basic VFR minimums the airport's rotating beacon is activated
- A SVFR clearance (or an IFR clearance if IFR rated) is required to operate into or out of the surface-based controlled airspace under these conditions
- Normally activated at night to help identify an airport with runway lights

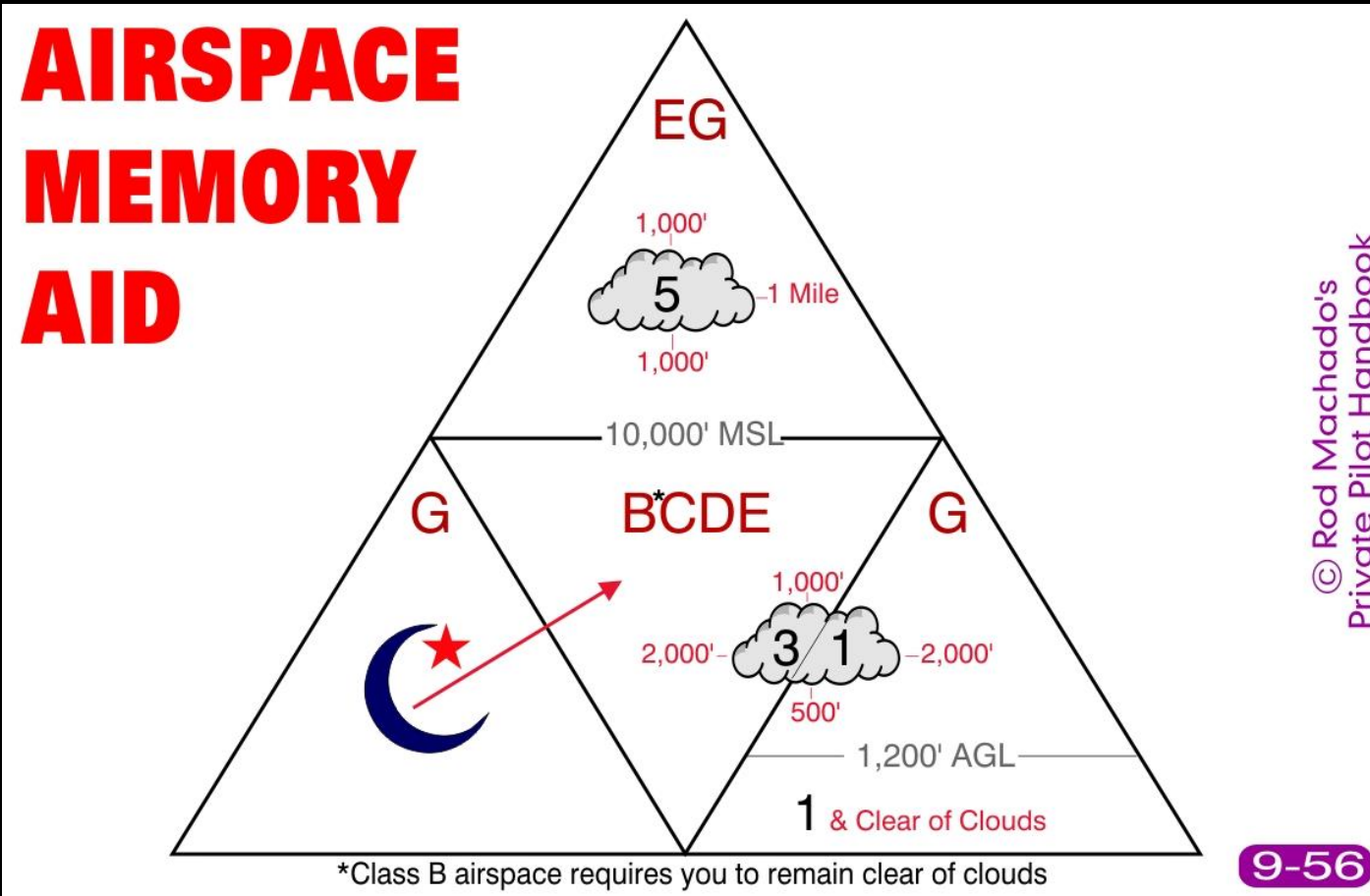
Satellite Airports Within Class D Airspace

- On occasion, another airport lies within the lateral boundaries of Class D airspace
- If you're landing at the uncontrolled airport you need to establish and maintain two-way radio communication with the primary airport prior to entering Class D airspace
- If taking off from the uncontrolled airport, you must establish contact with the primary tower as soon as practicable after departing



Airspace Visibility and Cloud Clearance Memory Aid

Class D

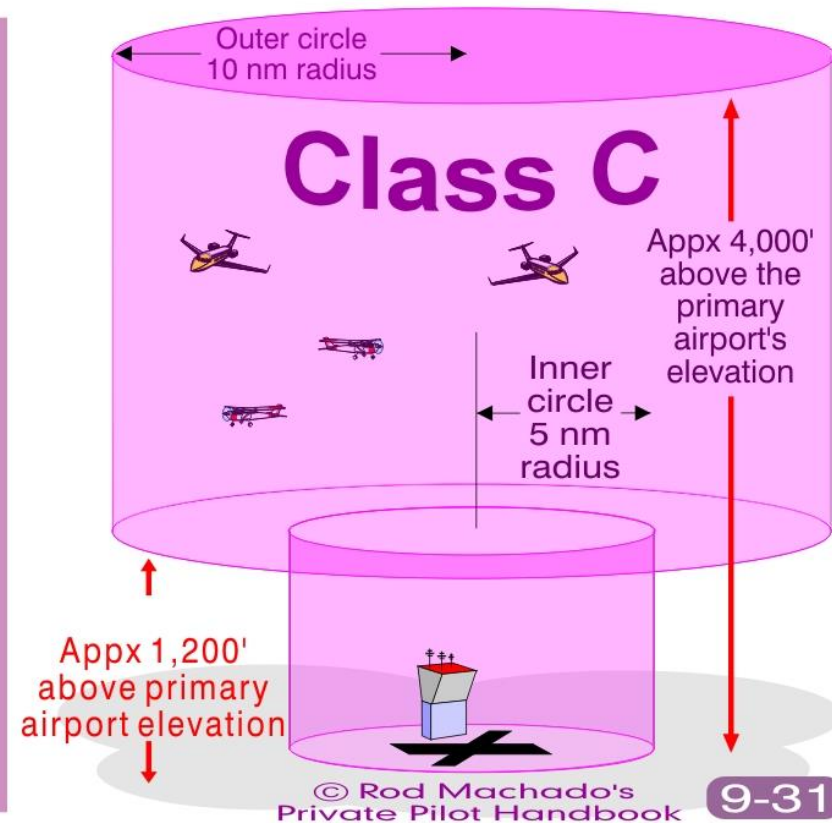


Class C Airspace

- An operating control tower as well as radar approach control services are associated with Class C airspace
- ATC provides basic radar service, sequencing, and separation between VFR and IFR aircraft
- Operating anywhere within the boundaries of Class C airspace requires that you establish and maintain communication with the appropriate ATC facility (usually Approach Control) prior to entering this airspace

DIMENSIONS OF CLASS C AIRSPACE

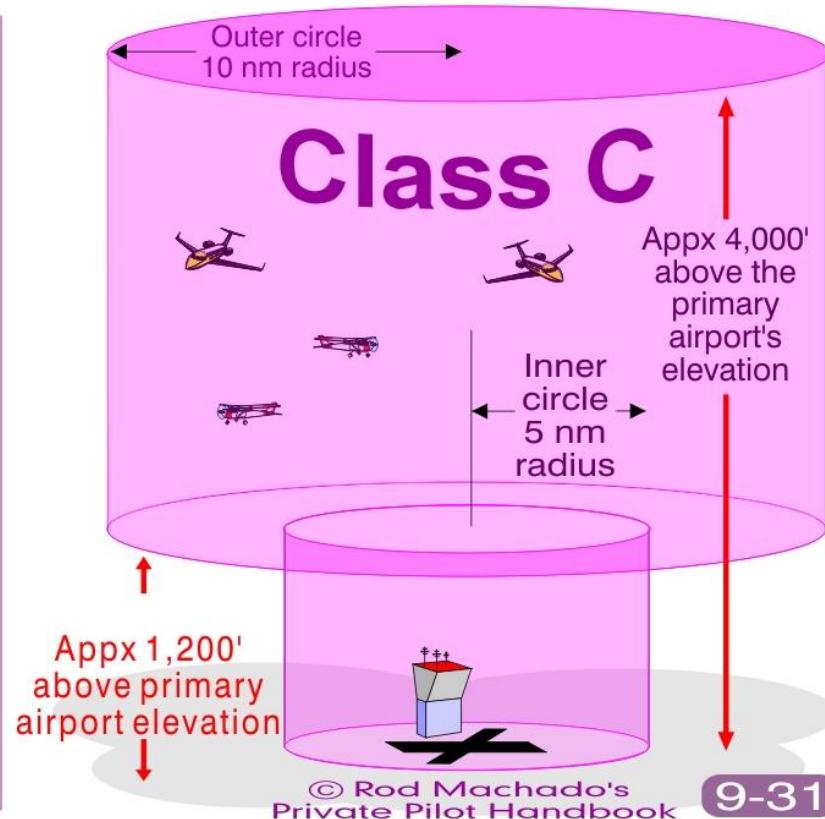
Operating anywhere within the boundaries of Class C airspace requires that you establish & maintain communication with the appropriate ATC facility (usually Approach Control) prior to entering this airspace. ATC provides basic radar service, sequencing and separation between VFR and IFR aircraft. A mixture of faster (🐟) & slower aircraft (🐟) is common in Class C airspace.



Class C Airspace

DIMENSIONS OF CLASS C AIRSPACE

Operating anywhere within the boundaries of Class C airspace requires that you establish & maintain communication with the appropriate ATC facility (usually Approach Control) prior to entering this airspace. ATC provides basic radar service, sequencing and separation between VFR and IFR aircraft. A mixture of faster (🛩️) & slower aircraft (🐟) is common in Class C airspace.



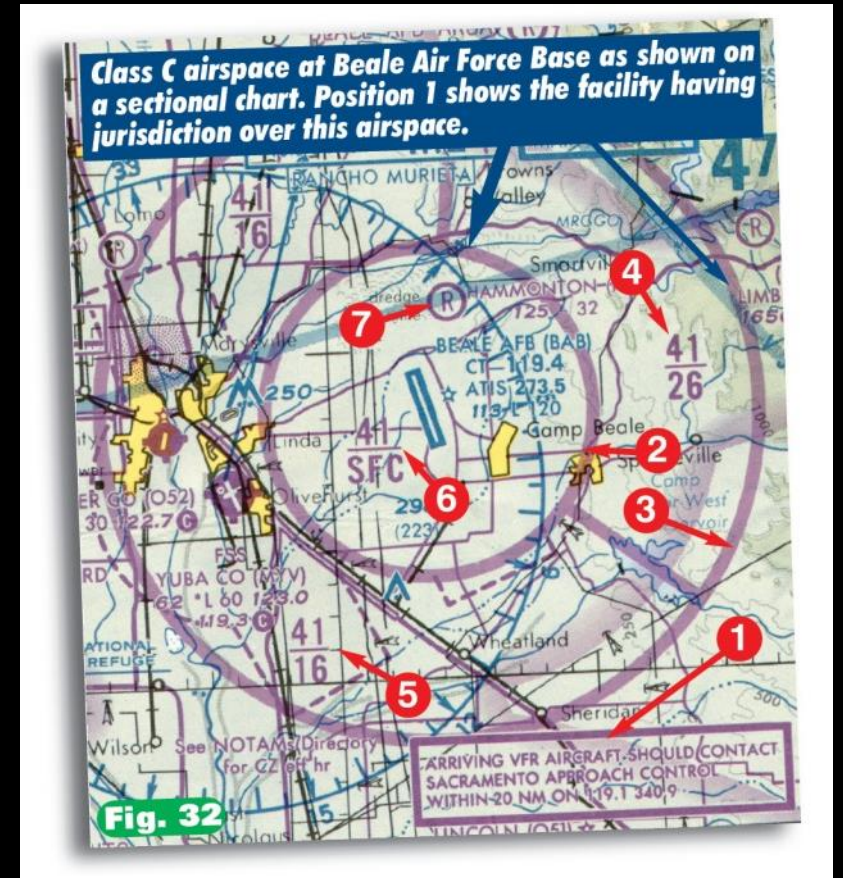
- The surface-based inner cylinder (the core surface area) extends upward to approximately 4,000 feet AGL and has a 5 nm radius from the center of the primary airport
- The upper cylinder (the shelf area) normally begins at 1,200 feet AGL and has a 10 nm radius from the center of the primary airport
- The upper limit of the top cylinder is generally found at 4,000 feet above the elevation of the primary airport
- It *also* provides this same service within a 20 nm radius of the primary airport (often defined as the outer area)

Equipment Requirements To Operate Within Class C Airspace

- Two-way radio communication is required in Class C as well as Class D airspace
- Operations within Class C airspace require a transponder with Mode C capability (an encoding altimeter) and ADS-B (out)
- This transponder and ADS-B (out) requirement also applies anywhere above the ceiling and within the lateral boundaries of Class C airspace upward to 10,000 feet MSL

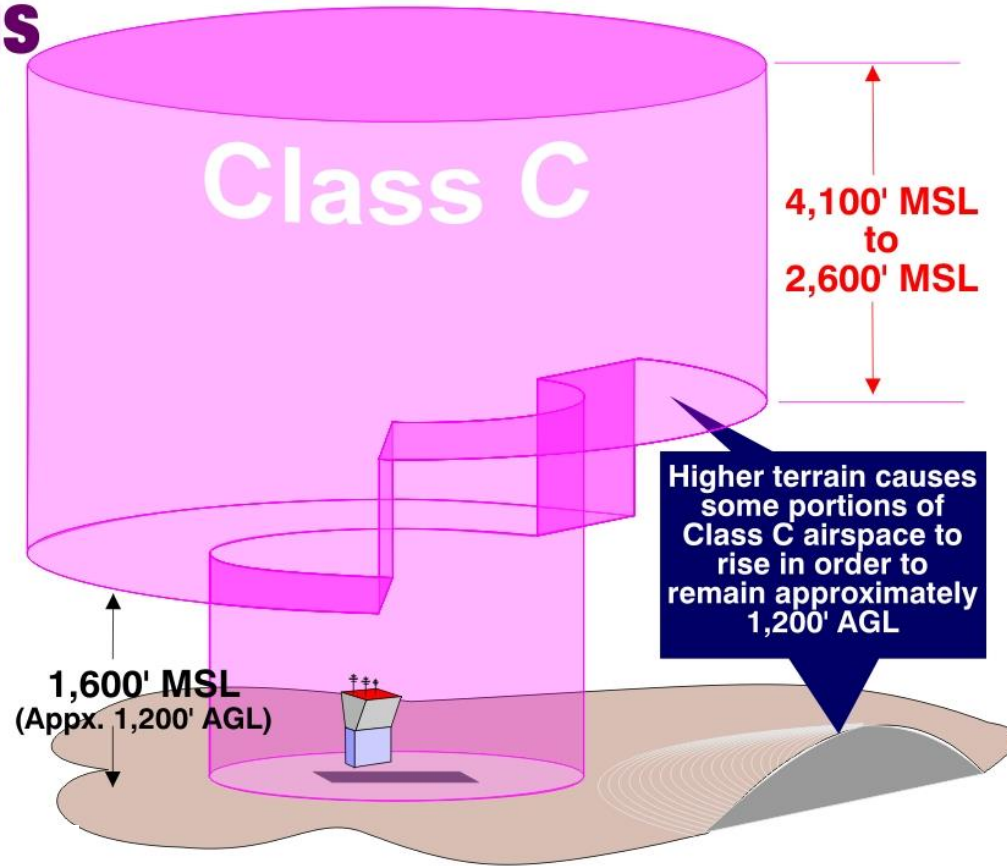
Class C Airspace

- Class C airspace is depicted on an aeronautical sectional chart by solid magenta rings surrounding the primary airport
- Elevation numbers show the boundaries of the inner and outer cylinder altitudes in MSL



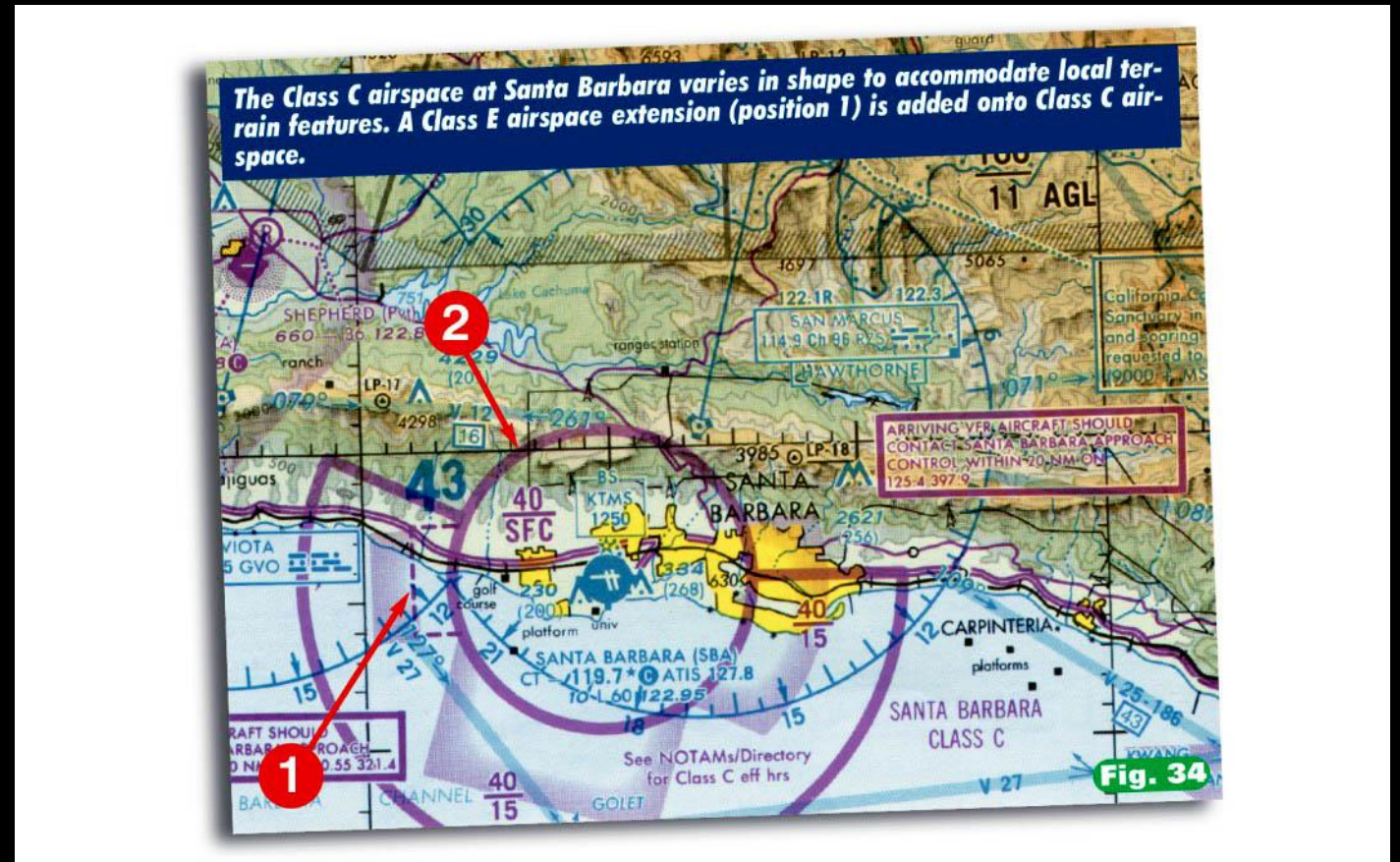
Variations in Class C Airspace

DIMENSIONS OF BEALE'S CLASS C AIRSPACE

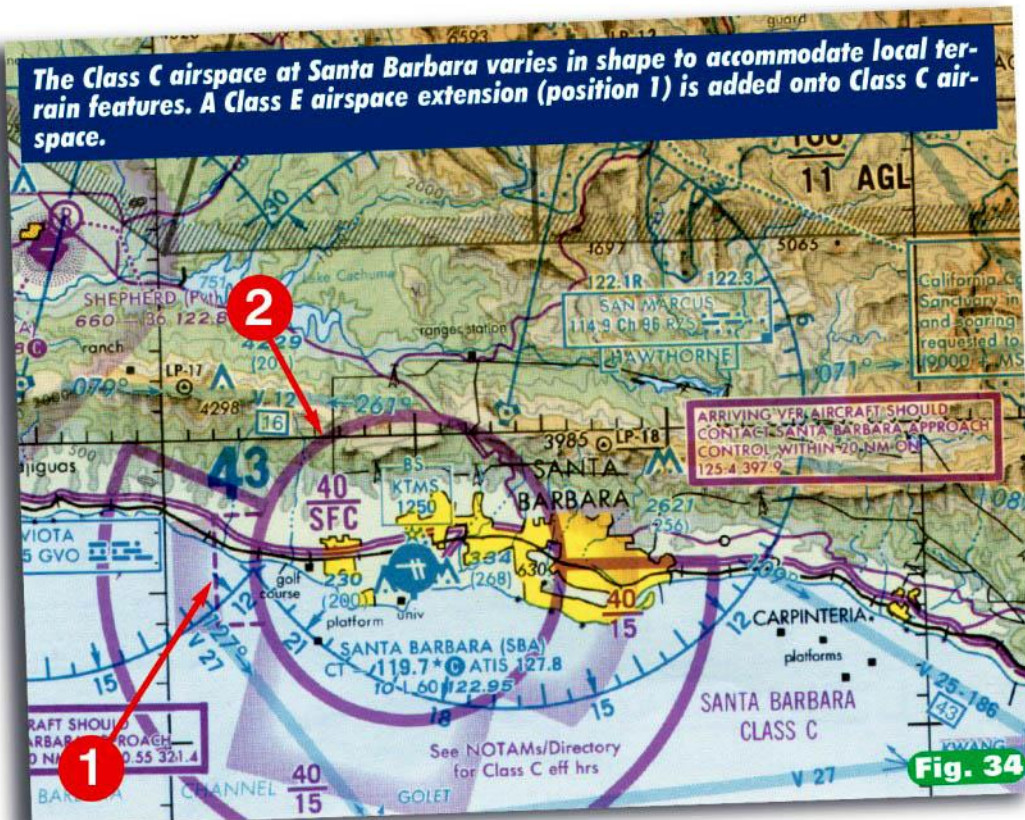


Variations in Class C Airspace

- A portion of the outer cylinder on the eastern side of the Class C airspace is missing
- Steeply rising terrain east of the airport necessitated removal of this section
- The inner cylinder of the Class C airspace is controlled airspace touching the surface



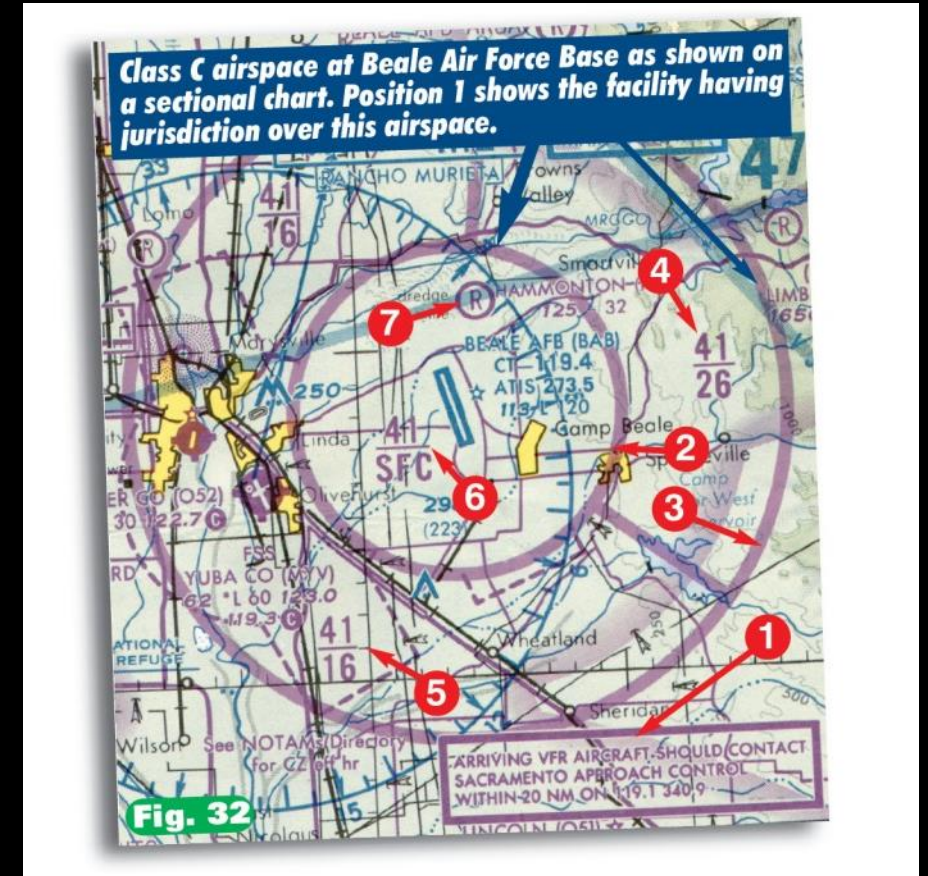
Variations in Class C Airspace



- An extension of Class E airspace is added onto the inner cylinder of Class C airspace
- Within this small segment of the magenta dashed line, Class E airspace extends from the surface upward to the overlying shelf of Class C airspace

Satellite Airports Within Class C Airspace

- You can depart a satellite airport without an operating control tower if you establish and maintain two-way radio communication with the appropriate ATC facility (usually approach or departure control) as soon as possible after departing



Class C Airspace Hours of Operation

The A/FD excerpt for Santa Barbara shows the hours of operation for Class C airspace (position 1). Notice that these hours coincide with the hours of operation of the tower (position 2) and approach/departure control (position 3). When Class C airspace isn't in effect, Class E airspace exists within the depicted surface boundaries (position 4).

SANTA BARBARA MUNI (SBA) 7 W UTC-8(-7DT) N34°25.57' W119°50.49' **LOS ANGELES**
 14 B S4 FUEL 100LL, JET A OX 1, 2, 3, 4 TPA—See Remarks LRA H-46, L-3D, 4F, 7A
 Class I, ARFF Index C IAP, AD

RWY 07-25: H6052X150 (ASPH-PFC) S-110, D-160, DT-245
 HIRL
 RWY 07: MALSR. Tree. Rgt tfc.
 RWY 25: REIL. VASI(V4L)—GA 3.0° TCH 46'. Fence.

RWY 15R-33L: H4184X100 (ASPH) S-48, D-63, DT-100 MIRL
 RWY 15R: REIL. Tree. RWY 33L: Tree. Rgt tfc.

RWY 15L-33R: H4180X75 (ASPH) S-35, D-41, DT-63
 RWY 15L: Thld dspcd 217'. Bldg. RWY 33R: Rgt tfc.

AIRPORT REMARKS: Attended 1330-0600Z±. Fee for fuel after hours call 805-964-6733 or 967-5608. Numerous flocks of birds on and in/ovf arpt. Rwy 15L-33R dalgt hrs only. Arpt has noise abatement procedures ctc arpt ops 805-692-6005. Due to limited ramp space at the airline terminal non-scheduled transport category acft with more than 30 passenger seats are required to ctc arpt ops 805-692-6005 24 hour PPR to arrival. Commercial airline ramp CLOSED to all General Aviation acft. TPA-1004(990) small acft, 1504(1490) large acft. Pure jet touch/go or low approaches prohibited. When twr clsd ACTIVATE MIRL Rwy 15R-33L CTAF.

WEATHER DATA SOURCES: ASOS (805) 681-0583.

COMMUNICATIONS: CTAF 119.7 ATIS 132.65 (805) 967-0283
 UNICOM 122.95
 HAWTHORNE FSS (HHR) TF 1-800-WX-BRIEF. NOTAM FILE SBA.

Ⓡ APP/DEP CON 125.4 (330°-150°) 124.15 127.725 120.55 (151°-329°) 124.15 127.725 (1400-0700Z±)
 Ⓡ L.A. CENTER APP/DEP CON 119.05 (0700-1400Z±)

TOWER 119.7 (1400-0700Z±) CLNC DEL 132.9 GND CON 121.7

AIRSPACE: CLASS C svc 1400-0700Z± ctc APP CON other times CLASS E.
RADIO AIDS TO NAVIGATION: NOTAM FILE HHR.

Fig. 35

Departing the Primary Airport within Class C Airspace

- When departing the primary airport in Class C airspace, the ATIS will often require you to contact Clearance Delivery for departure instructions
- Normally you will be given the departure control frequency, a transponder squawk code, and instructions on how to depart the area (such as a heading or a route to be flown)
- Must establish and maintain two-way radio communication with the control tower
- After departure, you must communicate as instructed by ATC while operating within this airspace
- This means you'll be handed off from the tower to Departure Control when leaving the airport

Weather Minimums For Class C Airspace

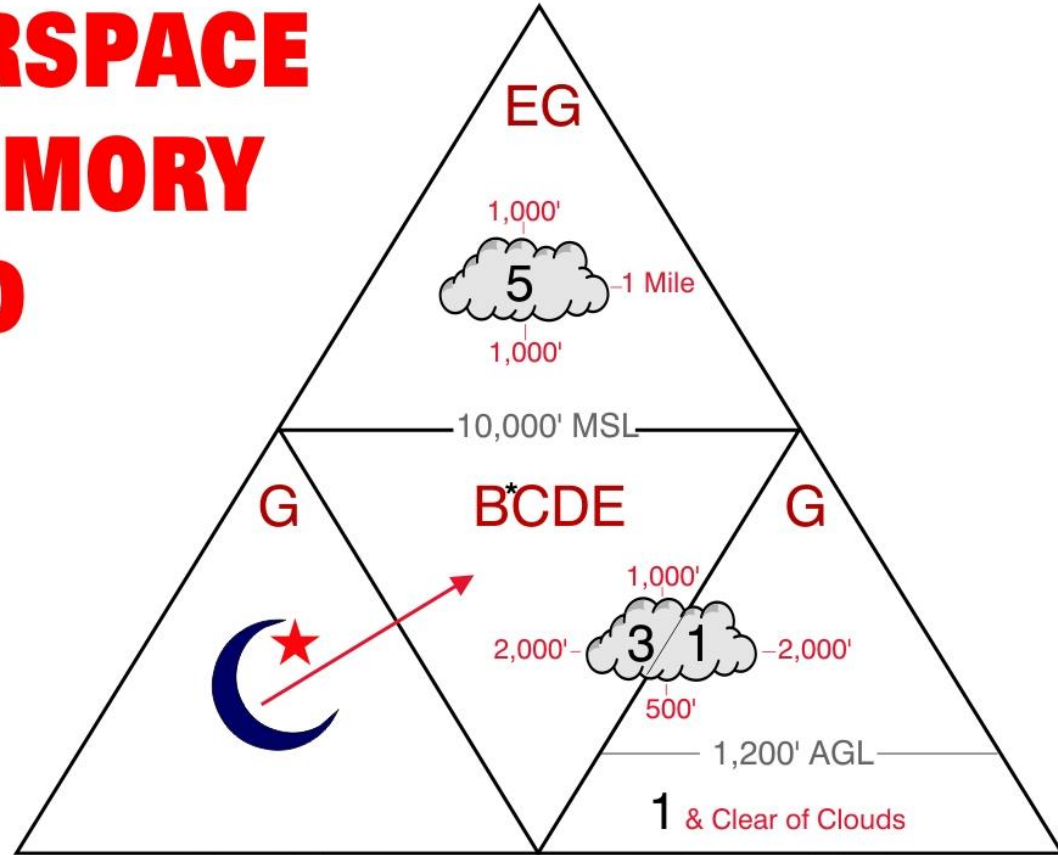
- The weather minimums for Class C airspace are the same as they are for Class D, and Class E airspace below 10,000 feet MSL
- 3 sm visibility, 1,000 feet above any clouds, 500 feet below clouds, 2,000 feet laterally from clouds (while airborne)
- Class C airspace is surface-based controlled airspace

Weather Minimums For Class C Airspace

- Taking off, landing or operating in the traffic pattern of an airport having any type of surface-based controlled airspace established for it requires a minimum of 3 sm visibility and 1000-foot ceiling
- This is reported *ground visibility*
- When it's not reported, the pilot must maintain at least 3 sm *flight visibility*
- If weather conditions are less than 3 sm reported ground visibility or less than a 1,000-foot ceiling (if a ceiling exists), an SVFR clearance is required before taking off, landing, or entering the traffic pattern within the surface-based portion of Class C airspace (and its Class E extension) below 10,000 feet MSL

Airspace Visibility and Cloud Clearance Memory Aid *Class C*

AIRSPACE MEMORY AID



*Class B airspace requires you to remain clear of clouds



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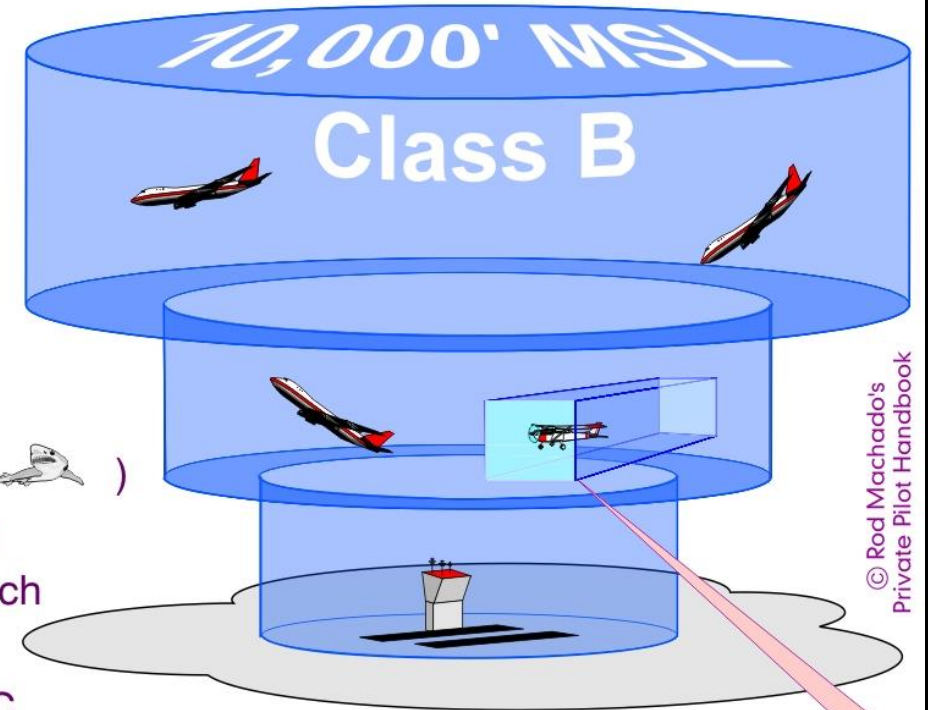
Class B Airspace

- Typically has a radius of 15 to 30 miles from the primary airport and it extends vertically from the surface to 10,000 feet MSL

CLASS B AIRSPACE

Class B airspace may resemble an inverted wedding cake. Its multiple tier structure is designed to keep larger aircraft () and small aircraft () separated as they approach or overfly the primary airport. This is why an ATC clearance is required when operating anywhere within Class B airspace.

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Some Class B airspace structures have a corridor allowing flight that's exempt from Class B airspace entry requirements.

Class B Airspace

- Boundaries are defined by solid blue lines surrounding the primary airport
- The rings and segments are often made up of DME arcs and/or radials or bearings from local VORs
- With GPS or DME capability, pilots can determine position relative to the individual rings of this Class B airspace
- 200 knots indicated airspeed when operating below the lateral limits or within VFR Corridor

Class B Airspace for Dallas-Ft. Worth Intl. Airport



Requirements to Enter Class B Airspace

- To take off or land at an airport or to fly through the airspace, must hold at least a private pilot's license
- An exception exists for student pilots seeking private pilot certification who were given the instruction and appropriate logbook endorsement required by FAR 61.95
- Three miles visibility and clear of clouds
- ATC clearance is required before operating in Class B airspace
- Clearance must be obtained from the ATC facility having jurisdiction over that area
- While you need only establish and maintain communication for Class C or D airspace, you need to obtain a clearance to enter Class B airspace

Class B Airspace Equipment Requirements

- Transponder with Mode C capability and ADS-B (out)
- For IFR pilots, a VOR receiver or RNAV system is required
- If the Class B airspace doesn't extend to 10,000 feet MSL, a transponder with Mode C capability and ADS-B (out) is required when operating above the ceiling and within the lateral boundaries of Class B airspace

Class B Mode C Ring

- Mode C transponder plus ADS-B (out)



A transponder having Mode C or S capability is also required from the surface to 10,000 feet MSL, when operating within 30 nm of certain high-capacity airports having Class B airspace. This requirement is identified by the presence of a magenta ring around these airports as shown in Figure 41, position A.

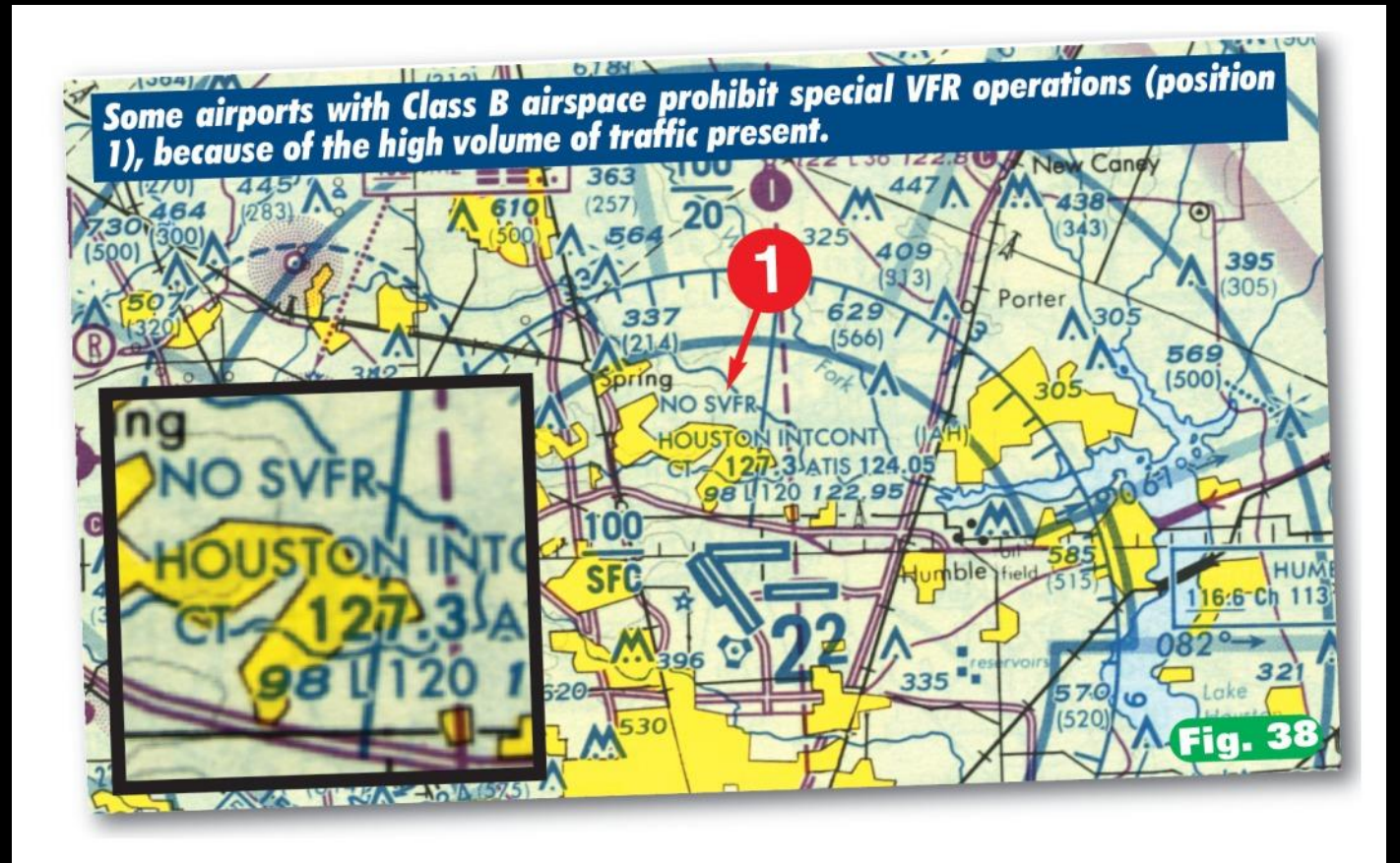


Additional Requirements In Surface-Based Controlled Airspace (B,C,D,E)

- Visibility
 - The reported ground visibility at the airport must be at least 3 sm
 - If the ground visibility isn't reported, then the flight visibility during takeoff, landing or when operating in the traffic pattern must be at least 3 sm
- Ceiling
 - If a ceiling exists at that airport, it can be no lower than 1,000 feet AGL
 - A ceiling is defined as the height above the earth's surface of the lowest layer of clouds reported as broken or overcast, or any reported vertical visibility into obscuring phenomena

Special VFR Within Class B Airspace

- A special VFR clearance is required if not 3 SM / 1000-foot ceiling
- Special VFR (SVFR) operations may be unavailable (NO SVFR)



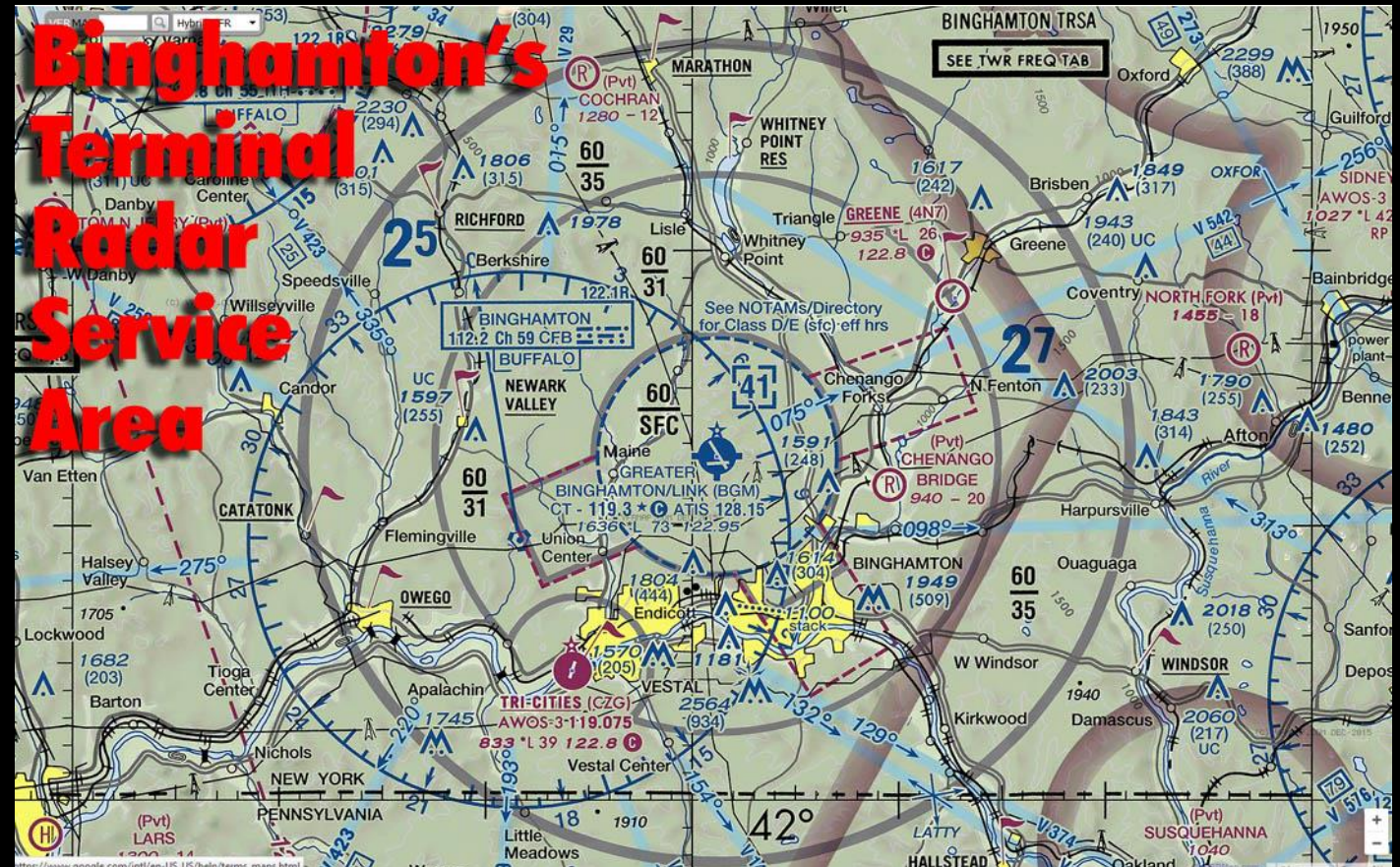
VFR Corridor

- Special Flight Rules Area
- No ATC clearance required
- Use VFR Terminal Area Chart
- 200 knots maximum IAS when operating below the lateral limits (or through a VFR corridor) of Class B airspace area



Terminal Radar Service Area (TRSA)

- ATC provides sequencing and separation between all participating VFR aircraft and all IFR aircraft
- Boundaries are identified by a black line
- TRSA's have variable sizes and shapes but usually contain a surface-based layer around the primary airport with one, two or more elevated cylinders of airspace
- Altitudes for the different layers are shown within the individual rings



Terminal Radar Service Area (TRSA)

- Refer to the frequency tab on the edges of the sectional chart to identify the appropriate approach control frequencies
- The CS also contains this information
- Pilot participation in the TRSA service is recommended, but not mandatory
- If you don't want TRSA service, you should state, "Negative TRSA service"

THE SECTIONAL CHART'S FREQUENCY TAB

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

FACILITY	FREQUENCIES	SERVICE AVAILABILITY
WINDSOR LOCKS CLASS C	123.95 290.55 (061°-240°) 125.35 281.5 (241°-060°) 127.225 323.2	CONTINUOUS
BINGHAMTON TRSA	118.6 257.625 (SFC TO 5000') ← 1 127.55 257.625 (6000'-8000') O/T 132.175 298.9 NEW YORK CNTR	0600-2400

Fig. 45

The frequency tab found on the sectional chart shows the approach control frequencies for TRSA service at Binghamton (position 1). These frequencies are based on the listed bearings from the primary airport (Binghamton in this instance).

The Chart Supplement also contains similar information about the Binghamton TRSA and contact location information based on altitudes at Binghamton (position 2).

BINGHAMTON

GREATER BINGHAMTON/EDWIN A LINK FLD (BGM)(KBGM) 7 N UTC-5(-4DT) NEW YORK
N42°12.51' W75°58.78' H-10H, 11C, 12J, L-30J, 32F 33A
IAP, AD

COMMUNICATIONS: CTAF 119.3 ATIS 128.15 UNICOM 122.95

BINGHAMTON RCO 122.1R 112.2T (BUFFALO RADIO)

Ⓡ BINGHAMTON APP/DEP CON 118.6 (Sfc-5000') 127.55 (6000-8000') (1100-0500Z‡)

Ⓡ NEW YORK CENTER APP/DEP CON 132.175 (0500-1100Z‡) ← **2**

BINGHAMTON TOWER 119.3 (1100-0500Z‡) GND CON 121.9 CLNC DEL 125.0

CLEARANCE DELIVERY PHONE: For CD if una to ctc on FSS freq, ctc New York AR 531-468-1425.

AIRSPACE: CLASS D svc 1100-0500Z‡; other times CLASS E.

TRSA svc ctc APP CON

Fig. 46

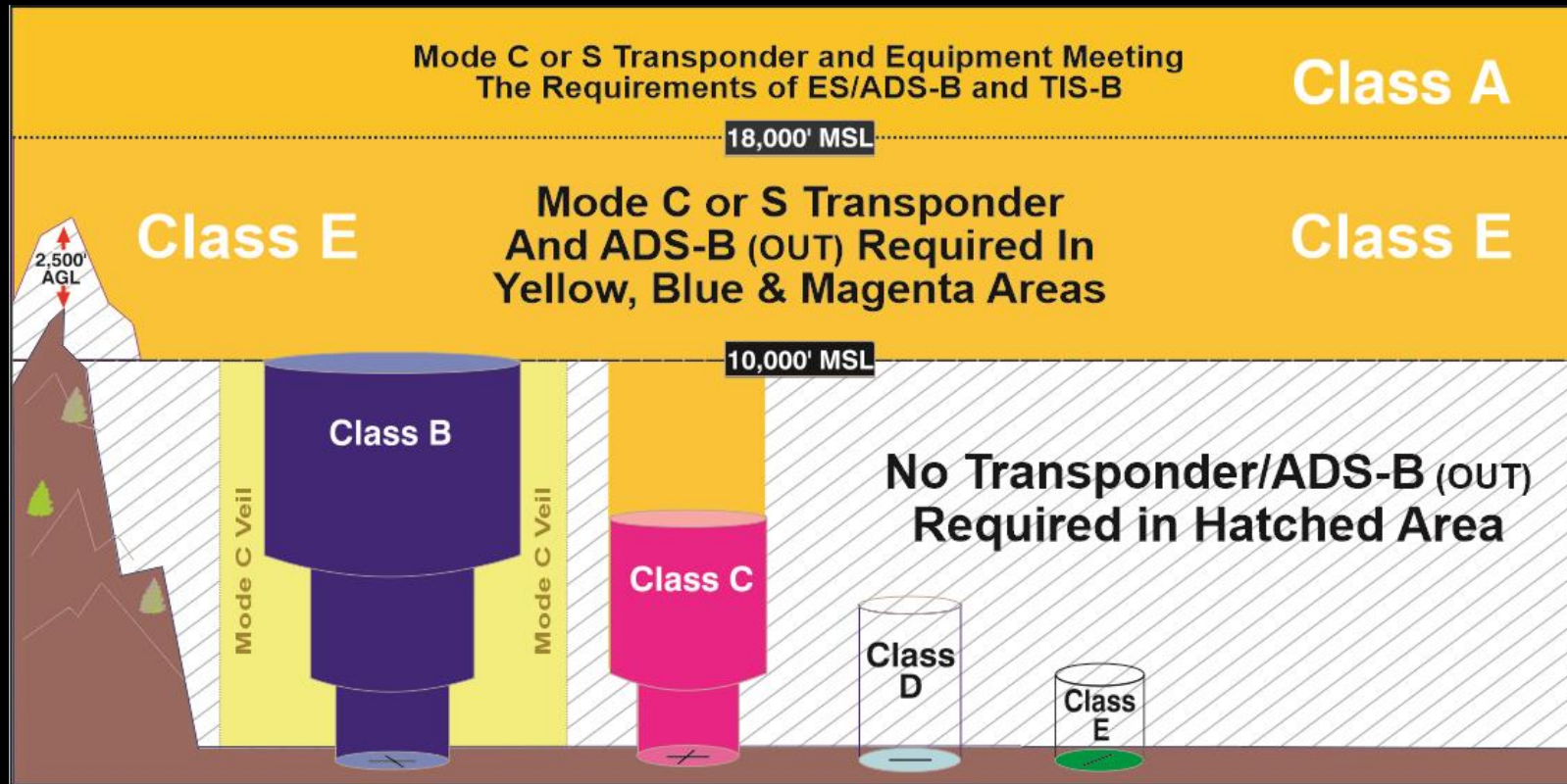
Transponder Mode C Requirements

- Several airports require a transponder with Mode C capability from the surface to 10,000' MSL when operating within 30 nm of that airport
- Denoted on sectional chart by magenta colored ring surrounding the primary airport listing this Mode-C requirement (Mode C Ring)

Transponder Mode C Requirements

- A transponder with Mode C (or S) and ADS-B Out is required in all the airspace of the 48 contiguous United States when operating at and above 10,000 feet MSL, excluding the airspace at and below 2,500 feet AGL
- If your aircraft has Mode C transponder and ADS-B (out) it must be turned on any time you are operating in controlled airspace, even if not required by the specific airspace you are operating in
- Use the code assigned by ATC, or the VFR code (1200) when not in contact with ATC

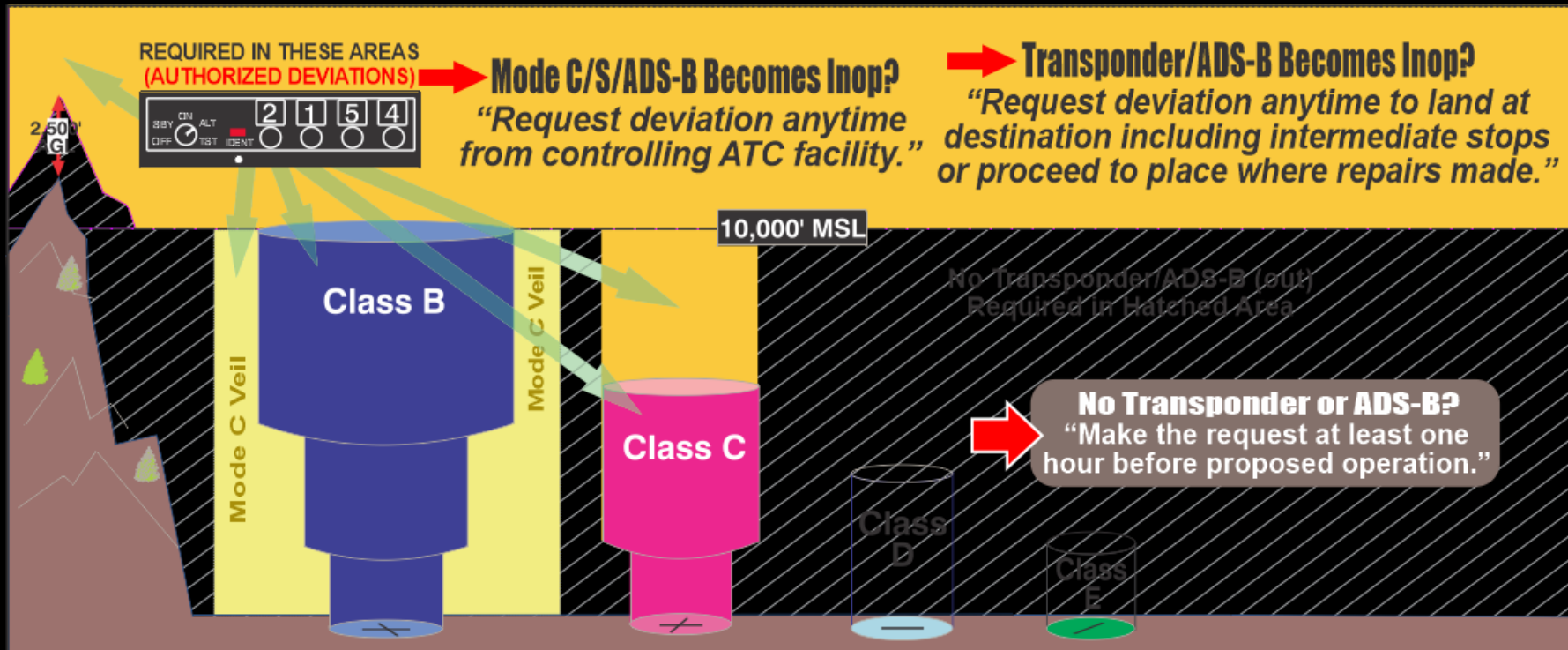
Mode C and ADS-B Requirements



Transponder and Mode C Deviations

- If transponder lacks Mode C capability, you can request a deviation to operate within airspace requiring Mode C with the ATC facility having jurisdiction over that airspace.
- If you have a transponder that is temporarily inoperative advise controller of any intermediate stops
- If airplane doesn't have a transponder at all, a request must be submitted at least one hour in advance

Transponder and Mode C Deviations



Entry, Equipment, and Pilot Requirements Summary

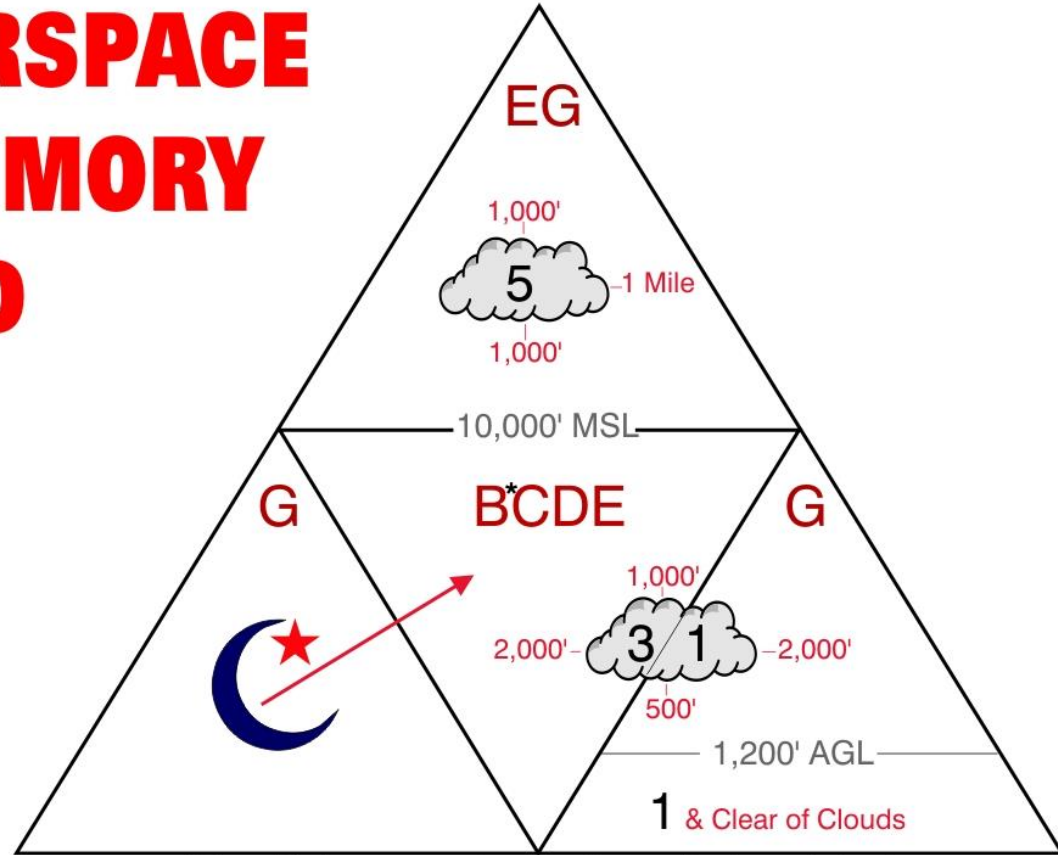
Class Airspace	Entry Requirements	Equipment	Minimum Pilot Certificate
A	ATC clearance	IFR equipped	Instrument rating
B	ATC clearance	Two-way radio, transponder with altitude reporting capability	Private—(However, a student or recreational pilot may operate at other than the primary airport if seeking 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

Speed Restrictions

- 250 knots below 10,000 feet MSL in any airspace
- 200 knots indicated airspeed when operating below the lateral limits (or through a VFR corridor) of Class B airspace area
- When any aircraft is within 4 nm of the primary airport in Class C and D airspace and at or below 2,500 feet AGL, a 200-knot speed restriction applies

Airspace Visibility and Cloud Clearance Memory Aid *Class B*

AIRSPACE MEMORY AID



*Class B airspace requires you to remain clear of clouds

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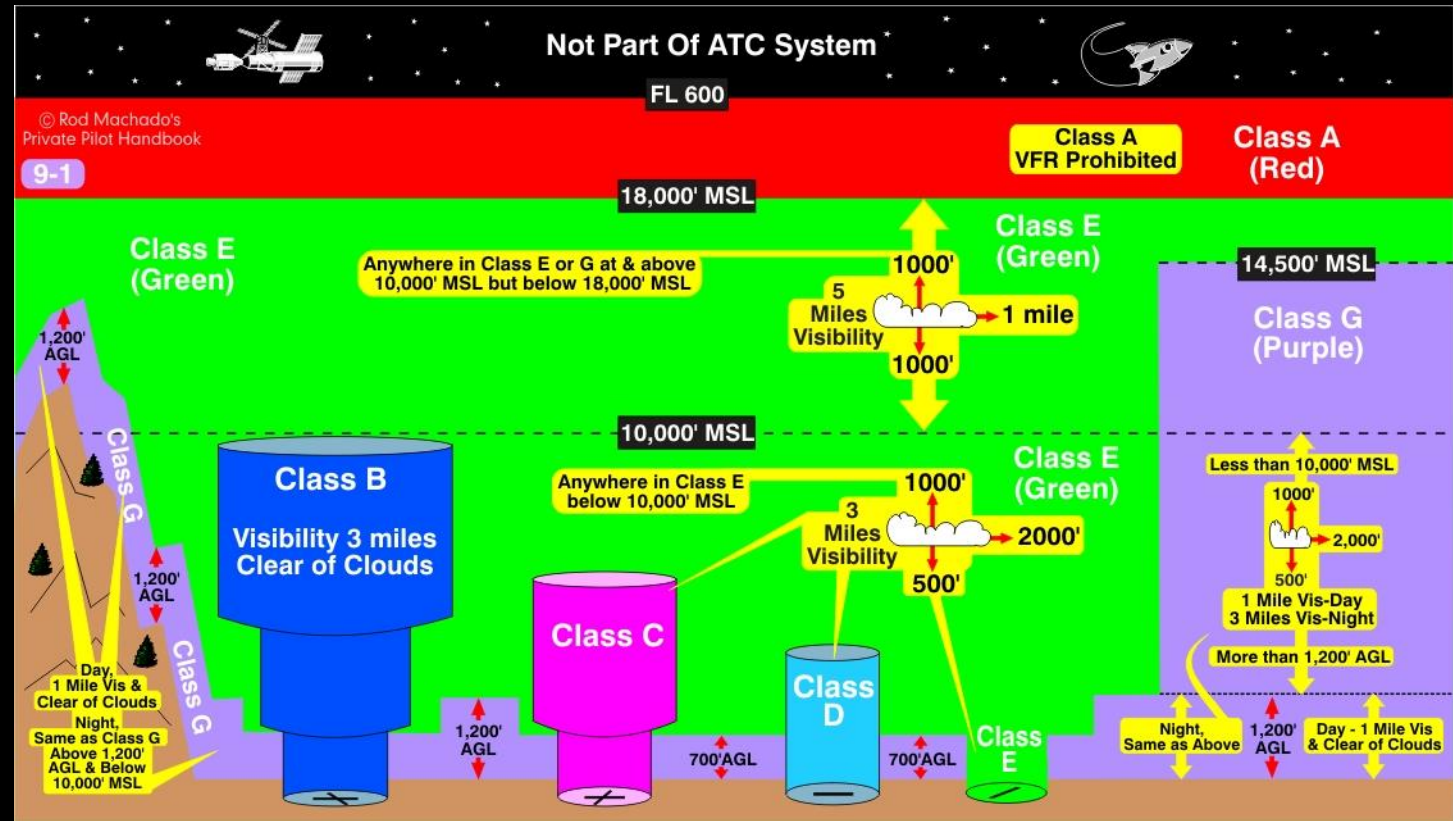
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Uncontrolled Airspace

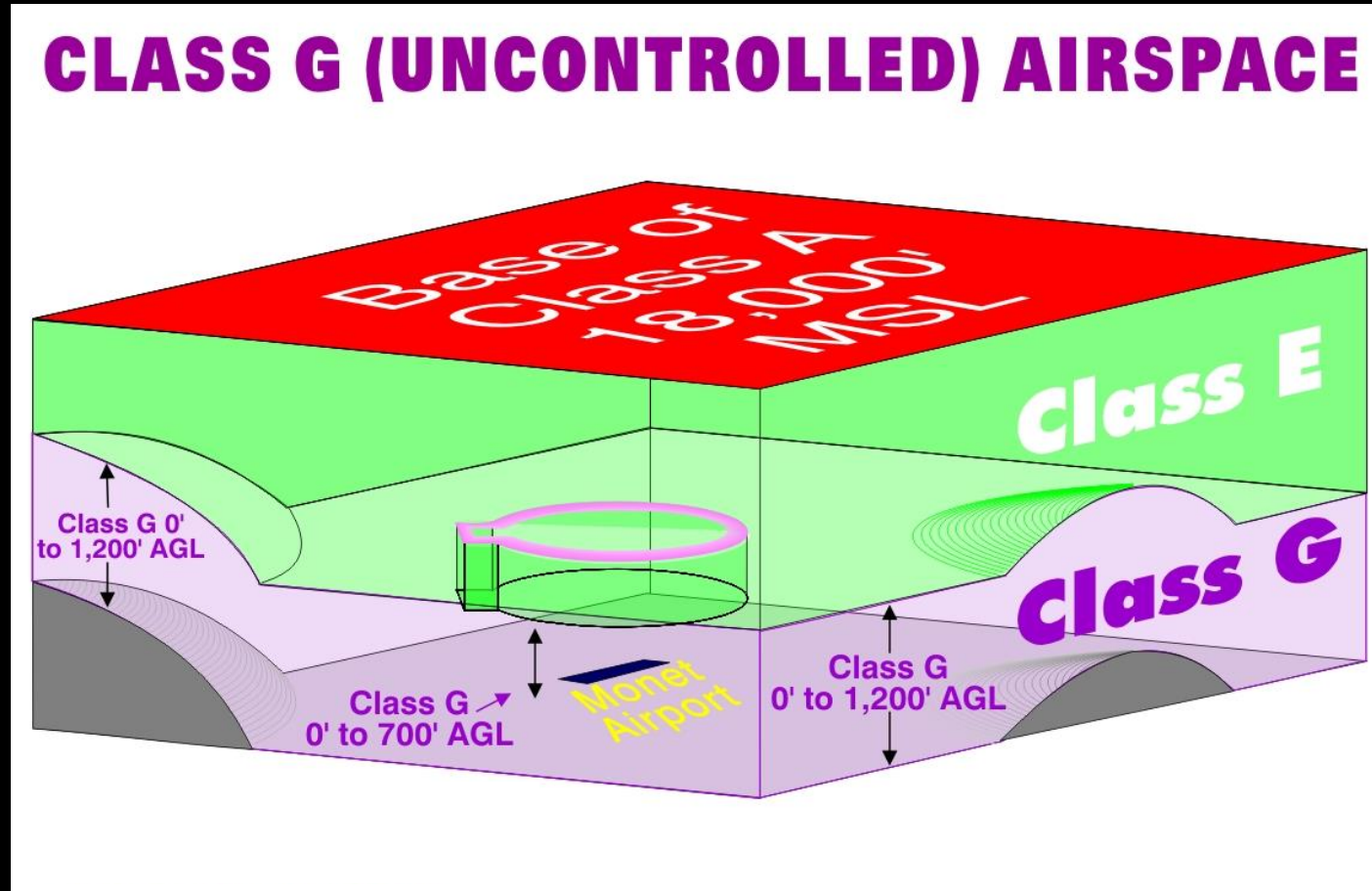
National Airspace System

Class G Airspace

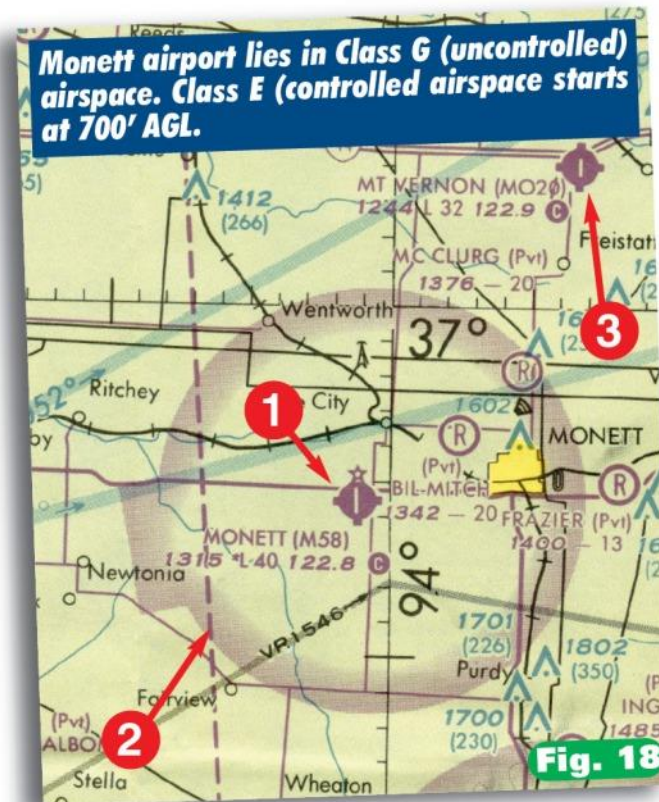
- Class G airspace is *uncontrolled* airspace
- The only place near the surface where you won't find Class G airspace, is within the surface-based controlled airspace that surrounds an airport



Class G (Uncontrolled) Airspace



Class G (Uncontrolled) Airspace







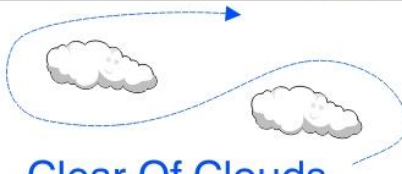


Night Operations in Class G Airspace at 1,200 Feet AGL And Below

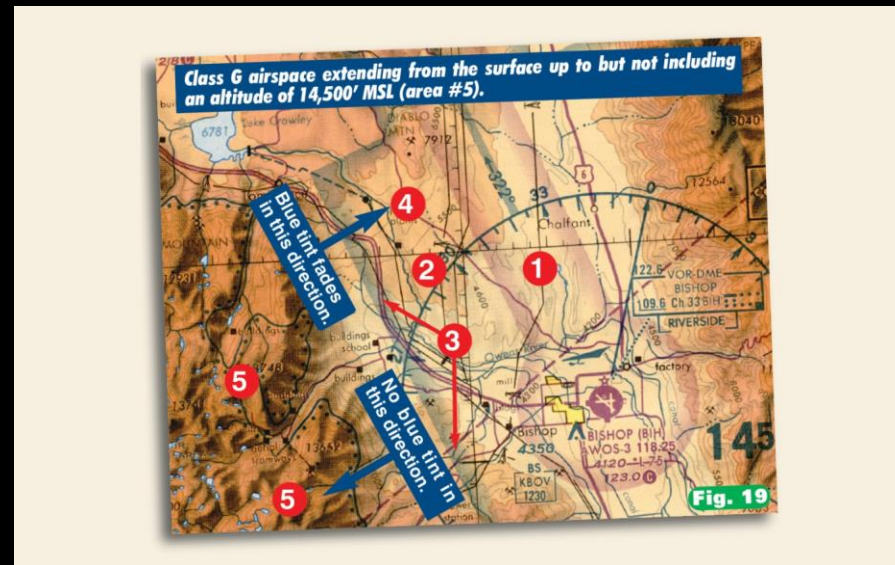
- Stricter basic VFR minimums at night in Class G airspace
- If you are operating in Class G airspace at or below 1,200' AGL, from sunset to sunrise, the Class E (less than 10,000 feet) airspace minimums apply
- One exception to nighttime minimums exists for airplanes operating in Class G airspace while in the traffic pattern:
 - If the flight visibility is less than 3 sm but not less than 1 sm during night hours, an airplane may be operated clear of clouds if it is flown in the airport traffic pattern within 1/2 mile of the runway

Class G Airspace VFR Weather Minimums 1,200 Feet AGL or Less

CLASS G MINIMUMS

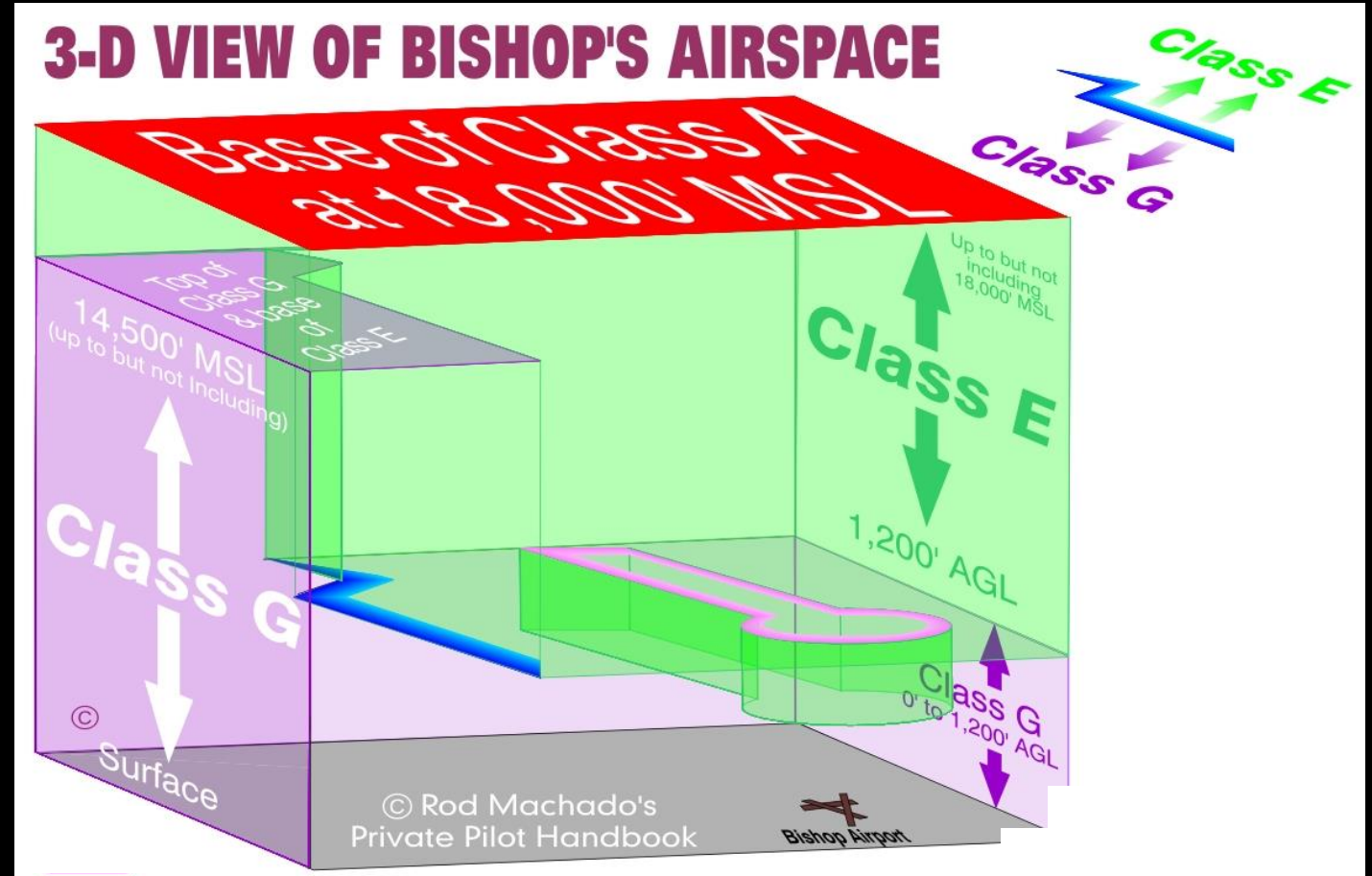
Airspace/Altitude		Visibility	Cloud Clearance
Class G airspace 1,200 feet or less AGL regardless of MSL altitude	Night ★ ★ ★ ★ ★	3 Miles Visibility  	1,000' 2,000' —  — 500'
	Day 	1 Mile Visibility  	 Clear Of Clouds

Operations In Class G Airspace Above 1,200 Feet AGL

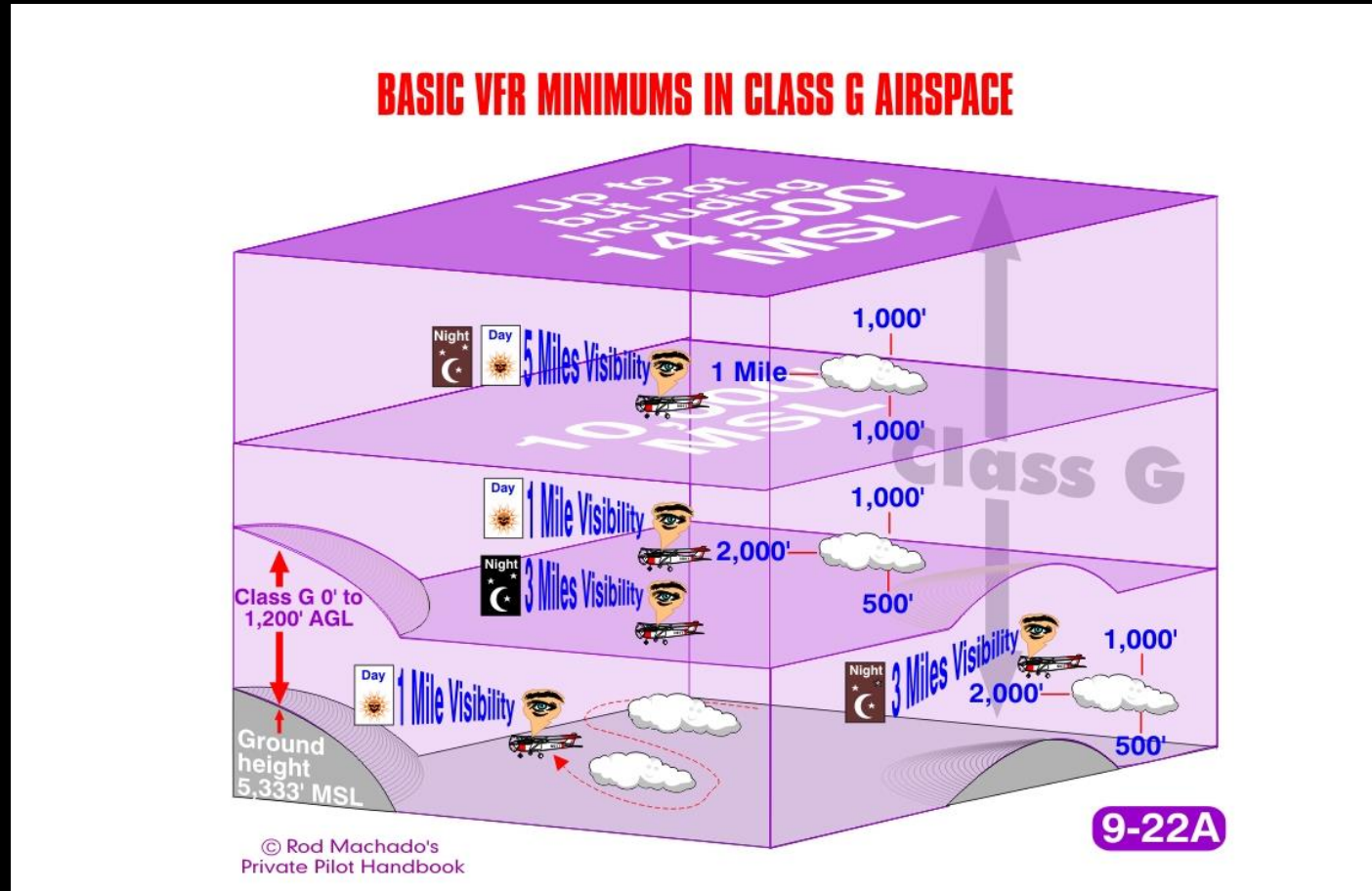


Class G Airspace Above 1,200 Feet AGL

- The direction the blue tinted line fades indicates where Class E (controlled) airspace begins at 1,200' AGL
- On the opposite side of the blue tinted line is Class G (uncontrolled) airspace from the surface, up to but not including 14,500' MSL

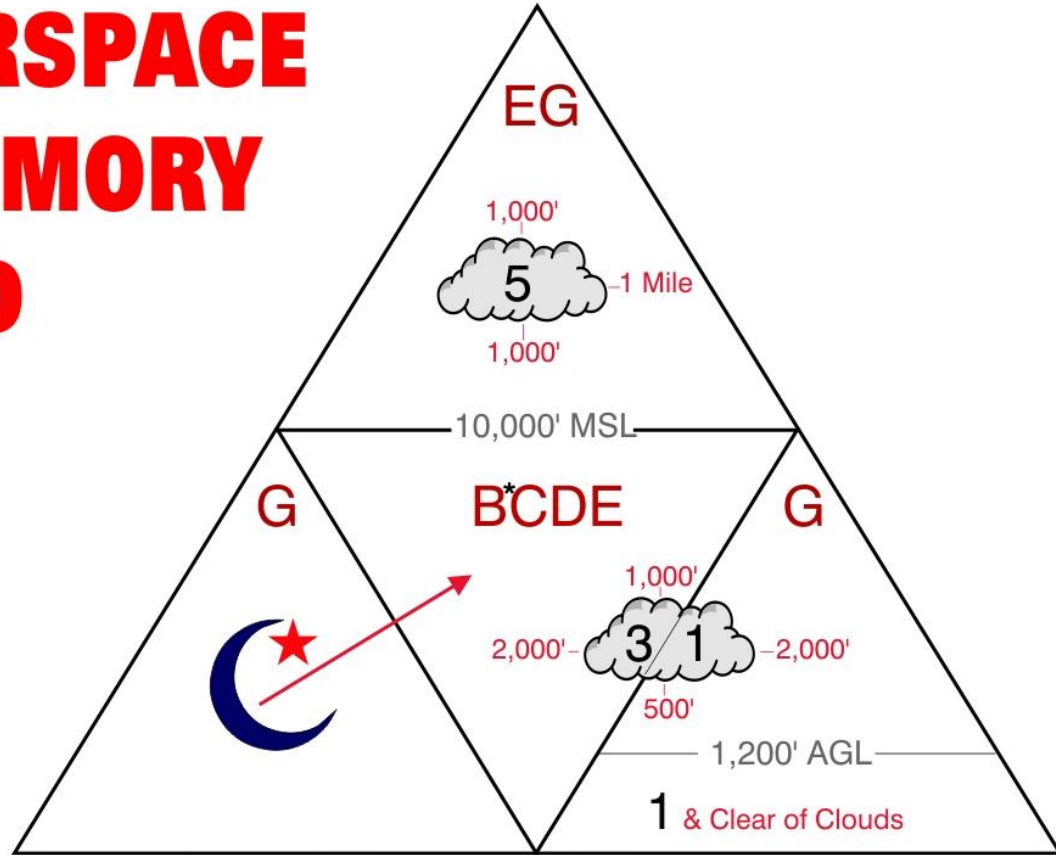


VFR Weather Minimums for Class G Airspace



Airspace Visibility and Cloud Clearance Memory Aid *Class G*

AIRSPACE MEMORY AID

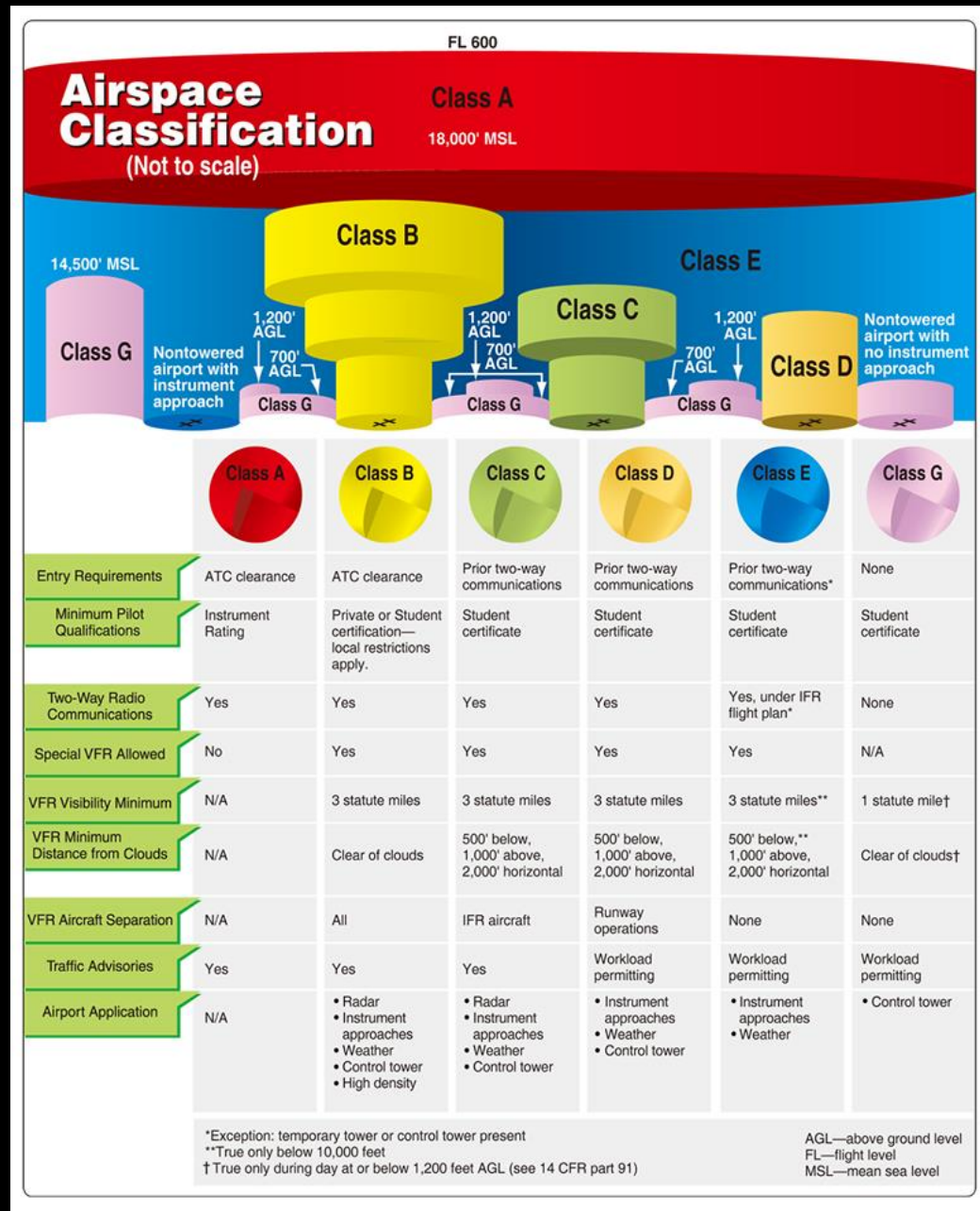


*Class B airspace requires you to remain clear of clouds

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Airspace Summary



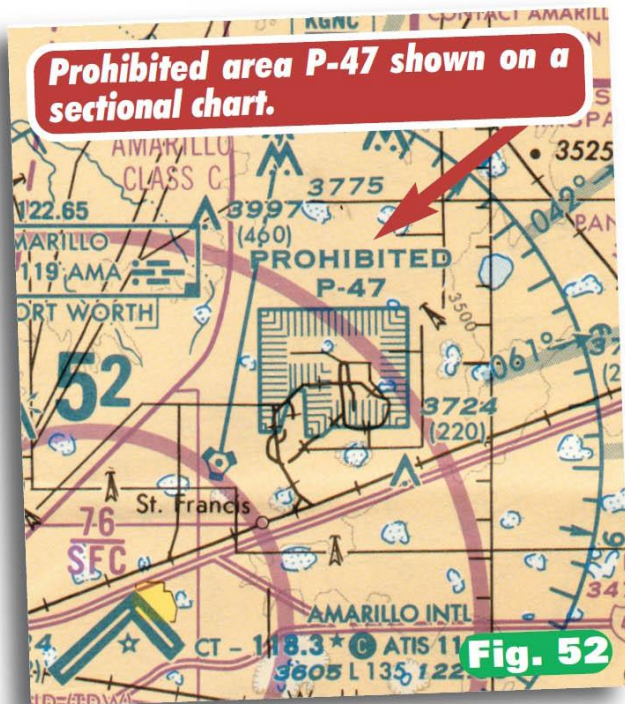
Special-Use Airspace

National Airspace System

Prohibited Areas

- Flight is prohibited
- Protects sensitive sites as in the White House, national security areas, or secret military installations
- Defined by blue-hatched lines within the prohibited area
- Under the special use airspace section shown on the sides of the sectional chart is a listing of different special use airspace segments as well as their limitations

Prohibited Areas



THE SECTIONAL CHART'S SPECIAL USE AIRSPACE TAB

The sectional chart's special use airspace tab provides information on prohibited area P-47.

SPECIAL USE AIRSPACE ON DALLAS-FT. WORTH SECTIONAL CHART

Fig. 53

Unless otherwise noted altitudes are MSL and in feet; time is local.
 Contact nearest FSS for information.
 †Other time by NOTAM contact FSS

The word "TO" an altitude means "To and including."
 "MON-FRI" indicates "Monday thru Friday"
 FL - Flight Level
 NO A/G - No air to ground communications

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

NUMBER	LOCATION	ALTITUDE	TIME OF USE	CONTROLLING AGENCY**
P-47	AMARILLO, TX	TO 4800		
R-5601 A	FORT SILL, OK	TO 40,000	CONTINUOUS	NO A/G
R-5601 B	FORT SILL, OK	TO 40,000	CONTINUOUS	ZFW CNTR
R-5601 C	FORT SILL, OK	TO 40,000	CONTINUOUS	ZFW CNTR
R-5601 D	FORT SILL, OK	TO 40,000	CONTINUOUS	ZFW CNTR
R-5601 E	FORT SILL, OK	500 AGL TO 16,500	SR-SS TUE-SAT†	ZFW CNTR
R-5601 E	FORT SILL, OK	500 AGL TO 6000	SR-SS TUE-SAT†	ZFW CNTR
A-561	FREDERICK, OK	TO 4000	0700-2300 MON-FRI	NO A/G

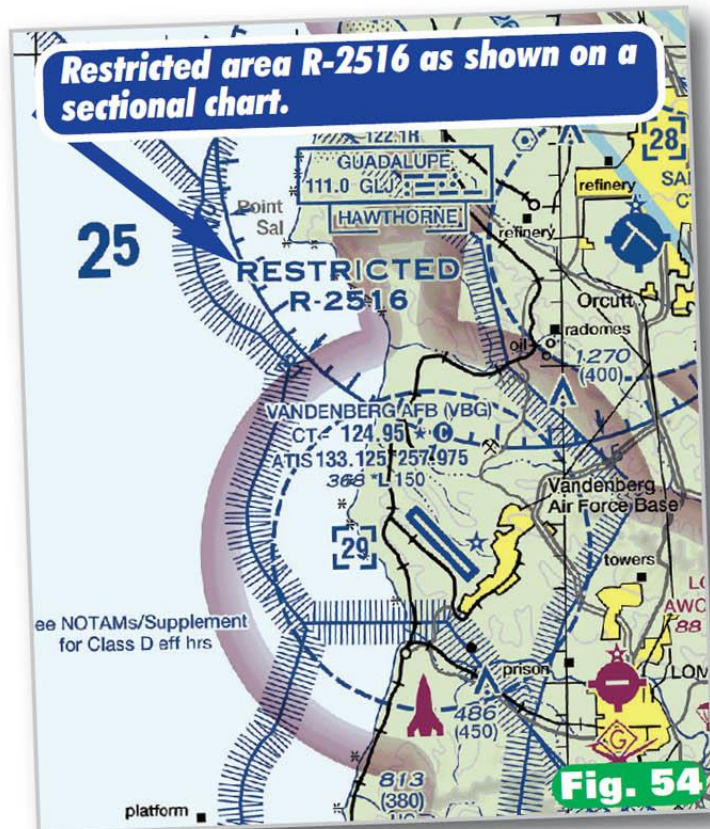
Restricted Area

- Restrict flights due to the unusual activities conducted within them
- These areas often contain invisible hazards to aircraft such as the firing of artillery, aerial gunnery, guided missiles, etc.

Restricted Area

- Identified by blue-hatched lines like prohibited areas
- Either a P or an R next to its identifying number
- Permission from the controlling agency is required
- Some restricted areas have designated hours or days of operation

Restricted Area



SPECIAL USE AIRSPACE ON LOS ANGELES SECTIONAL CHART

Unless otherwise noted altitudes are MSL and in feet. Time is local.
 "TO" an altitude means "To and including."
 FL - Flight Level
 NO A/G - No air to ground communications.
 Contact Flight Service for information.

Note: Special Use Airspace (SUA) NOTAMS are issued when SUA is active outside scheduled/published times. NOTAMS to be discussed in last chapter.

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

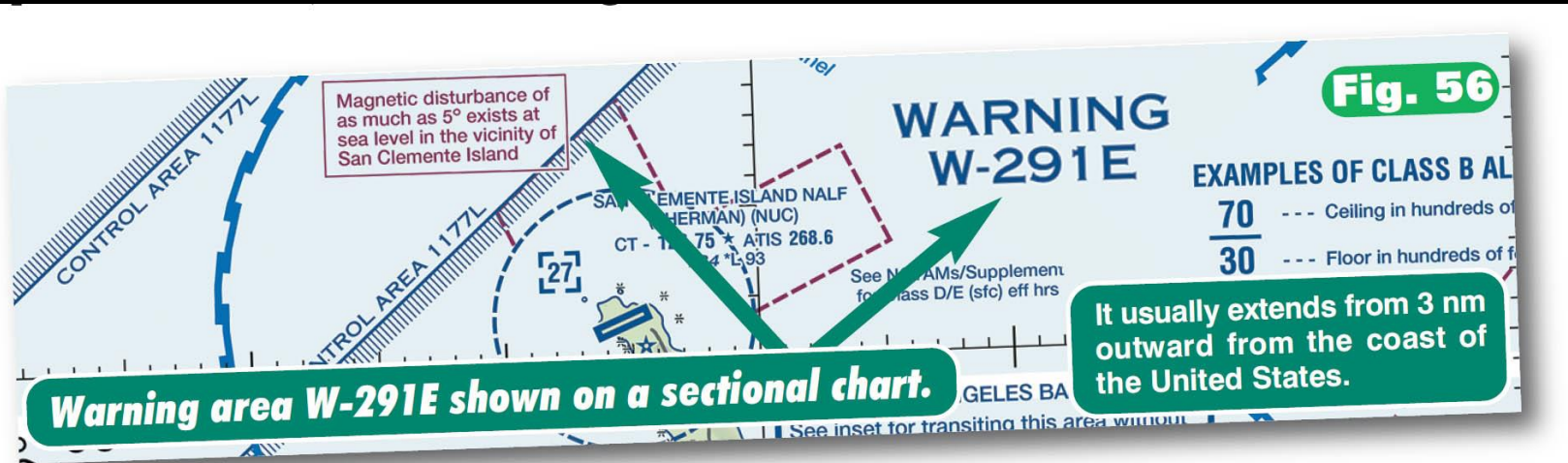
NUMBER	ALTITUDE	TIME OF USE	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
R-2501 A, B, C	UNLIMITED	CONTINUOUS	LOS ANGELES CNTR	126.35
R-2501 D, E	UNLIMITED	CONTINUOUS	LOS ANGELES CNTR	128.15
R-2502 A	TO 16,000	CONTINUOUS	LOS ANGELES CNTR	
R-2512	TO 23,000	0600-2300 †24 HRS IN ADVANCE	YUMA MCAS/YUMA INTL	124.15
R-2513	TO FL 240	CONTINUOUS	OAKLAND CNTR	128.7 307.0
R-2515	UNLIMITED	CONTINUOUS	JOSHUA CON FAC	120.25 133.65
R-2516	UNLIMITED	CONTINUOUS	LOS ANGELES CNTR	119.05
R-2517	UNLIMITED	CONTINUOUS	LOS ANGELES CNTR	119.05
R-2519	UNLIMITED	CONTINUOUS	LOS ANGELES CNTR	135.5
R-2524	UNLIMITED	CONTINUOUS	JOSHUA CON FAC	120.25 133.65
R-2534 A, B	500 AGL TO UNLIMITED	INTERMITTENT BY NOTAM 4 HRS IN ADVANCE	LOS ANGELES CNTR	119.05
R-2535 A, B	TO 100,000	0600-2200 MON-FRI †24 HRS IN ADVANCE	LOS ANGELES CNTR	132.15
W-285 A	TO FL 450	0630-2100 MON-FRI†	OAKLAND CNTR	134.15 355.6 (N) 134.55 290.5 (S)
W-285 D	TO FL 190	0630-2100 MON-FRI†	OAKLAND CNTR	134.15 355.6 (N) 134.55

Fig. 55

Warning Areas

- Special use airspace where hazards may exist
- U.S. doesn't have the right to impose a restriction because it's beyond the country's boundaries
- Identified by a blue hatched line, similar to restricted and prohibited areas
- Warning areas contain hazards similar to those found in restricted areas

Warning Areas



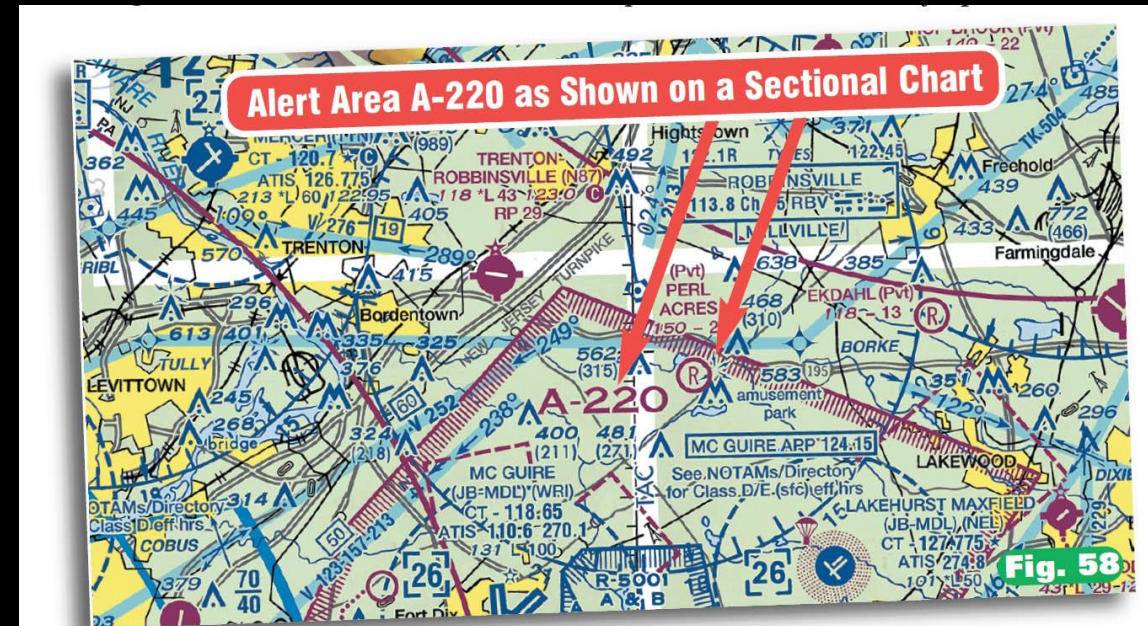
Warning area information on the sectional chart's special use airspace tab. **Fig. 57**

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

NUMBER	ALTITUDE	TIME OF USE	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
W-289 S, E, W	UNLIMITED	INTERMITTENT BY NOTAM	LOS ANGELES CNTR	132.15
W-289 N	TO FL 240	INTERMITTENT BY NOTAM	LOS ANGELES CNTR	132.15
W-291 E	TO FL 800	INTERMITTENT BY NOTAM	LOS ANGELES CNTR	132.15 (E OF 120 W)
W-292 E, W	UNLIMITED	INTERMITTENT BY NOTAM	LOS ANGELES CNTR	132.15

Alert Areas

- Areas where there is a high volume of pilot training or an unusual type of aerial activity
- Shown in a magenta color using the same symbolic hatching used by restricted, prohibited or warning areas
- You are not prohibited from entering an alert area, but maintain added vigilance



Alert area information found on the sectional chart's special use airspace tab.

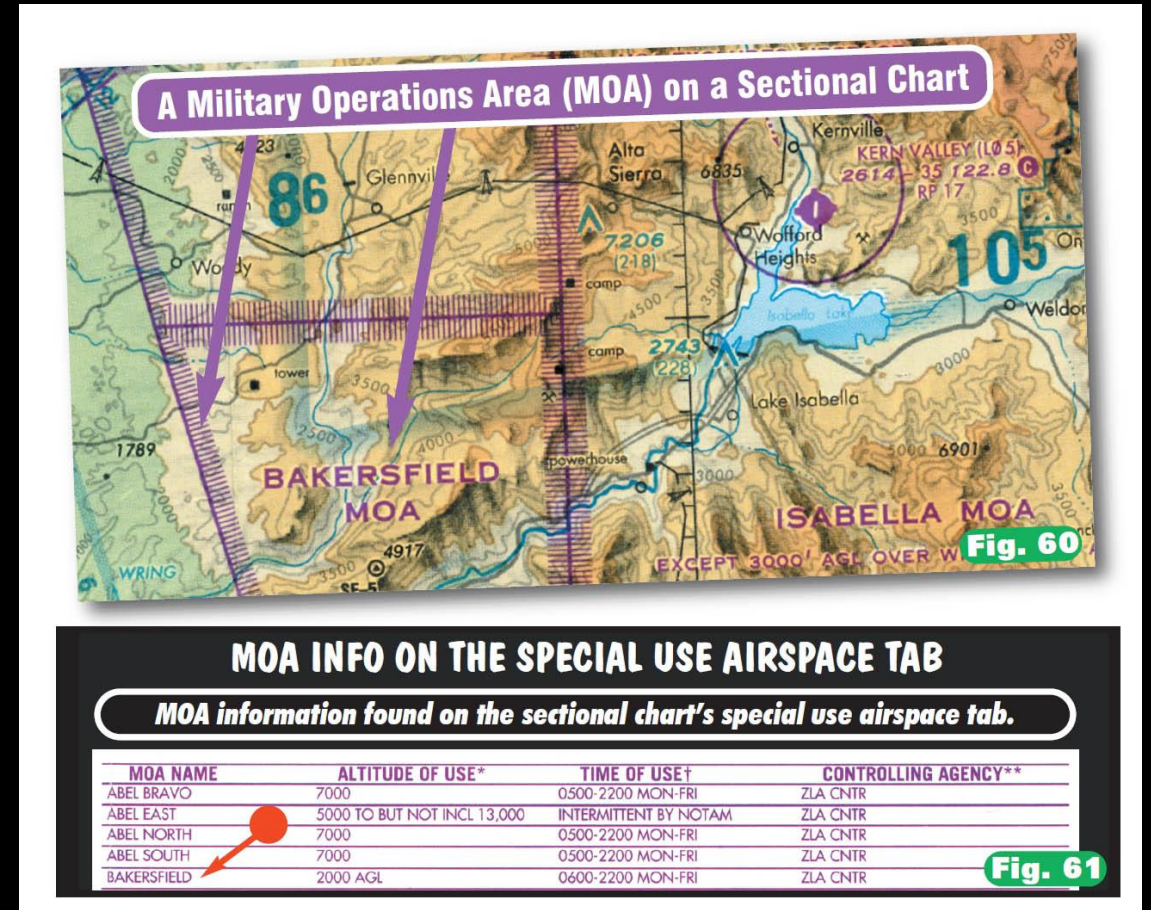
W OF 75°30'00" W				
W-387 A	TO BUT NOT INCL FL 240	CONTINUOUS	FACSFAC VACAPES	132.55 256.8
A-220	TO 4500	0800-2200	NO A/G	

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

Fig. 59

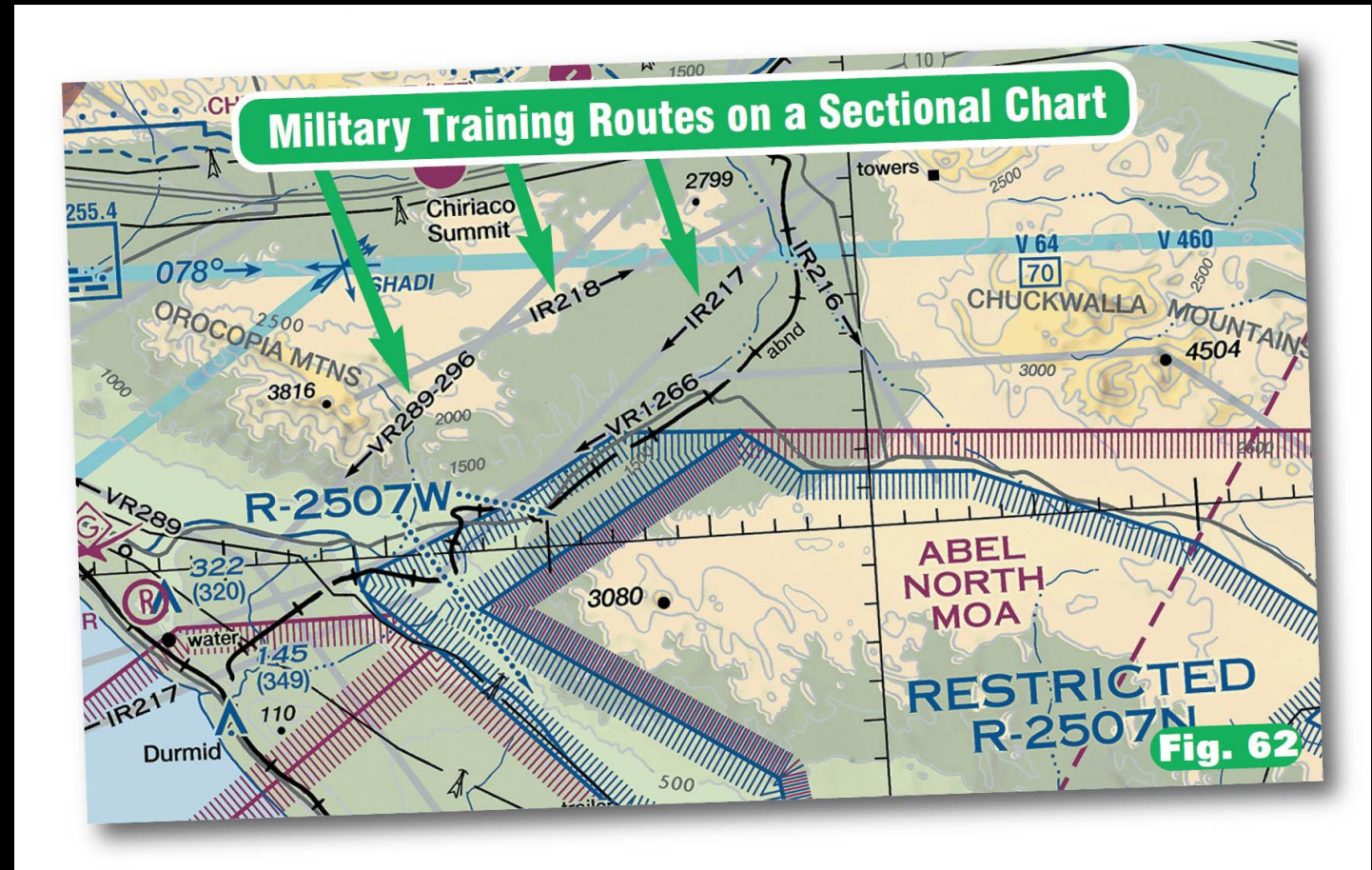
Military Operations Areas (MOA)

- Designed to separate or segregate certain nonhazardous military activities from IFR traffic
- Area outlined with a magenta hatched line
- Altitude listed is Base Altitude
- All MOA's are assumed to extend vertically to FL180 unless stated otherwise
- MOA does not restrict or prohibit the flight of VFR aircraft

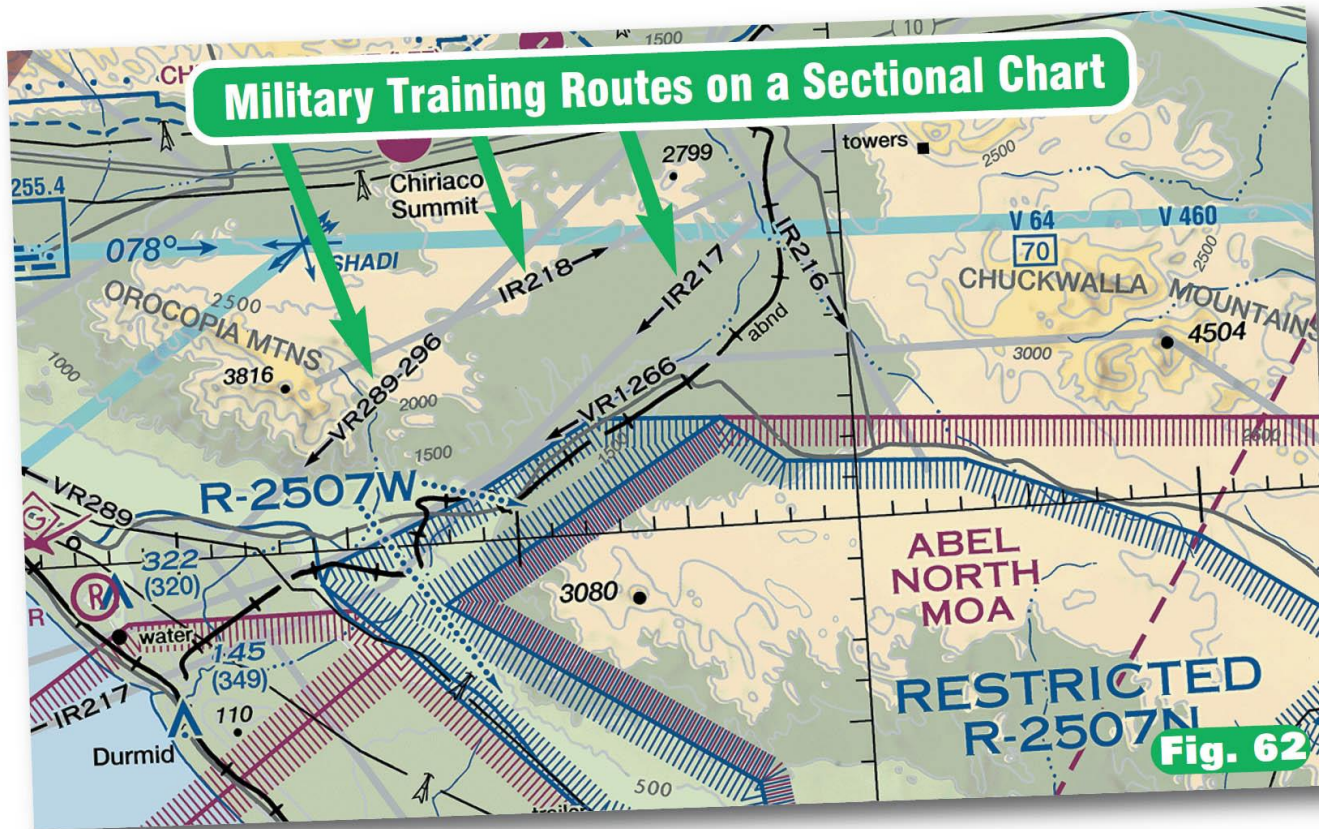


Military Training Routes (MTRs)

- IFR military training routes are designed to be flown above 1,500 feet AGL
- VFR military training routes exist at and below 1,500 feet AGL



Military Training Routes (MTRs)



- "IR" or "VR" identifies whether they are IFR or VFR routes
- 4-digit number next to it - at and below 1,500 feet AGL
- 3-digit number next to it - above 1,500 feet AGL
- Arrows point in the direction routes are usually flown
- FSS provides info as to when MTR is in use

Controlled Firing Areas

Controlled Firing Areas

A *controlled firing area (CFA)* is where the military (most likely) conduct certain activities that could be hazardous to non-participating aircraft (no, you can't participate, either). Fortunately, any activity in the CFA will be suspended immediately when a spotter airplane, radar or a ground-observer spots an aircraft in the area. For this reason, CFAs aren't shown

CONTROLLED FIRING AREA (CFA) EAST OF YUMA, AZ

The military has established a controlled firing area (CFA) east of Yuma, AZ. The CFA is bordered by the following fixes: BZA058015 - BZA068035 - BZA072034 - BZA075030 - BZA075015 - BZA058015. Operations will be conducted at or below 3000' AGL. The hours of operation are Monday through Saturday from sunrise to sunset.

on sectional charts. However, info on them can be found in the **Special Notice section (in the rear section) of the *Chart Supplement***.

Temporary Flight Restrictions (TFR)

- Natural disasters, events of high public interest, forest fires, national security, etc.
- FAA will often issue a TFR or temporary flight restriction for that area
- TFRs are usually issued in the form of a NOTAM
- NOTAMs designate an area and altitude in which the restrictions apply
- Before every flight, check with the local FSS for TFR information

TFR Info Shown on ForeFlight



KDCA SFRA

- Flying within 60 nm of the SFRA, or landing at an airport within the boundaries of a SFRA, requires you to meet both awareness training and equipment requirements
- To operate within the DC SFRA you must file and activate a DC SFRA flight plan

Flight Restricted Zone (FRZ), Special Flight Rules Area (SFRA) in Washington, D.C. Airspace



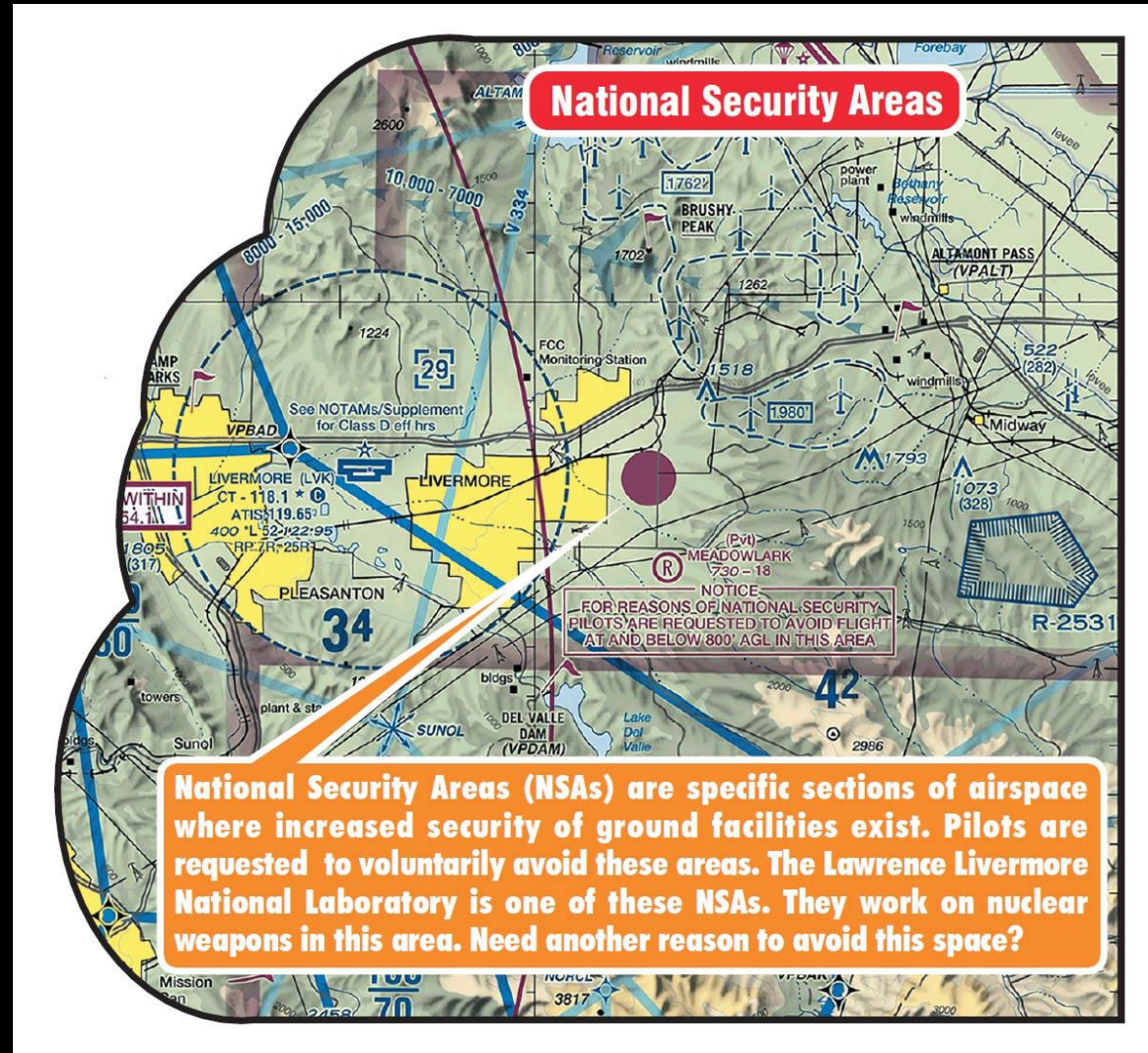
KDCA SFRA

- Within the DC SFRA is the DC FRZ
- The FRZ is a no-fly zone with exceptions for those airports located within its boundaries
- Flight to or from these airports require that a DC FRZ flight plan be filed and activated

Flight Restricted Zone (FRZ), Special Flight Rules Area (SFRA) in Washington, D.C. Airspace



National Security Areas

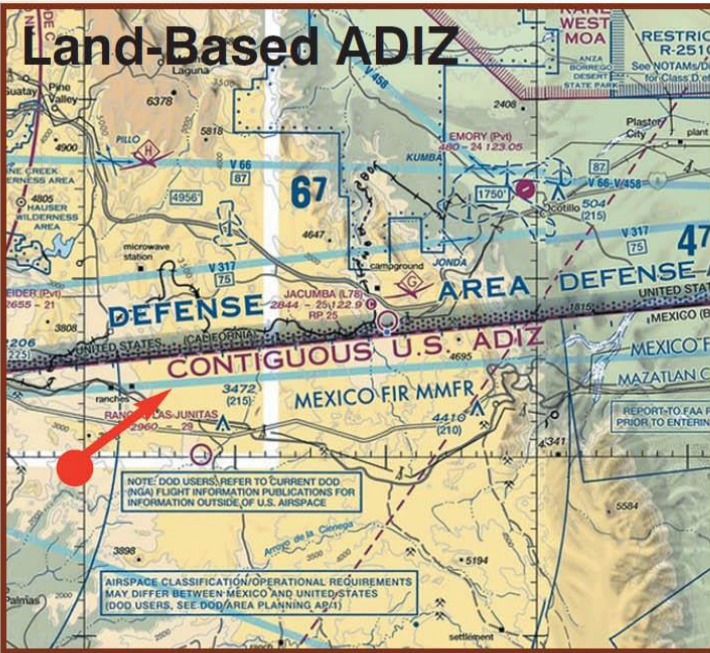
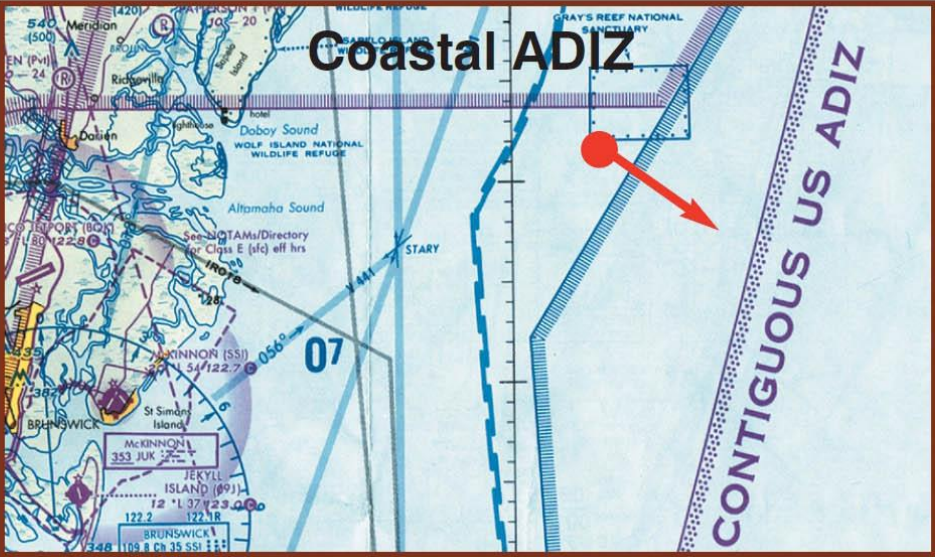


The ADIZ (Air Defense Identification Zone)

- Boundary along the eastern and western coasts of the US and the US/Mexican border and around land-based areas where national security is a concern

The ADIZ (Air Defense Identification Zone)

The ADIZ (Air Defense Identification Zone)



ADIZ Entry Requirements

- A DVFR (Defense VFR) flight plan must be filed for coastal and domestic ADIZs, and position reports must be made
- A transponder (Mode C) and two-way radio are also required
- For VFR entry into a land-based ADIZ you must have a transponder (Mode C), two-way radio, and must file and activate a VFR (or IFR) flight plan, then you must contact ATC to obtain a transponder code, maintain two-way communications at all times within the ADIZ as well as maintain your discrete transponder code until you have landed or are outside the ADIZ boundary
- You must also close that VFR flight plan after landing

Automatic Dependent Surveillance Broadcast (ADS-B)

- Radar bounces radio waves from ground-based antennas off airborne targets and then captures the reflected signals for interpretation
- ADS-B uses conventional Global Navigation Satellite System (GNSS) technology and a broadcast communications link as its fundamental components

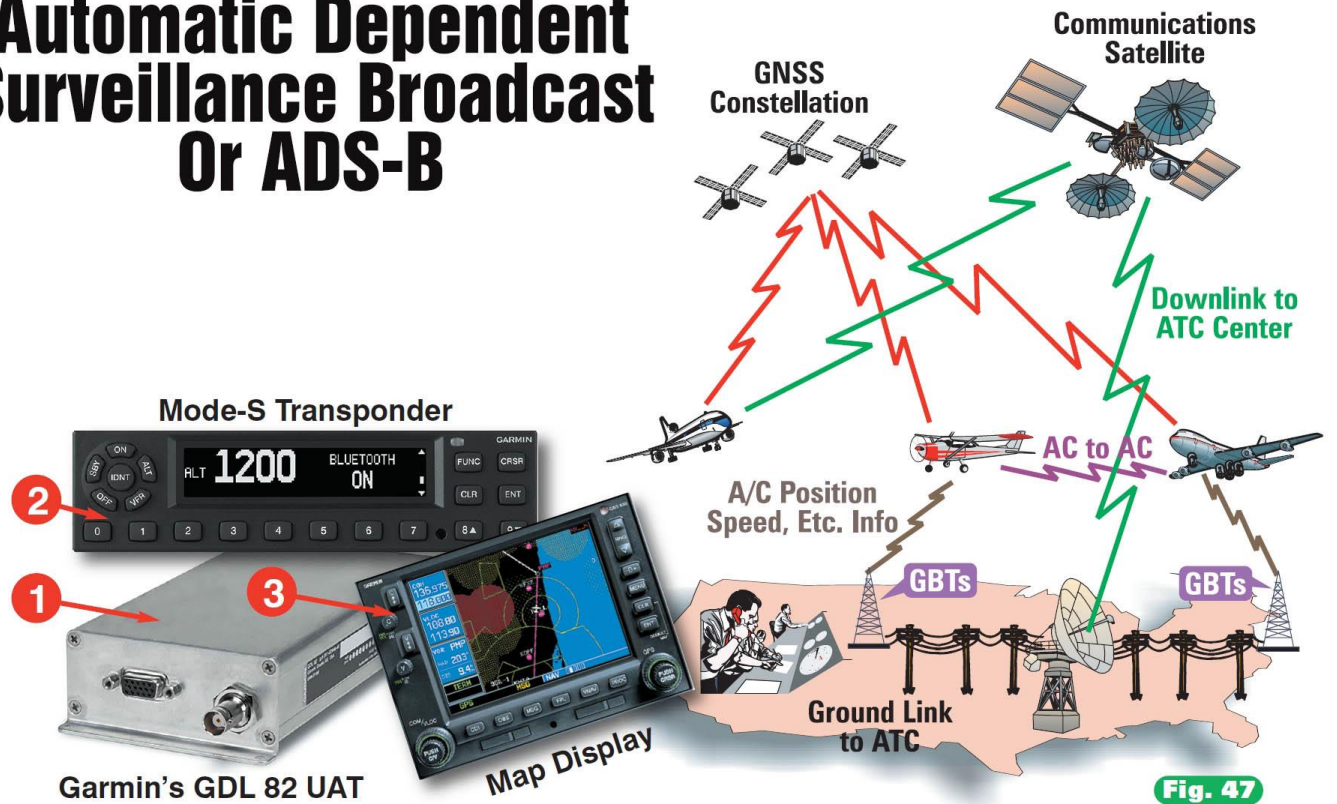
Automatic Dependent Surveillance Broadcast (ADS-B)

- Utilizes UAT (universal access transceiver) that interfaces with a multi-function cockpit display
- UAT transmits, receives, and decodes ADS-B messages sent from other airplanes and from ADS-B ground stations (GBT)
- This data link broadcasts your aircraft's position, velocity, projected track (all derived from GPS), and flight identification to other ADS-B equipped aircraft in your area, as well as to GBTs

ADS-B Data Links

- UAT transmits, receives, and decodes ADS-B messages sent from other airplanes and from ADS-B ground stations (GBT)

Automatic Dependent Surveillance Broadcast Or ADS-B



ADS-B Benefits

- ADS-B accuracy does not seriously degrade with range, atmospheric conditions, or target altitude
- Update intervals do not depend on the rotational speed or reliability of mechanical antennas
- The technology works well at low altitudes and on the ground
- Completely effective in remote areas or in mountainous terrain where there is either no radar coverage, or where radar coverage is restricted by problems with elevation, or line of sight

ADS-B Out

vs.

ADS-B In & Out

- ADS-B “Out” means that your airplane’s ADS-B unit sends current position, altitude, and velocity information from your airplane to ATC and to other airplanes
- Does not receive information from those other airplanes
- If your airplane is equipped with both ADS-B Out and In, you can also receive TIS-B and FIS-B, or Traffic Information Service Broadcast and Flight Information Service Broadcast

ADS-B Out

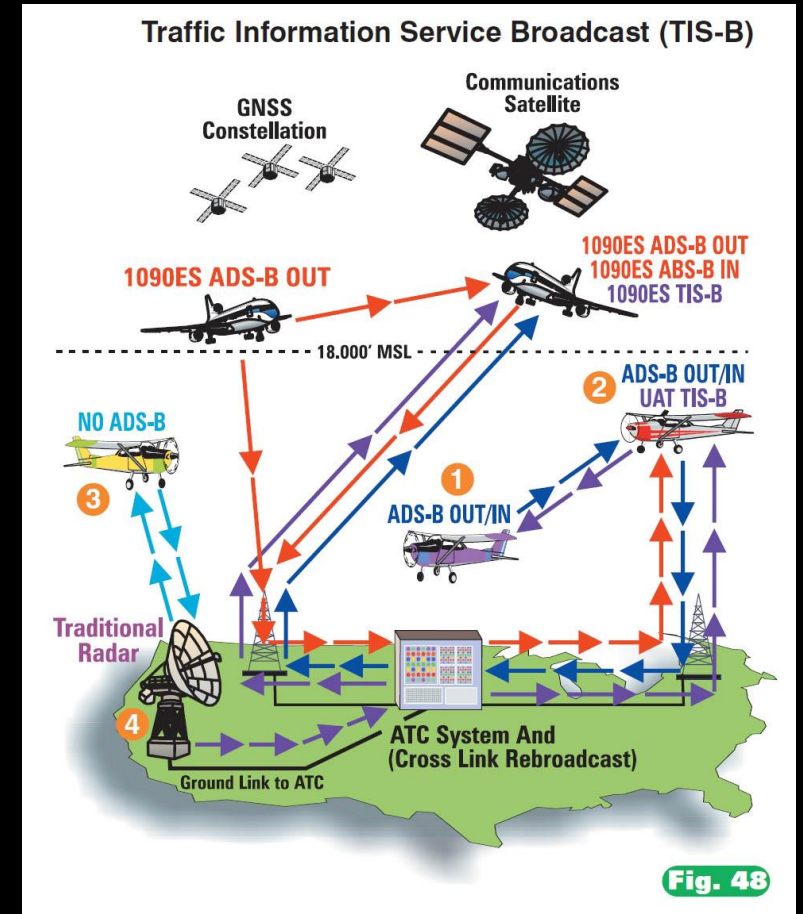
vs.

ADS-B In & Out

- TIS-B offers you the same position-type information on other aircraft
- FIS-B gives you such things as textual weather, weather graphics, TFRs, NOTAMS, etc. (must have cockpit map display to view this information)

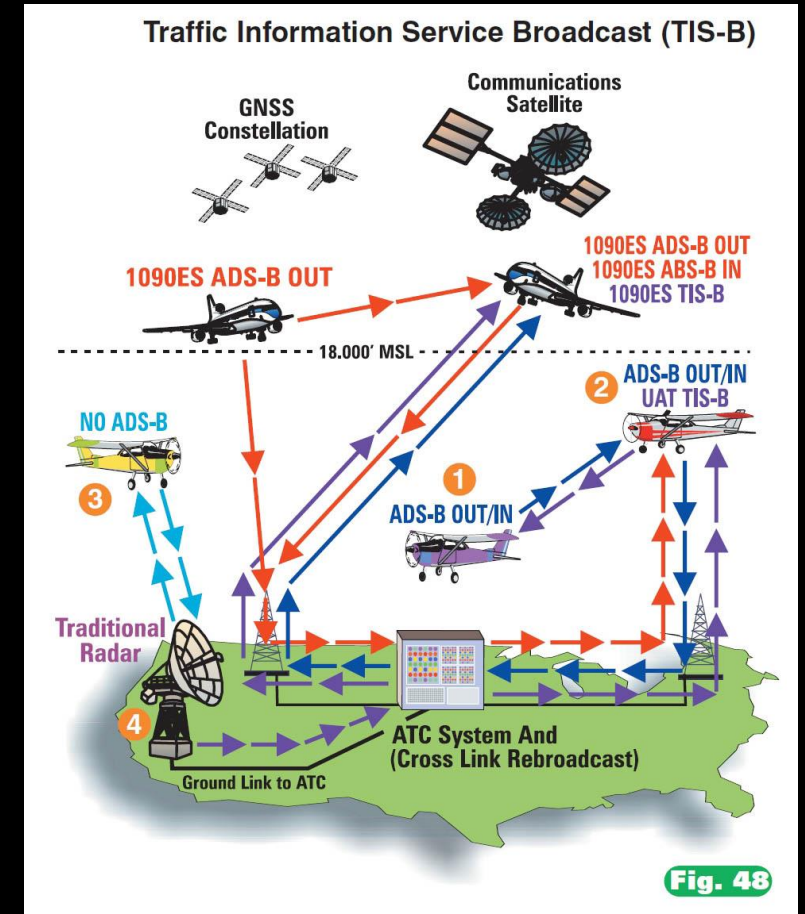
TIS-B

- GBTs can uplink the traffic information shown on ATC's secondary surveillance radar in addition to identifying other ADS-B
- TIS-B provides both traffic information uplinked from ATC radar and from airplanes with ADS-B Out capability



TIS-B

- ADS-B allows airplane to airplane information exchange
- No GBTs are required for ADS-B equipped airplanes to exchange data with each other
- This allows ADS-B equipped airplanes to identify each other's position, direction of flight, speed, and altitude



TIS-B

- Information is typically presented on a cockpit moving map display
- You can see the Mode A/C/S targets that the controller sees on his radar screen



ADS-B

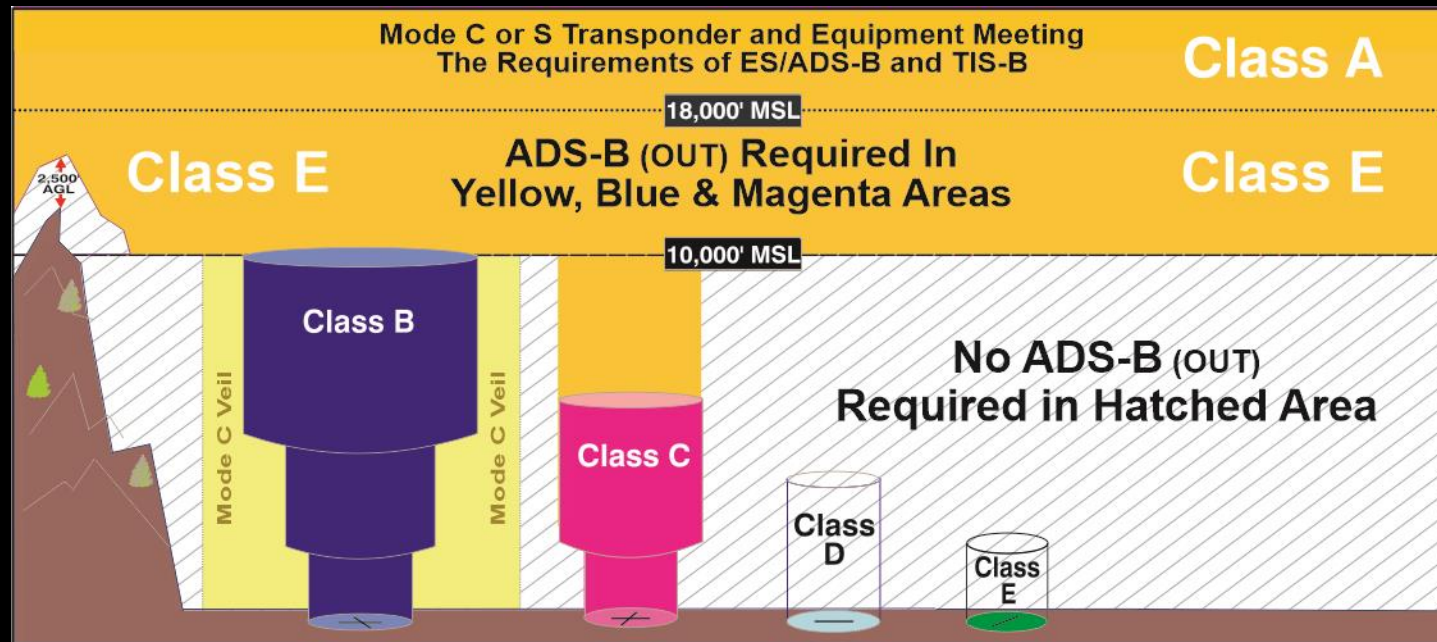
- Can obtain uplinked weather information from ADS-B (in) unit because it's a data link unit using a UAT
- Portable ADS-B "in" units are available that receive TIS-B and FIS-B (Foreflight with Stratus)
- There are no portable ADS-B "out" units that meet the FAA's ADS-B requirement
- ADS-B "out" unit must be certified by the FAA and installed by an FAA license mechanic or avionics technician

ADS-B Out UATs

- ADS-B “out” unit that uses a UAT that transmits or “squirts” on 978 MHz
- This frequency limits aircraft to operations within the US and below 18,000 feet MSL
- To operate at and above 18,000 feet MSL and/or outside the US an airplane must have an ADS-B unit based on a 1090 MHz Mode S “extended squitter” transponder, referred to as 1090ES

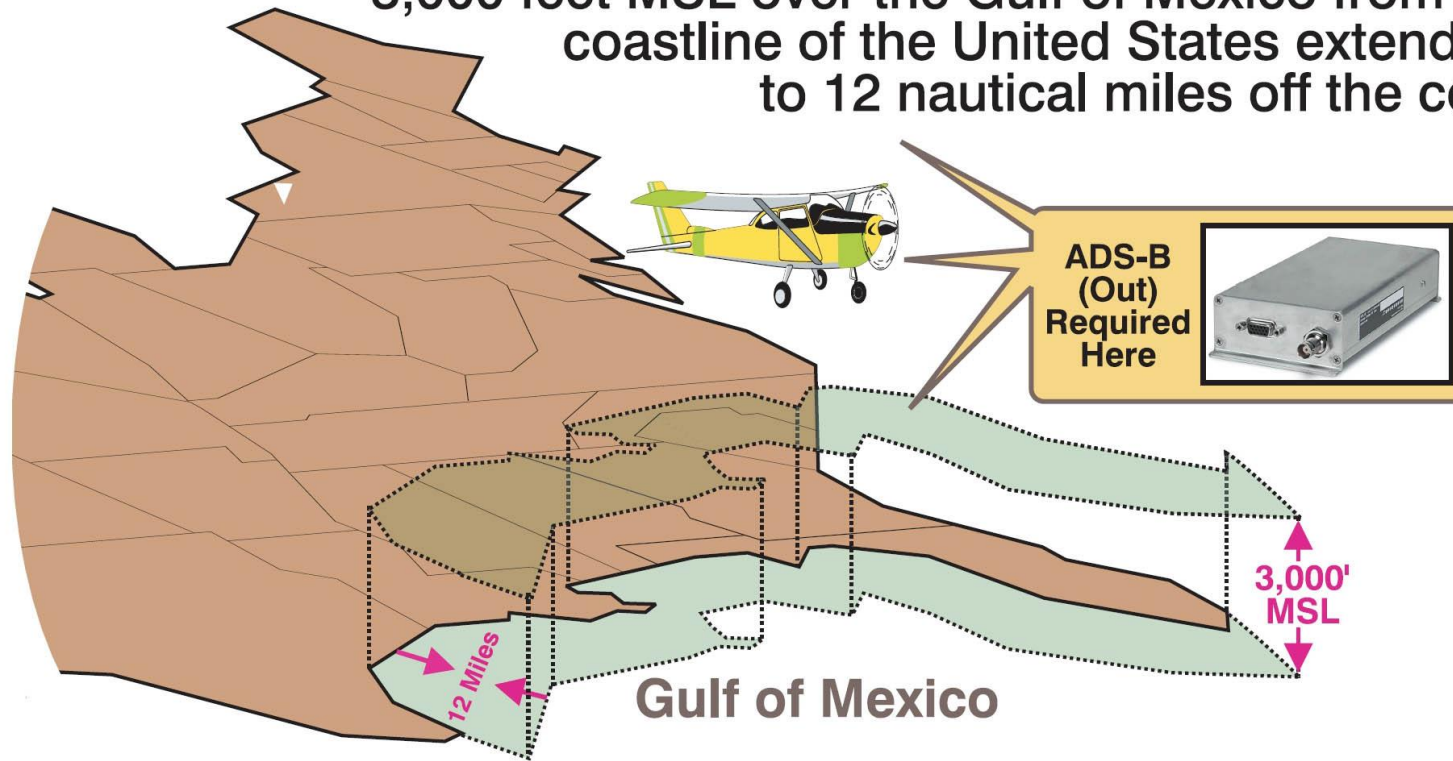
ADS-B Out Requirements

- Anywhere Mode C transponder is required.
- Note: Not required underneath shelf of class B (if no Mode C Veil) or underneath shelf of class C



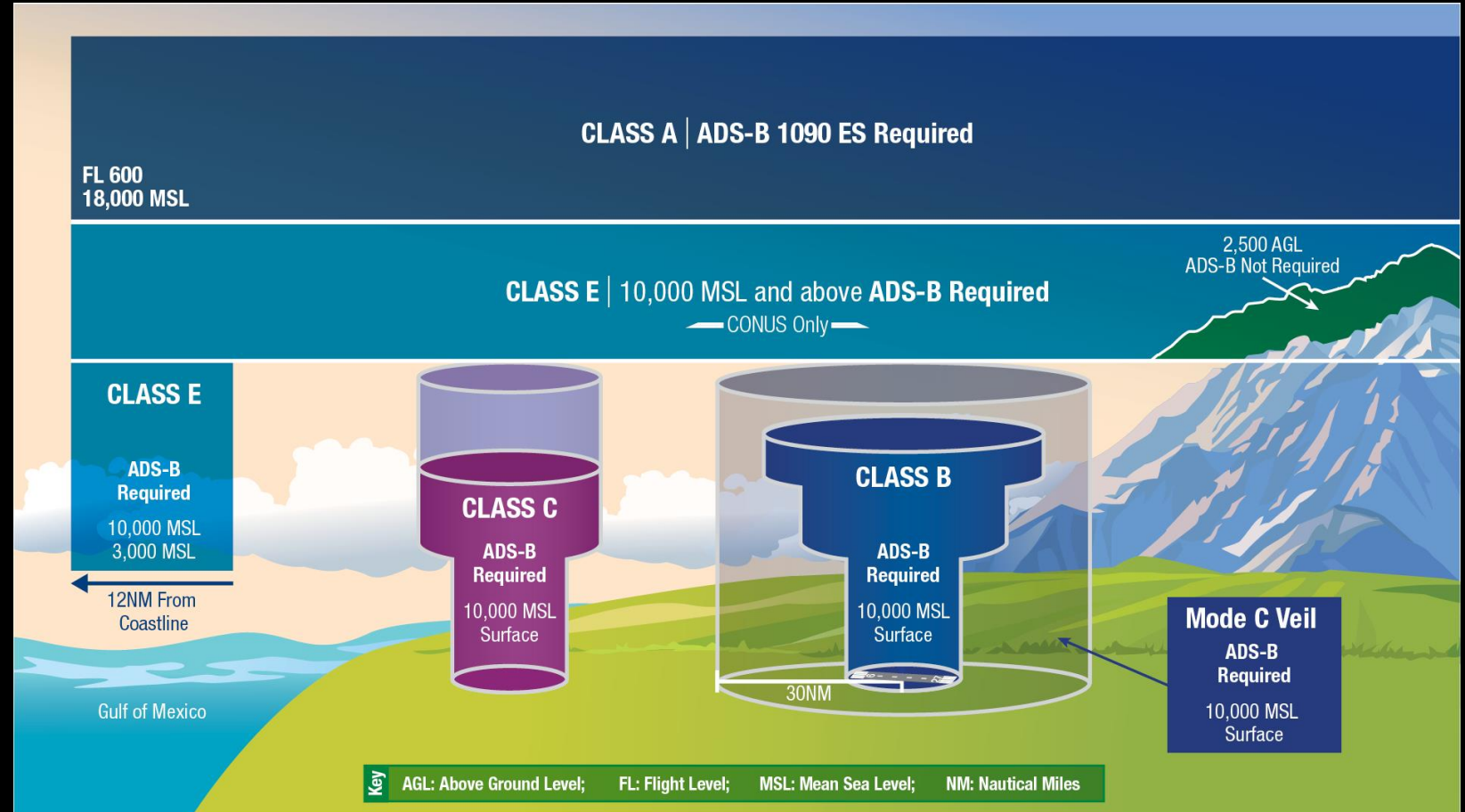
ADS-B Out Requirements: Gulf of Mexico

ADS-B *out* equipment required at and above 3,000 feet MSL over the Gulf of Mexico from the coastline of the United States extending to 12 nautical miles off the coast.



Transponder / ADS-B Out Requirements

- Both required at the locations shown
- Only the ADS-B Out is required over the Gulf of Mexico



Knowledge Check

What is the maximum indicated airspeed below 10,000' MSL?

- A. 210 KIAS
- B. 200 KIAS
- C. 265 KIAS
- D. 250 KIAS

Knowledge Check

What is the maximum indicated airspeed below 10,000' MSL?

~~A. 210 KIAS~~

~~B. 200 KIAS~~

~~C. 265 KIAS~~

D. 250 KIAS

Knowledge Check

Which of the following is consider uncontrolled airspace?

- A. Class A
- B. Class B
- C. Class D
- D. Class G

Knowledge Check

Which of the following is consider uncontrolled airspace?

~~A. Class A~~

~~B. Class B~~

~~C. Class D~~

D. Class G

Knowledge Check

The normal height of class D airspace is?

- A. 1,000' AGL
- B. 2,000' AGL
- C. 2,500' AGL
- D. 3,000' AGL

Knowledge Check

The normal height of class D airspace is?

- A. ~~1,000' AGL~~
- B. ~~2,000' AGL~~
- C. 2,500' AGL
- D. ~~3,000' AGL~~

Knowledge Check

Which of the following does not require a mode C transponder?

- A. Class A
- B. Class B
- C. Class C
- D. Class D

Knowledge Check

Which of the following does not require a mode C transponder?

- ~~A. Class A~~
- ~~B. Class B~~
- ~~C. Class C~~
- D. Class D**

Knowledge Check

ADS-B In and Out is required in all airspace today?

- A. True
- B. False

Knowledge Check

ADS-B In and Out is required in all airspace today?

- A. ~~True~~
- B. False

Knowledge Check

Outside the magenta vignette, Class G start at the surface and extend to what altitude?

- A. 700' AGL
- B. 700' MSL
- C. 1,200' AGL
- D. 1,200' MSL

Knowledge Check

Outside the magenta vignette, Class G start at the surface and extend to what altitude?

- A. ~~700' AGL~~
- B. ~~700' MSL~~
- C. 1,200' AGL
- D. ~~1,200' MSL~~

Knowledge Check

Can you fly through restricted airspace?

- A. No
- B. Yes, when a VFR flight plan has been filed
- C. Yes, when ATC approves
- D. Yes, during the hours of sunset-sunrise

Knowledge Check

Can you fly through restricted airspace?

- ~~A. No~~
- ~~B. Yes, when a VFR flight plan has been filed~~
- C. Yes, when ATC approves**
- ~~D. Yes, during the hours of sunset-sunrise~~