

# FLIGHT REVIEW

*Study Guide*

**J D Price, CFII, MEI, ATP**

This publication is for informational purposes only, and is not intended to substitute for any approved aircraft flight manual, Flight Service briefing, competent flight instruction, or regulations published by the Federal Aviation Administration. The navigational charts used herein are not current and should not be used for navigation.

### **Limitation of Liability**

The author, J D Price, assumes no responsibility for errors or omissions. In addition, liability is not assumed for damages resulting from the use of the information herein.

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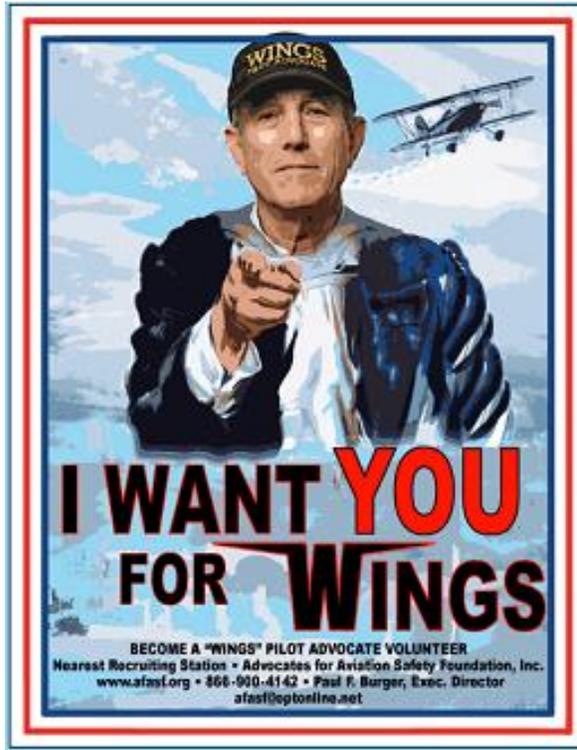
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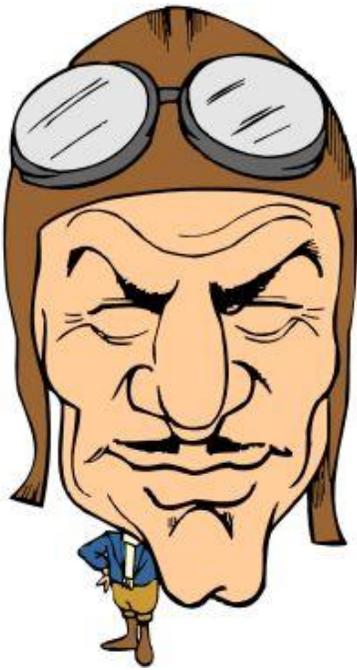
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[FAASafety.gov](http://FAASafety.gov)



*Try to learn from the mistakes of others.  
You won't live long enough to make all of them  
by yourself.*



# *The Flight Review*



***You need not have a flight review if, within the last two years you:***

- Had a practical exam for **any** certificate, category or class rating, including **any** CFI practical exam.
- Had a pilot proficiency check administered by the FAA.
- Had a Part 121 or 135 pilot proficiency check.
- Had a Part 141 Chief pilot proficiency check
- Had a military pilot proficiency check.
- Had a pilot examiner annual flight check.

You have a current Flight Review if you completed any phase of the FAA Wings Program in the last 24 months. (See <https://www.faasafety.gov/> for details).

# Flight Review Facts

- Flight Reviews expire on the last day of the 24<sup>th</sup> month. For instance, if your flight review was flown on July 2nd, 2020, it will expire on July 31st, 2022.
- Without a current flight review, you cannot fly as PIC.
- If the flight review is unsatisfactory, the instructor does not document this as a failure.
  - You simply correct your deficiencies and have another flight review with the same or different CFI.
- **One Flight Review suffices for all the categories and classes of aircraft that you fly.** So, if you have a flight review in your Goodyear Blimp, you're legal for two more years in your Cessna Citation. (FAR 61.56, 61.57)
- When your logbook is endorsed by the CFI, you don't need to carry your logbook with you when you fly. However, officials from the FAA, NTSB, and law enforcement, may ask to see your logbook.
- An FBO will want to see the Flight Review endorsement, if you wish to rent one of their airplanes.
- If your Flight Review was earned through the FAASafety's Wings Program, that fact will be stored on the FAA's servers.

NR IST. APP.	REMARKS AND ENDORSEMENTS	NH T/O
	I certify that (First name, MI, Last name), (pilot certificate) (certificate number) has satisfactorily completed a flight review of §61.56(a) on (date). S/S (date) J. J. Jones 987654321 CFI Exp. 12-31-__	

# A Review of Category, Class and Type

## Category Examples



## Class Examples



**MULTI ENGINE LAND**



**SINGLE ENGINE LAND**



**SINGLE ENGINE SEA**

**A type rating is required in a specific make and model of aircraft if:**

- It's powered by one or more turbojet engines. (This excludes turboprops like the Piper Malibu and King Air C90, 100 and 200 aircraft).

**or**

- The aircraft's takeoff gross weight is certified for 12,500 pounds or more, similar to the larger King Air 300 which has a max takeoff weight of 14,000 pounds.



## Flight Controls

**Your Aircraft** must have dual flight controls. Why? *FAR 61.56* specifies that during a flight review, "flight training" must be given. *FAR 91.109* requires that flight instruction or training be given in aircraft with dual controls.

**Beech Pilot Proficiency Program Flight Reviews** in aircraft with a throw over control wheel have an exemption from the dual flight control rule, but the pilot must be PIC. That is, he or she must have a current medical and an unexpired flight review.





**Your Certified Flight Instructor (CFI)** must be qualified in your airplane's **Category** and **Class**. Your CFI doesn't need to have five hours of PIC flight time in your model aircraft.

**However**, if you need a Flight Review in an aircraft that requires a type rating, your CFI must have a type rating in that aircraft.

He or she doesn't need a current FAA Medical if you can be the Pilot In Command (PIC). That is, you must have an unexpired flight review and current medical.



### **Light Sport Exception**

Your CFI will need at least five hours of flight time in the make and model Light Sport aircraft.



## **What to Expect**

**The flight review does not involve a written examination. However, it does require a minimum of:**

- A one-hour oral which includes a review of FAR Part 91 flight rules
- A one-hour flight.



If you fly less than 50 hours a year, or you haven't flown for a long time, you can expect a longer oral and flight.



## ***The Oral***

To prepare for the oral, you should certainly study this review.

In addition, you could complete the “*Flight Review Prep Guide*” course available at [www.faasafety.gov](http://www.faasafety.gov). Bring a copy of the completion certificate to the flight review.

Your CFI may give you a short (no more than 50 nm) cross-country flight plan assignment to an unfamiliar airport. Be sure to consider runway lengths, weather, fuel requirements, terrain, NOTAMs, TRFs, etc.

## ***The Flight***

Your CFI could ask questions to determine your experience and the type of flying that you normally do, and then determine which maneuvers you will perform. Remember that it is proficiency-based, and the CFI has discretion on how much time and how much instruction is needed to ensure that you are proficient. You must demonstrate that you can safely exercise the privileges of your certificate.

As you fly selected maneuvers, you’ll be evaluated on your basic stick and rudder proficiency. If asked to fly a short cross-country, that’s a good place to sample your knowledge of aircraft systems, and your ability to make good decisions when faced with unusual circumstances, (*Aeronautical Decision Making and Risk Management*).



# ***Are you Familiar with Your Aircraft?***

Engine out glide speed for maximum range \_\_\_\_\_.

The make and horsepower of your engine \_\_\_\_\_.

Fuel capacity \_\_\_\_\_.

Usable gallons of fuel \_\_\_\_\_.

Minimum & maximum oil capacity \_\_\_\_\_.

Your oil type and weight \_\_\_\_\_.

Max oil temp and pressure \_\_\_\_\_.

Max demonstrated crosswind (limit) \_\_\_\_\_.

How many people will it carry with a full load of fuel? \_\_\_\_\_.

Baggage compartment limit \_\_\_\_\_.

Sea Level takeoff distance \_\_\_\_\_.

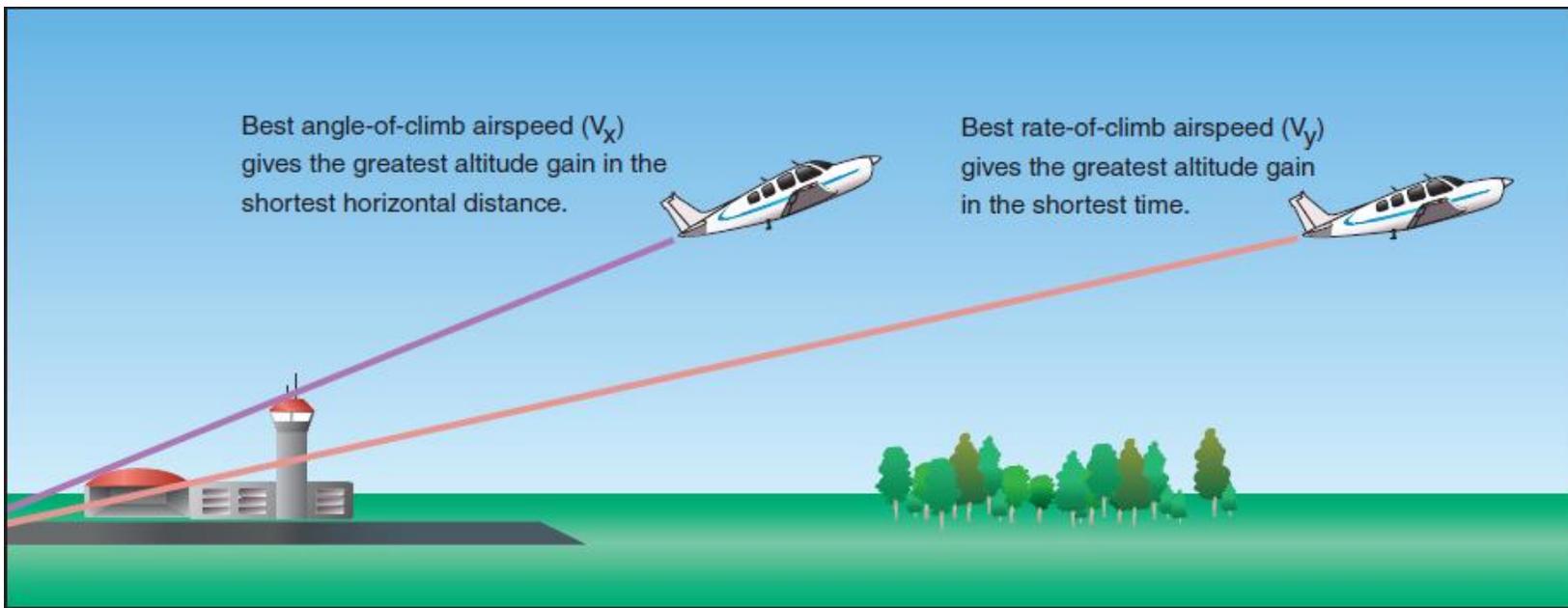
$V_s$  \_\_\_\_\_ Clean stall speed.

$V_{so}$  \_\_\_\_\_ Stall speed in the landing configuration.

$V_y$  \_\_\_\_\_ Best rate of climb speed.

Normal climb-out speed \_\_\_\_\_.

$V_x$  \_\_\_\_\_ Best angle of climb speed.



Normal approach-to land speed \_\_\_\_\_.

$V_{le}$  \_\_\_\_\_ Max landing gear extended speed, or the speed it can be flown with the gear down.

$V_{lo}$  \_\_\_\_\_ Max landing gear operating speed.

Do you know the backup system for lowering the gear?

$V_{fe}$  \_\_\_\_\_ Max flap extension speed.

$V_a$  \_\_\_\_\_ Maneuvering speed.

$V_{no}$  \_\_\_\_\_ Maximum structural cruising speed in turbulence (end of the green arc and the beginning of the yellow arc).

Yellow arc speeds are for smooth air only.

$V_{ne}$  \_\_\_\_\_ Never exceed speed (RED LIINE).



White arc—commonly referred to as the flap operating range. The arc's upper limit provides the maximum flap speed. Approaches and landings are usually flown at speeds within the white arc.

The lower limit of the white arc represents **VS0** — the stalling speed or the minimum steady flight speed in the landing configuration. In small aircraft, this is the power-off stall speed at the maximum landing weight in the landing configuration (gear and flaps down).

Green arc—the normal operating range of the aircraft. The lower limit of the green arc (**VS1**) — represents the stalling speed or the minimum steady flight speed obtained in a specified configuration. For most aircraft, this is the power-off stall speed at the maximum takeoff weight in the **clean configuration** (gear up, if retractable, and flaps up).



Upper limit of green arc (**VNO**) —the maximum structural cruising speed. Do not exceed this speed except in smooth air.

Yellow arc—caution range. Fly within this range only in smooth air, and then, only with caution.

Red line (**VNE**) —never exceed speed. Operating above this speed is prohibited since it may result in damage or structural failure.





### ***Soft Field Takeoff***

Use recommended Takeoff Flaps. With the yoke as far aft as you can hold it, taxi onto the runway without stopping. Once lined up on the centerline, apply full power with the yoke still in the full aft position.

As you add power, you will also need to add right rudder. As the nose wheel comes off the ground, you might need to reduce back pressure a bit to avoid scraping the tail.

The idea is to get unstuck from the runway at the first possible opportunity and then build up airspeed in ground effect before attempting to climb out. The main wheels will lift off at a lower airspeed than normal. As soon as all three wheels are off the ground, relax the yoke a bit to increase climb speed.

Because of the high-power setting and high angle of attack, as soon as you're airborne, you'll need additional right rudder to keep the nose tracking straight. Do not try to climb out of ground effect until you're at best rate of climb speed, ( $V_y$ ).

### ***Soft Field Landing (approach no faster than $1.3 \times V_{so}$ )***

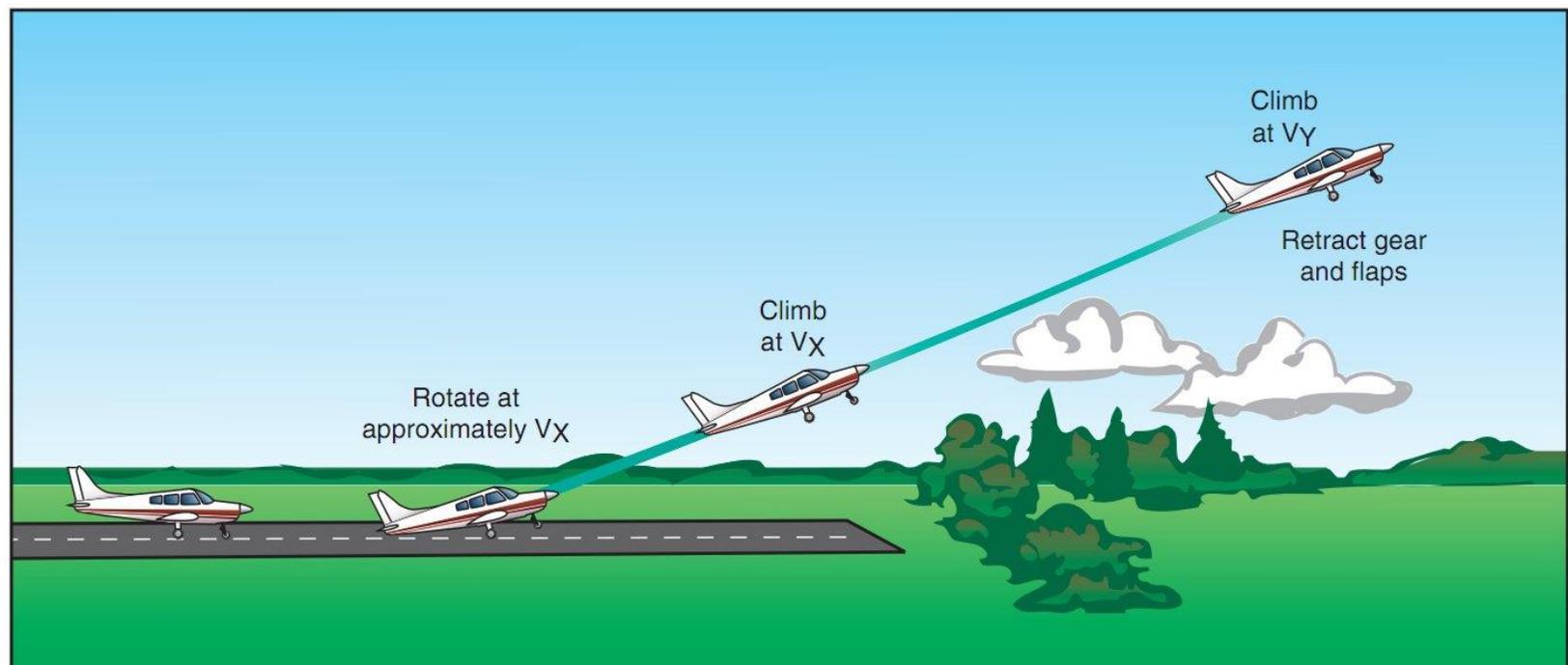
The objective is to land as gently as possible on the main gear and to keep the nose wheel off the ground as long as possible during the rollout to minimize the chances of becoming stuck, or flipping over should the nose wheel dig in.

Fly a stabilized approach with full flaps. Just before touchdown, add a little power, (just slightly above idle), to reduce the sink rate and to provide more elevator authority, while keeping the nose wheel off the runway.

After your gentle, nose-high touchdown, maintain enough back pressure to hold the nose wheel off the runway as long as possible without scraping the tail. You won't have nose wheel steering with the nose wheel off the surface, so you'll need rudder input to maintain directional control.

Eventually, the nose wheel should touch down smoothly while holding the yoke full aft, minimizing the weight on the nose wheel.

Exit the runway with the yoke held full aft and, local conditions permitting, taxi without stopping to your tie down spot.



## ***Short Field Takeoff***

Used when you need to get off the ground in the minimum distance and climb steeply to clear obstacles. Set flaps for takeoff. When you taxi onto the runway, **DON'T WASTE RUNWAY.**

Hold the brakes and apply full power. Check the engine instruments and tachometer, to ensure that you have full power!

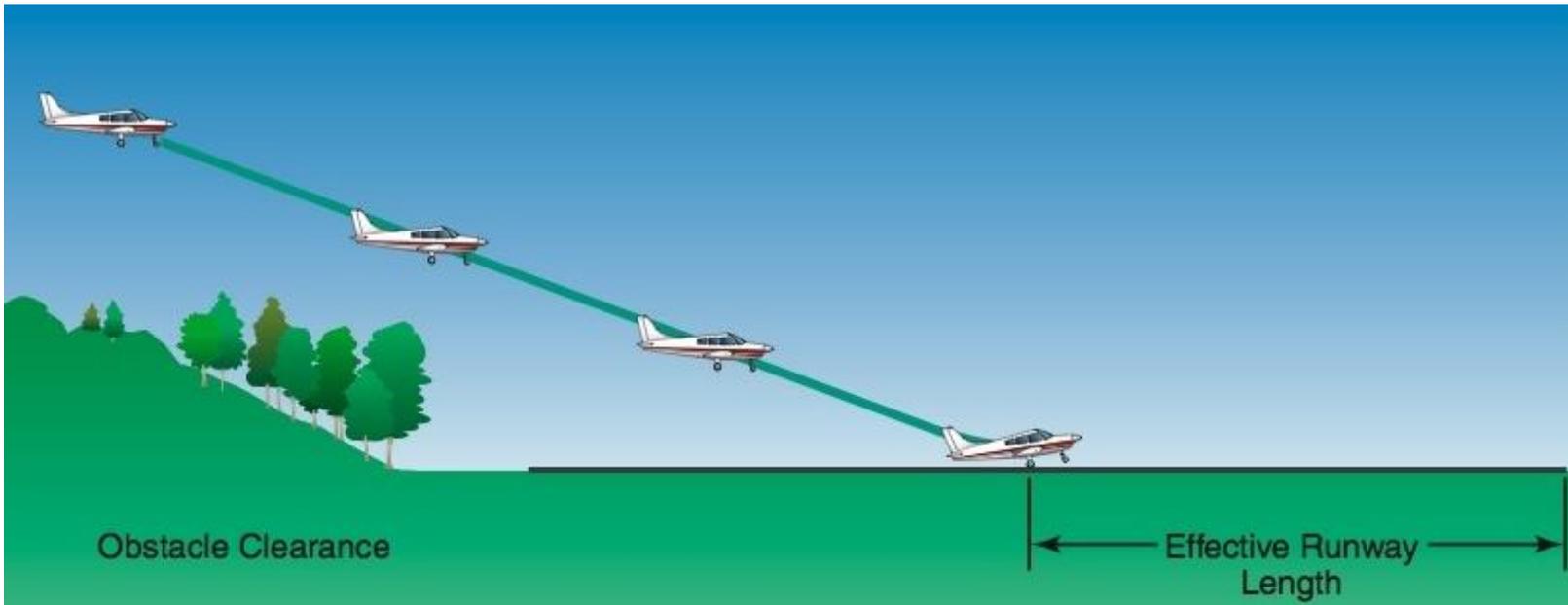
Release the brakes and rotate normally, commencing a climb out at the recommended obstacle clearance speed or best angle of climb speed, ( $V_x$ ). This is a higher angle of attack than the one you see during a normally climb.

You'll need additional (more than usual) right rudder to keep the nose tracking straight.

Pay attention to your airspeed indicator.

After clearing the obstacle, lower the nose slightly and accelerate to best rate of climb speed, ( $V_y$ ) and retract the gear and the flaps.

## ***Short Field Landing***



The objective is to clear obstacles on final, land, and stop in the minimum distance possible.

Stabilize the aircraft with full flaps at your aircraft's recommended short field approach speed. That is usually  $1.3 \times V_{so}$  (stall speed configured). This is usually a few knots slower than normal approach speed.

Once obstacles have been cleared and landing is assured, reduce power to idle and continue to descend at the minimum recommended speed until you're ready to flare.

After touchdown, retract the flaps while applying maximum braking. Raising the flaps transfers the load from the wings to the wheels and allows you to brake harder. Take care that you do not lock the wheels and skid.

Bring the airplane to a full stop before exiting the runway.

It can be a firm landing, as long as the main gear touches down first and there's no bounce.

## Avoiding Wake Turbulence (AIM 7-3-6)



- All aircraft generate some wake turbulence through their wing-tip vortices. The greatest vortex is generated by a heavy, clean, and slow aircraft.
- If landing behind a large aircraft on the same runway, stay at or above its flight path. Note its touchdown point and land **BEYOND** that point.
- If landing behind a departing large aircraft, note its rotation point and land well **BEFORE** that point.
- If departing behind a large aircraft on the same runway, note its rotation point and rotate **BEFORE** that point. Climb **ABOVE** and **UPWIND** of its flight path.

LAKE ELSINORE CA 92532-2529

VI NATIONALITY USA                      SEX HEIGHT WEIGHT HAIR EYES  
IVa D.O.B. 20 FEB 1980                      M 73 175 BROWN BLUE  
IX HAS BEEN FOUND TO BE PROPERLY QUALIFIED TO EXERCISE THE PRIVILEGES OF  
II AIRLINE TRANSPORT PILOT  
III CERTIFICATE NUMBER 2737489  
X DATE OF ISSUE 11 OCT 2008

XIV



*“Airplanes are never impressed by the flying credentials in your wallet.”*

*James Price*

# Aircraft Loading



## Aft Center of Gravity (CG) Characteristics

- Less wing loading = a slower stall speed.
- Reduced drag. A smaller angle of attack is required to maintain level flight, so the cruise speed is higher.
- Less stable & less controllable.

*IF THE CG IS aft of the AIRCRAFT'S AFT CG limit, the aircraft could stall after takeoff or Go-Around because there may not be enough elevator authority to recover.*

## **RULES AND LAWS**

*Rules are made by those who are trying to keep you safe. Laws of Physics are set by the Almighty. You may find it necessary to suspend a Rule, but you can never suspend a Law.*

## Forward Center of Gravity (CG) Characteristics



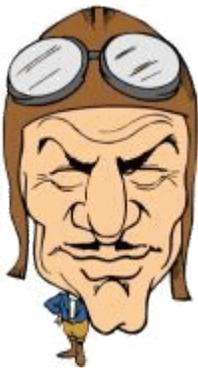
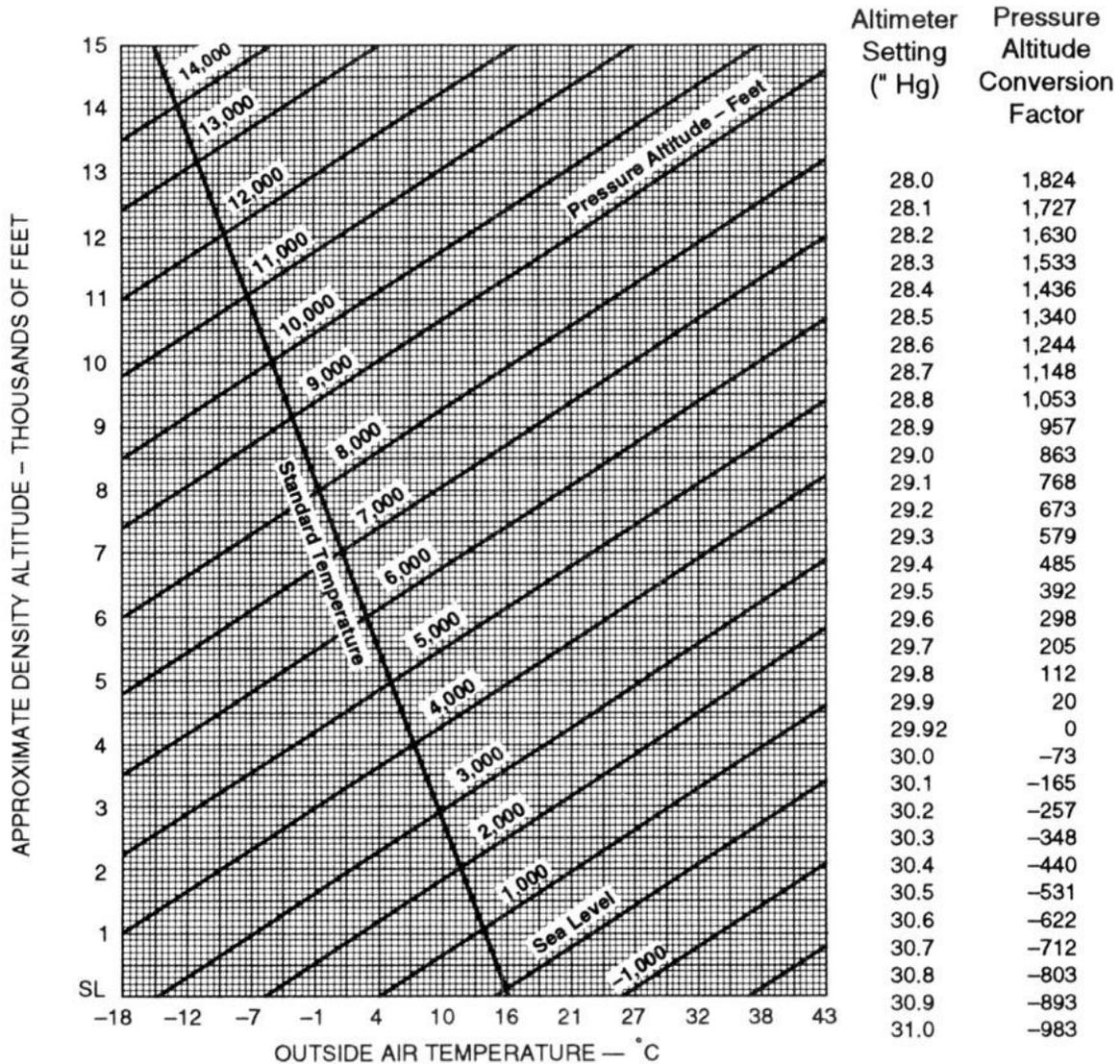
- Increased wing loading = a higher stall speed.
- Increased drag and a greater angle of attack to maintain level flight, so the cruise speed is slower.
- More stable & controllable.
- It's harder to rotate, and flare.
- Takeoff rolls are longer.

### **WEIGHTS**

AvGas	<b>6 lb / gal</b>
Jet A	<b>6.75 lb / gal</b>
Oil	<b>1.9 lb / qt</b>
Water	<b>8.3 lb / gal</b>

# Takeoff and Landing Distances

## DENSITY ALTITUDE CHART



### A RULE YOU CAN LIVE WITH

AOPA Air Safety Institute recommends that you use the 50/50 rule for takeoff correction. That is: Correcting for altitude and temperature, determine the takeoff distance required to clear a 50-foot obstacle. **Then, increase that number by an additional 50%.**

## ***Higher Density Altitude Effects***

### ***There is less thrust, so there's:***

- Slower takeoff acceleration.
- Longer takeoff rolls.
- Decreased climb rate.

*Higher density altitude increases the landing Ground Speed.* You'll land at the same indicated airspeed, but because the true airspeed is greater, you'll have a longer landing distance.

## ***Taking Off with a Tailwind***

For every 10% of the takeoff speed, a tailwind will increase the ground run by about 21%. **FOR EXAMPLE:** Let's assume that you plan to lift off at 60 knots, and the zero-wind charted takeoff ground roll is 1,300 feet. A 6-knot tailwind, (10% of the 60-knot takeoff speed), will increase your charted 1,300 ground roll by 21%, or 273 feet.

## ***Fickle Headwinds***

Winds have a mind of their own, and can change quickly with altitude, or simply disappear. Never count on a headwind to ensure your takeoff!

## ***Crosswinds***

The required control surface deflection and tire scrubbing add extra drag and increase the ground roll.

## ***Exceeding Maximum Takeoff Weight (MTOW)***

### ***The Consequences of Excess Weight:***

- Reduced structural load safety factor.
- Reduced acceleration, higher takeoff speed, and longer takeoff distance. In fact, the aircraft may not leave the ground.
- Reduced rate of climb.
- Reduced angle of climb.
- Reduced cruising speed and range.
- Lower stalling speed and reduced maneuverability.
- Higher landing speed and extended landing distance.



### ***Logging Flight Time – PIC or Dual***

You don't need a current medical to have an annual review, but if your medical has expired, the Flight Review time will be logged as "dual". Once you receive a medical, you can log PIC time.

If you have a current medical or qualify under BasicMed, log the Flight Review time as PIC.

### ***How Much Should You Train?***

There are flight departments of all sizes, from the largest airline, to the company that has one plane to run errands. No matter the size, they all want their pilots to be proficient and highly trained. Every passenger expects their pilot to be full of knowledge, well trained, proficient, and competent.



*Is a Flight Review with a CFI every two years working for you? Perhaps that depends on how much you fly, and if you're feeling challenged as an aviator. If you need more training, please go to **[www.FAASafety.gov](http://www.FAASafety.gov)** and register for the Wings program.*



# ***Flight Regulations***

## ***Deviating from the Rules*** (FAR 91.3)

- If an in-flight emergency requires immediate action, the PIC may deviate from the rules as necessary.
- If the PIC deviates from a rule, he or she shall, upon the request of the Administrator, send a written report to the Administrator.

## ***Is the Aircraft Ready?***



You are directly responsible for and are the final authority as to the operation of the aircraft. (FAR 91.3)

(FAR 91.413) **The PIC must make sure that his/her**

**aircraft is airworthy. That includes checking the following:**

<i><b>Type</b></i>	<i><b>Interval</b></i>	<i><b>Per</b></i>
<i><b>AD Inspections</b></i>	Per the AD. (Expires the last day of the 12 <sup>th</sup> month)	<b>39.7</b>
<i><b>Annual Inspection</b></i>	12 Months	<b>91.409</b>
<i><b>100 Hour Inspection *</b></i>	Every 100 hours	<b>91.409</b>
<i><b>Transponder</b></i>	24 Months. (Expires the last day of the 24 <sup>th</sup> month)	<b>91.413</b>
<i><b>Static System, if flying IFR</b></i>	24 Months. (Expires the last day of the 24 <sup>th</sup> month)	<b>91.411</b>
<i><b>ELT Operational</b></i>	<b>**</b> 12 Months	<b>91.207</b>
<i><b>ELT Battery</b></i>	<b>***</b> Per Battery or 1 hour of use	<b>91.207</b>
<i><b>GPS Data Base</b></i>	Current if flying IFR	
<i><b>VOR</b></i>	IFR, checked every 30 days	<b>91.171</b>

**\* A 100 Hour Inspection** is required if:

- The aircraft is carrying people or property for compensation – or – is used for flight instruction.
- If you forget and have the aircraft inspection at 110 hours, the next 100 hour inspection is due 100 hours from when it was originally due. (You can't roll it forward like an Annual Inspection due date).

## ELTs and their Batteries

**\*\* Each emergency locator transmitter must be inspected within 12 calendar months after the last inspection for:**

- Proper installation
- Battery corrosion
- Operation of the controls and crash sensor
- The presence of a sufficient signal radiated from its antenna.

**\*\*\* ELT Batteries must be replaced:**

- If the transmitter has been in use for more than 1 cumulative hour, or
- When 50% of their useful life has expired. If the batteries are rechargeable, replace when 50% of the charge life has expired.



**Expiration  
Date**

In plain English, all of the batteries must have the same expiration date and they must be replaced upon reaching 50% of their useful life, based on the expiration date on each battery cell.

The new expiration date for replacing (or recharging) the battery must be legibly marked on the outside of the transmitter and entered in the aircraft maintenance record.



# Required Equipment, VFR DAY: **TOMATO FLAMES**

- **A**IRSPEED Indicator. (A1)
- **T**ACHOMETER, (for each engine). (T1)
- **O**IL PRESSURE gauge, (for each engine using a pressure system). (O1&2)
- **M**ANIFOLD PRESSURE gauge (M) for each altitude engine (A turbocharged reciprocating engine's manifold pressure is boosted and therefore, you must be able to monitor that pressure).
- **A**LTIMETER. (A2)
- **T**EMP gauge for each liquid cooled engine.
- **O**IL TEMP gauge (O1&2) for each air-cooled engine.
- **F**UEL gauge for each tank (F).
- **L**ANDING GEAR POSITION indicator, (if the aircraft has retractable gear). (L)
- **A**NTI-COLLISION LIGHT system (A3), if the aircraft was certified after March 11, 1996. (In the event of an Anti-collision light failure, you may continue to a location where repairs or replacement can be made).
- **M**AGNETIC DIRECTION INDICATOR (M2) (Installed in the aircraft).
- **E**LT (E) (FAR 91.207).
- **S**EAT BELTS (S). If the aircraft was certified after July 1978, you'll also need Shoulder Straps.

## VFR Day Instrument Requirements

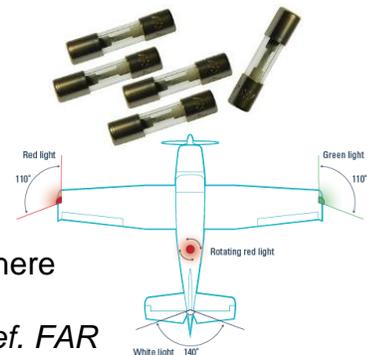


## Tomato Flames



# Required Equipment, VFR NIGHT: **FLAPS**

- **F**USES. If your aircraft is equipped with fuses, you'll need 3 of each kind, and they must be accessible in flight. Note: If your airplane has circuit breakers, there's no need to have fuses.
- **L**ANDING LIGHT – but only if you are flying for hire.
- **A**NTI-COLLISION LIGHT SYSTEM, if certified after August 11, 1971.
  - In the event of failure, you may continue to a location where repairs or replacement can be made.
- **P**OSITION LIGHTS. Must be on from sunset to sunrise. (Ref. FAR 91.209).
- **S**OURCE OF ELECTRICAL POWER (an alternator or generator).



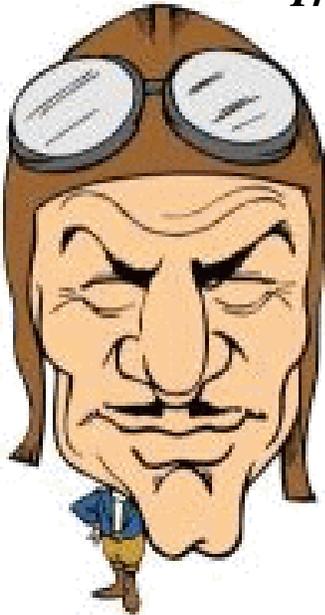
## Required Equipment for an IFR Flight, in addition to the equipment required for VFR:

(FAR 91.205)

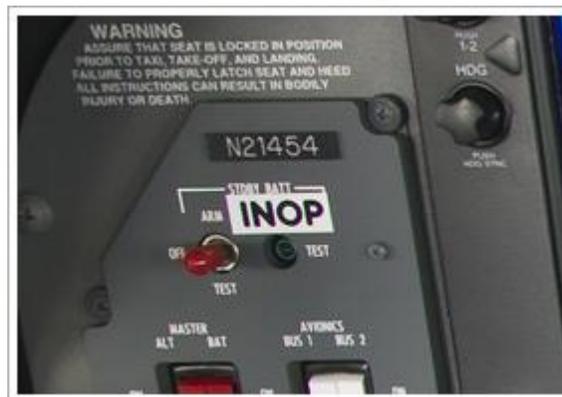
- **D**IRECTIONAL GYRO (DG) or equivalent.
- **R**ATE OF TURN indicator **or** an additional attitude indicator
- **A**TTITUDE INDICATOR.
- **G**ENERATOR or Alternator with adequate capacity.
- **S**KID / SLIP Indicator
- **C**LOCK installed in the aircraft, displaying hours, minutes and seconds.
- **A**LTIMETER.
- **R**ADIOS & NAV. Two-way radios and NAV equipment appropriate to the ground facilities to be used.



### Travel Tip



*You can take off with inoperative instruments or equipment that's not required by FAR 91, as long as that instrument or equipment is removed or placarded "**Inoperative**" and a pilot or mechanic determines that the loss of that instrument or equipment is not a hazard. The bad component or instrument must be unpowered/unwired.*



## **Required Documents in the Aircraft** (FAR 91.203, 91.9)



- **A**irworthiness certificate.
- **R**egistration certificate.
- **R**adio license, for SOME commercial operations & if traveling outside the USA.  
To order online, go to <http://wireless.fcc.gov/uls/index.htm?job=home>
- **O**perating limitations (The Owner's Manual).
- **W**eight and balance data.



**(FAR 91.103) If you plan to fly outside of the airport area, or file IFR, you must:**

- Study weather reports and forecasts.
- Determine fuel requirements.
- Plan alternatives if the planned flight cannot be completed.
- Check with ATC for known traffic delays.
- Determine takeoff and landing distances by evaluating:
  - Runway lengths, airport elevation and slope.
  - Aircraft gross weight.
  - Wind and temperature.

### **For Local Flights:**

You should know about the airport(s) you intend to use, including the runway lengths, takeoff and landing distances for the day's conditions.

### **Planning Fuel Requirements (FAR 91.151 & 167)**

- **VFR Day:** Fuel to destination + 30 minutes, assuming normal cruising speed.
- **VFR Night:** Fuel to destination + 45 minutes, assuming normal cruising speed.
- **IFR:** Fuel to destination and alternate (if required) + enough fuel to fly for another 45 minutes at normal cruising speed.



VFR or IFR, I recommend that you always plan to have 1 hour of fuel reserve! You'll thank me later.



*“Any attempt to stretch fuel is guaranteed to increase headwinds.”*

*According to AOPA's Air Safety Institute, in an average week, three general aviation aircraft crash due to improper fuel management.*



# Medical

(FAR 61.23)

- 3rd Class — Good for **60** months, unless you're 40 or over on the day of the examination; then it's good for **24** months.
- 2nd Class — Good for Commercial privileges the first 12 months, then it turns into a 3rd class physical.
- 1st Class — Under 40: ATP privileges 1 year. Over 40: 6 months. If **over 40**, after 6 months, the 1<sup>st</sup> Class drops to a 2nd Class for next 6 months, then becomes a 3rd class and is valid for only 1 more year as a 3rd Class (total 2 years). **Under 40**: After 1 year, 1<sup>st</sup> Class reverts to a 3rd Class for 3 years, (total 4yrs).

*You must submit FAA Form 8500-8 (MedXPress) before your physical. Fill out the form at: <https://medxpress.faa.gov> When completed, you'll receive a confirmation number. Save the number and present upon arrival for physical. This will help them retrieve your form.*

## FAA MedXPress Program For Pilots

Your Express  
Lane to Medical  
Certification



### To qualify:

- You must possess a valid **U.S.** Driver's License and consent to a national driver registration check.
- You must have held a valid medical certificate at any time after July 15, 2006. Your certificate must have never been revoked and your most recent medical application must have never been denied.
  - You've never had a valid medical since July 2006? You must take a one time FAA Medical Exam.
- If you already have a Special Issuance (SI), you'll won't be required to go through that process again as long as you are under the care of your physician. If your physician finds that you have developed an adverse condition, you'll need to go through the SI process one time.

## Adverse Condition examples:

- **Cardiovascular**, such as a Heart Attack, Cardiac Valve Replacement, Heart Transplant, etc.
- **Neurological**, such as Epilepsy
- **Mental Health Personality disorders**, such as psychosis, delusions, or hallucinations

**More SI information can be found at**

[https://www.faa.gov/news/updates/media/final\\_rule\\_faa\\_2016\\_9157.pdf](https://www.faa.gov/news/updates/media/final_rule_faa_2016_9157.pdf), pages 73 – 76.

### **You can fly IFR and VFR, reciprocating or turbine engine, pressurized or non-pressurized, as long as the aircraft:**

- Carries no more than five passengers (it's an aircraft designed with no more than six seats)
- Has a max certificated weight of 6,000 pounds.
- You can fly a fast aircraft, as long as you do not exceed 250 KIAS.
- You must not fly above 18,000 feet MSL
- You cannot fly for hire, except for flight instruction and as permitted by 14 CFR 61.113..
- You can fly domestically (USA), and if a foreign country accepts BasicMed, you can fly in that country, too.

### **If you want to operate under BasicMed, follow these steps:**

**1<sup>st</sup>**

- **Get a comprehensive medical exam (CME).** To do this, visit a state licensed physician and take the Comprehensive Medical Examination Checklist (CMEC) with you. You can find the CMEC at [https://www.faa.gov/documentLibrary/media/Form/FAA\\_Form\\_8700-2\\_.pdf](https://www.faa.gov/documentLibrary/media/Form/FAA_Form_8700-2_.pdf)  
The exam expires four years later on the **same day of the month.**

**4**  
**YEARS**

**2<sup>nd</sup>**

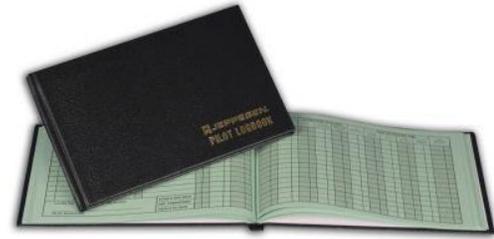
- After completing the medical exam, **complete an online Medical Education course**, which is provided at no charge by AOPA at <https://basicmedicalcourse.aopa.org/> .  
The course expires two years later on the **last day of the month.**

**2**  
**YEARS**

**You must have your US Driver's License with you when you fly.**

## You must keep the following in your logbook:

- A copy of the completed and signed physician exam checklist, and . . .
- A copy of the online Medical Education course, “Course Completion Certificate”.



## You don't need to have your BasicMed credentials with

**you when you fly.** If you wish, you can keep images of the completed physician's checklist and proof of course completion on your Smartphone. If asked, you can show this to an FAA Inspector. [CLICK HERE](#) for more BasicMed information.



**If you are taking advantage of BasicMed and develop an adverse medical condition, you must either ground yourself or be treated by a physician before you continue to fly.**



## Drugs and Alcohol (FAR 91.17)

### ***You cannot be a crew member:***

- If you're using any drug that affects your physical or mental capacities in any way.
- If you've consumed alcohol within eight hours.
  - You could be under the influence after 8 hours. Therefore, you would be wise to allow **12 to 24** hours from bottle to throttle.
  - Legally, you're under the influence if your blood alcohol is **.04%** or more.



## ***Passengers & Substance Abuse***

**THE RULES:** Unless there's an emergency, a pilot may not allow anyone to board his/her aircraft if they appear to be intoxicated or under the influence of drugs. The exception is a medical patient under proper care.

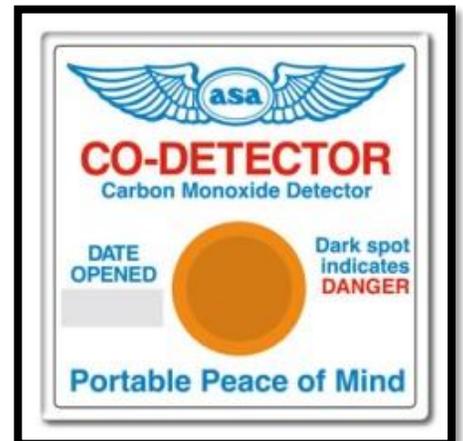
**A FIELD SOBRIETY TEST:** If your passenger(s) cannot correctly pronounce "innovative", "preliminary", "proliferation", or "cinnamon" – they may be under the influence.



## ***Refusing to Submit to a Drug or Alcohol Test (FAR 61.14)***

That's grounds for denying an application for any certificate or rating for a year, and suspension or revocation of any certificate or rating.

***Carbon Monoxide*** is a big concern, especially in the winter. Most heaters work by air flowing over the manifold. If exhaust fumes escape, the results could be fatal. If you detect the odor of exhaust or feel drowsy, dizzy, or have a headache while using the heater, you should suspect carbon monoxide poisoning and land immediately.



## Blood Donation - All Classes

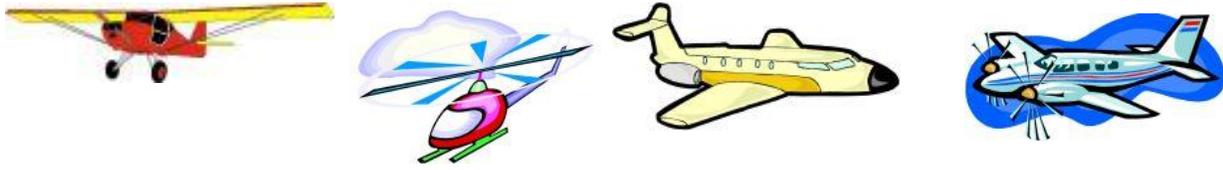
Disease/Condition	Evaluation Data
<b>A. One unit</b> (less than or equal to 500 ml)	After a 24 hour recovery period and the airman has no symptoms:
<b>B. Two or more units</b> (more than 500 ml) This includes Power Red (double red cell donation)	After a 72 hour recovery period and the airman has no symptoms:
<b>C. Platelet OR Plasma donation</b>	After a 4-hour recovery period and the airman has no symptoms:

Ref: [Guide for Medical Examiners](#)

### *Diving and Flying*

The AIM tells us that a pilot should wait at least 12 hours prior to flying to altitudes up to 8,000' (MSL) if a dive has not required a "controlled ascent" (non-decompression stop diving) and at least 24 hours after diving in which a "controlled ascent" (decompression requiring) is required. Any flight above 8000' MSL should be delayed until at least 24 hours has elapsed. "These recommendations are actual flight altitudes above mean sea level (AMSL) and not pressurized cabin altitudes."

# Landing Currency – It is Category, Class and Type Specific



***If you'll be carrying passengers in a particular aircraft, you'll need, within the past 90 days, you'll need to have landing currency:***

- **Day Landing Currency:** Three takeoffs and landings, day or night. (If it's a tail wheel aircraft, those landings need to be to a full stop).
- **Night Landing Currency:** From one hour after sunset to one hour before sunrise, **three** takeoffs and **three** landings to a **full stop**.



## Sunrise and sunset

	Times for 18-Feb-2017	
	Local (UTC-7)	Zulu (UTC)
Morning civil twilight	06:44	13:44
Sunrise	07:09	14:09
Sunset	18:14	01:14
Evening civil twilight	18:39	01:39

**You can find Sunset and Sunrise times at [AirNav.com](http://AirNav.com) and on the airport page of apps like ForeFlight**

## ***Required Personal Documents*** (FAR 61.3)

***When flying as a pilot, you must have with you:***

- A current plastic (credit card style) pilot certificate that includes an “English Proficient” endorsement. (Required for international flying).
- An appropriate current medical.
- A photo ID (Driver’s license, government ID, military ID, or passport).

## ***406 MHz ELTs***

On **February 1, 2009**, the international COSPAS-SARSAT satellite system discontinued satellite-based monitoring of the 121.5 and 243 MHz frequencies.

121.5 / 243 MHz distress signals are now only detected by local airport facilities, air traffic control facilities, or by overflying aircraft. **This assumes that an overflying aircraft will be monitoring 121.5.** If an aircraft crashes, especially in a remote area, a **121.5 MHz ELT** will provide extremely limited assistance.

The new **406 MHz ELTs** are monitored by satellites and also contain a 121.5 MHz ELT. Optionally, they can be linked to a GPS, to provide precise coordinates to search responders.



### ***If you don't have a 406 ELT***

Consider carrying a personal locator beacon, (PLB). Base your decision on the type of flying you do, the equipment you carry, and the type of terrain you overfly.

## ***Stations, Seatbelts/ Shoulder Harnesses*** (FAR 91.107)

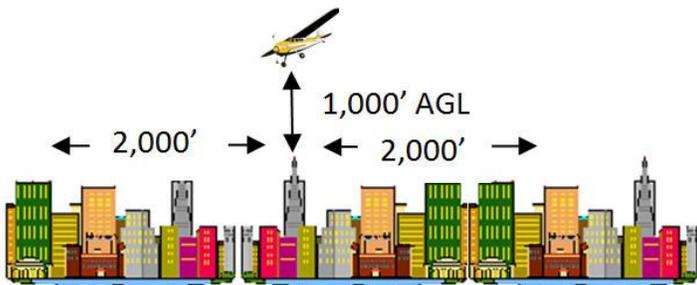
**PICS must ensure** that each passenger has been briefed on how to fasten and unfasten their safety belt, and if applicable, their shoulder harness.

**Before and during – taxi, takeoff, and landing:** Passengers and crew must be in an appropriate seat with their safety belt and shoulder harness fastened.

- **If the aircraft was manufactured after July, 1978:** Shoulder straps must be installed and worn.
- **If a child is less than 24 months old:** He or she can be held on a passenger's lap.
  - See FAR 91.107 for child approved seat/restraint systems.

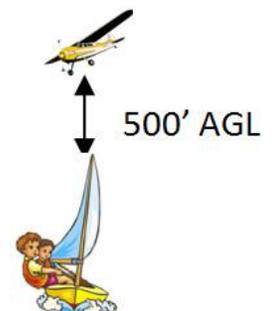
## ***Minimum Safe Altitudes*** (FAR 91.119)

**Anywhere** – Fly at an altitude that will allow a safe emergency landing without hazard to people or property on the surface.



**Congested Areas:** Fly no closer than **1,000 feet** above the highest obstacle within **2,000 feet** of the aircraft.

**Over water and non-congested, sparsely populated areas:** Fly no closer than **500 feet** to any person, vessel, vehicle or structure.



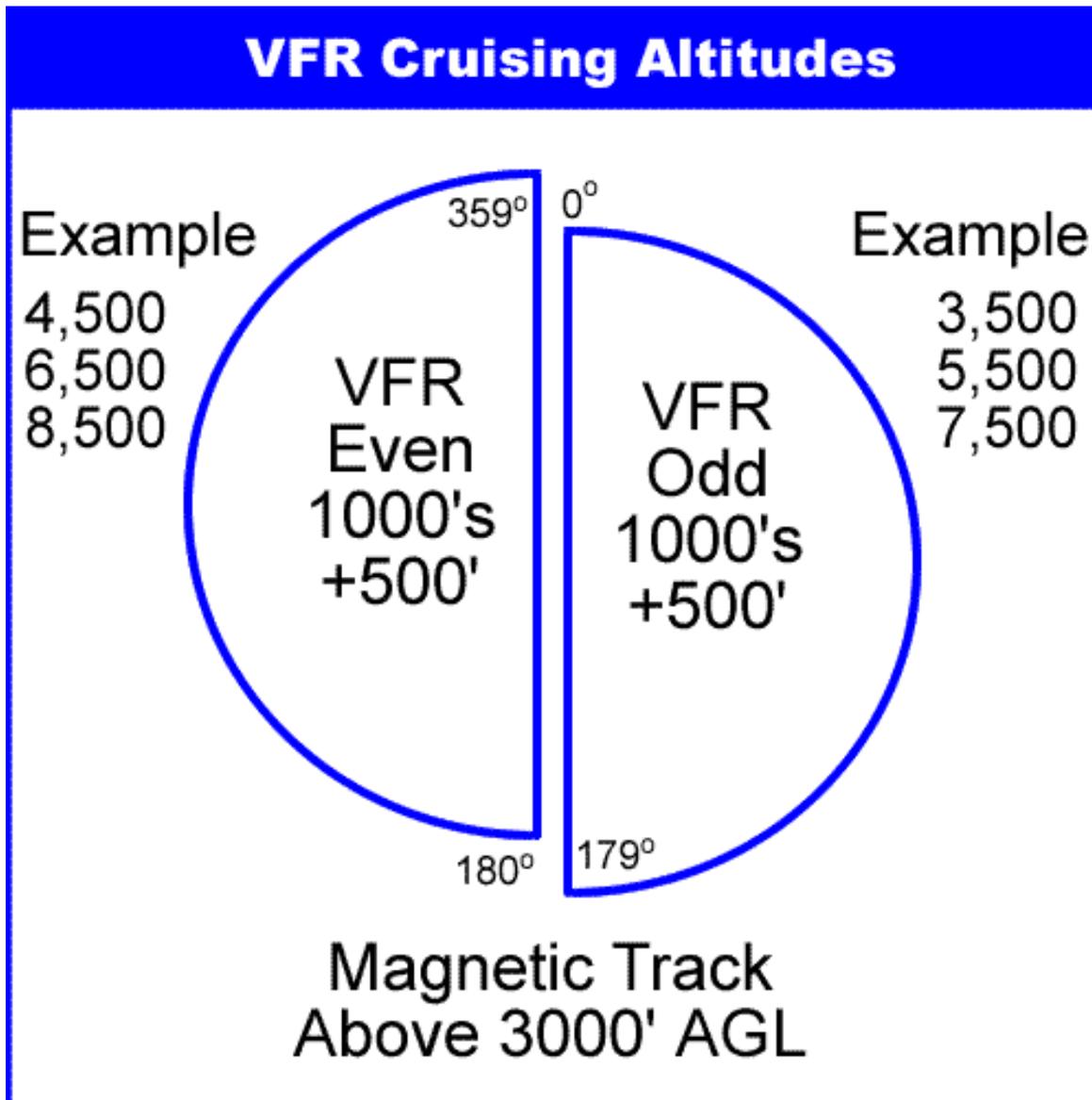
## **Formation Flying** (FAR 91.111)

*It's never done* without the pilots of all aircraft involved making prior arrangements.

It's never done when carrying passengers for hire.



## **Cruising Altitudes** (FAR 91.179)



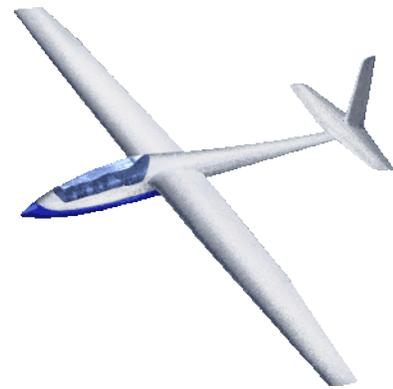
**Order of Right of Way** (FAR 91.113)

**Aircraft in distress** have the right-of-way over all other **aircraft**.



**Balloons** are the least maneuverable and have the right of way over **everything**.

**Gliders** are the next least maneuverable and have the right of way over **airplanes and rotorcraft**.



**Aircraft towing or refueling an aircraft** has the right of way over all other **engine driven aircraft**.



**Airships** are next.

**Lowest Priority:**

Airplane, Rotorcraft, Powered Parachute, and Weight Shift Aircraft

## Right of Way – Converging, Approaching Head-On, and Overtaking (FAR 91.111)



- If converging — the aircraft on the right has the right of way, (if it's the same category aircraft).
- If approaching head-on — both aircraft should alter course to the **right**.
- If Overtaking — the overtaken aircraft has the right of way. The pilot of the overtaking aircraft should alter course to the **right**.

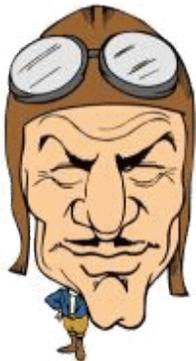


## Right of Way – Landing (FAR 91.113)

- Final approach or landing aircraft have the right of way.
- If you're at a lower altitude, you have the right of way, but you should never take advantage of your position.

## Oxygen (FAR 91.211)

<b>ABOVE 15,000 MSL:</b>	<b>Oxygen available for everyone.</b>
<b>ABOVE 14,000 MSL:</b>	Oxygen is always required for flight crew.
<b>14,000 MSL</b> ↑ <b>12,500 MSL</b> ↓	 <p>After 30 minutes, Oxygen is required for the flight crew</p>



### Travel Tip

*Supplemental oxygen can help prevent hypoxia symptoms when flying:*

- At or above 5,000 feet MSL at night.
- At or above 10,000 feet MSL during the day

## ***The Private Pilot and Flight Cost Sharing***



### **The Pilot and Passengers must Share on an Equal Basis**

You can share the cost of fuel and oil consumed on a flight + ramp or tie-down fees at the destination airport. If the airplane is rented from an FBO or flight school, the hourly rental fee (plus the cost of fuel, if that isn't included in the rental fee) can be shared by the pilot and passengers.

### **A Common Purpose**

In addition to equal sharing of the cost of the flight, the FAA says the pilot and passengers must have a "common purpose" for the flight as well. That is, they must be flying to the destination for a reason, not merely so the pilot can build time and charge money.

### **What you cannot share**

Indirect expenses such as insurance, maintenance and depreciation cannot be shared.

## ***Commercial Pilot Certificate***

Got a Commercial Certificate? You must have at least a 2<sup>nd</sup> Class Medical to be a real Commercial Pilot. If you have a 3<sup>rd</sup> Class Medical or have let your 2<sup>nd</sup> Class lapse into a 3<sup>rd</sup> Class, the ***Private Pilot Cost Sharing*** rules apply.



### ***Judgment Creep***

*If a pilot pushes a limit, and gets away with it, his or her judgment creeps to the "Edge", setting a new, bolder limit.*

*Creeping closer and closer to the edge of the safety envelope will eventually result in a Judgment Spiral.*

# Airspace

FL 600  
18,000 MSL

CLASS A | ADS-B 1090 ES Required

CLASS E | 10,000 MSL and above ADS-B Required

2,500 AGL  
ADS-B Not Required

CLASS E

ADS-B  
Required

10,000 MSL  
3,000 MSL

12NM From  
Coastline

Gulf of Mexico

CLASS C

ADS-B  
Required

10,000 MSL  
Surface

CLASS B

ADS-B  
Required

10,000 MSL  
Surface

30NM

Mode C Veil

ADS-B  
Required

10,000 MSL  
Surface

Key AGL: Above Ground Level; FL: Flight Level; MSL: Mean Sea Level; NM: Nautical Miles

## A Mode C TRANSPONDER & ADS-B OUT IS REQUIRED:

- In Class A airspace
- Within 30 nm of the Class B primary airport (The CLASS B VEIL)
- In and above Class C
- When operating above 10,000 MSL, (excluding the airspace below 2,500 AGL).





FL 600  
18,000 MSL

Class A exists in all the lower 48 states the Eastern portion of Alaska.

- Starts above 18,000' MSL.
- Altimeters set to 29.92 in class A.
- Must be on an IFR flight plan with an ATC clearance. (No VFR or VFR on Top).
- Above FL600, it's now Class E airspace

## Class A Exceptions

Class A does not exist in the Western portion of Alaska, nor does it exist over Hawaii. (The Hawaiian Victor Airways have no upper limit).



Surrounds busy airports, like Los Angeles, Chicago O'Hare, Phoenix, Detroit, etc.

## Certificate, Training & Endorsement Requirements:

- Pilots only need a Private Pilot certificate to operate in Class B.
- **Student Pilots** can fly in Class B, but they must have received Class B ground and flight instruction. Must have a Logbook endorsement to operate within a specific Class B, and it must be endorsed by the instructor who provided the instruction within the last 90 days. The endorsement can authorize takeoffs and landings at a specific airport in Class B airspace.
- Busy CLASS B primary airports like Chicago O'Hare (ORD) and Los Angeles (LAX) may exclude student takeoffs and landings.
- **Recreational Pilots** may fly in Class B airspace if they have an endorsement for ATC communications.

### When VFR, to enter Class B:

You must hear the controller say, "Cleared into class B".

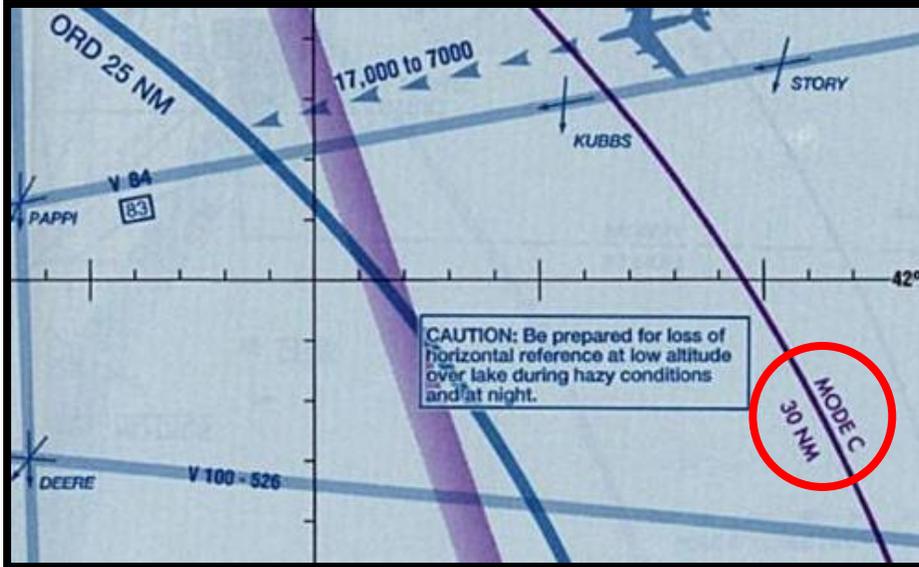
## Class B VFR Weather Requirements

Air Traffic Control makes Class B airspace possible by constantly monitoring and separating each flight in the airspace. This constant control is also why it has some of the most relaxed weather minimums

Air Traffic Control makes Class B airspace possible by constantly monitoring and separating each flight in the airspace. This constant control is also why it has some of the most relaxed weather minimums.

3 SM  
Visibility



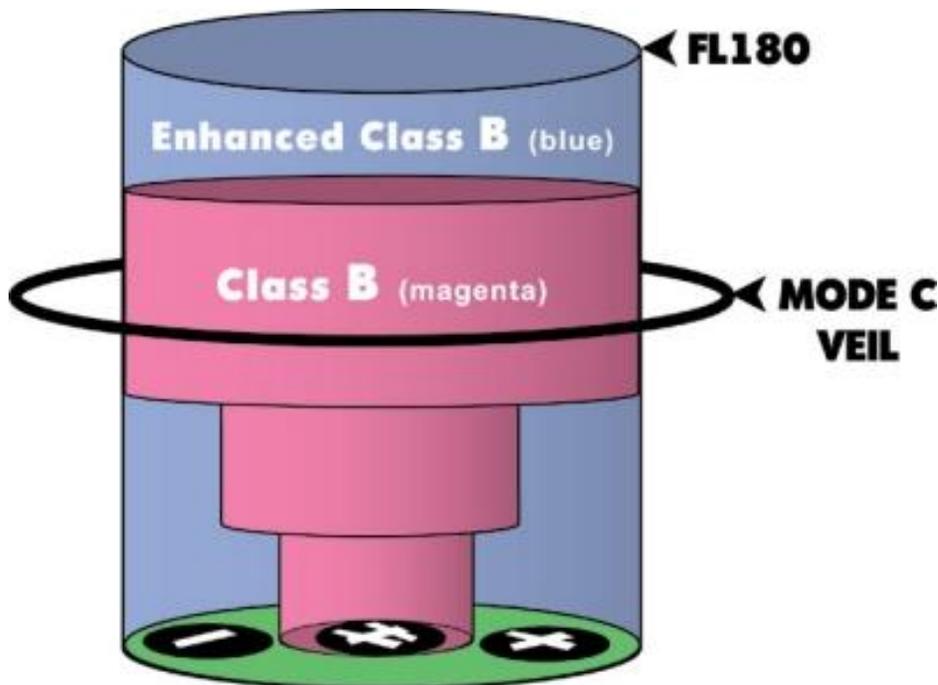


## Is Your Transponder or ADS-B Out Broken?

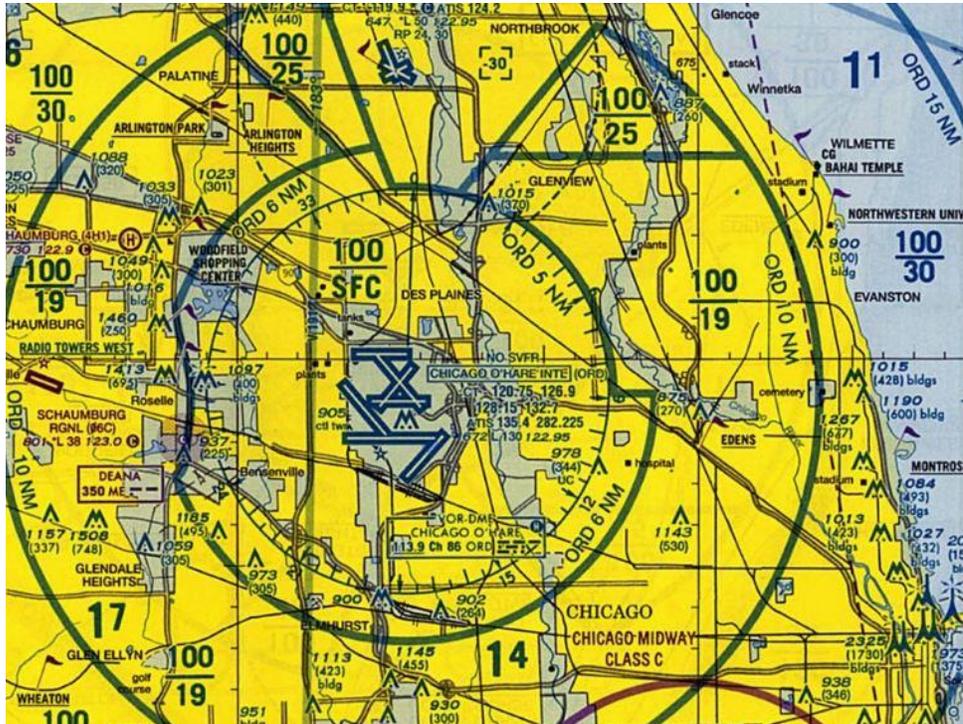
No problem. You can request permission to fly in Class B one hour prior to the desired operation.

### Class B Structure:

- Shaped like an upside down, multi-level wedding cake, with the middle layer starting at the ground and extending up.
- Tops vary from 7,000 feet MSL at some coastal airports, to 12,000 feet MSL at Denver. The average is 10,000 feet MSL. Check the chart.



Class B airspace is depicted on WACs, Sectionals and TACs by dark blue lines.



**Class B Traffic Separation Service:** VFR aircraft are separated from all aircraft in Class B with traffic advisories.

**Class B Special VFR:** Some Class B airspaces prohibit Special VFR flights.



- Class B: Maximum 200 knots when flying **beneath** Class B airspace.
- Class B: Maximum 250 knots when flying **within** class B airspace. (*FAR 91.117*)



*FAASafety.gov offers an online course: “A Direct Approach to Class B VFR Operations” This course may qualify for Wings Credit.*

# Class C



Mode C and ADS-B Out is required in and above Class C airspace.

## Certificate Requirements:

- Need at least a Student Pilot Certificate.

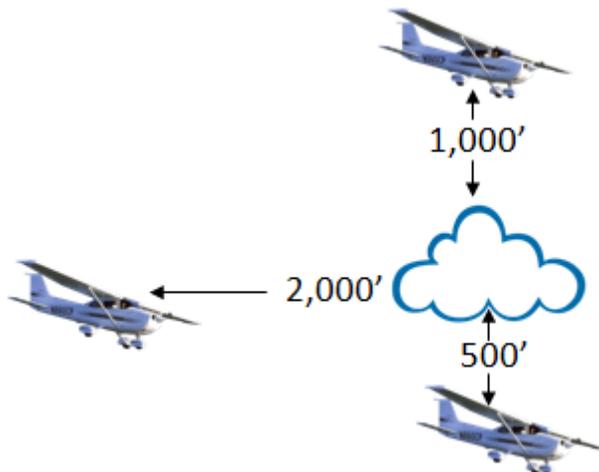
### To Enter Class C VFR:

- Establish contact with ATC. That means that the controller acknowledges you **with your call sign**.
  - “Cessna 7462Q, standby,” is an acknowledgement.
  - “Aircraft calling Tucson approach, standby,” is NOT an acknowledgement!
  - The words, “Cleared to enter Class C airspace” **are not** required.



## Class C VFR Weather Requirements

# 3 SM Visibility



## Class C Structure:

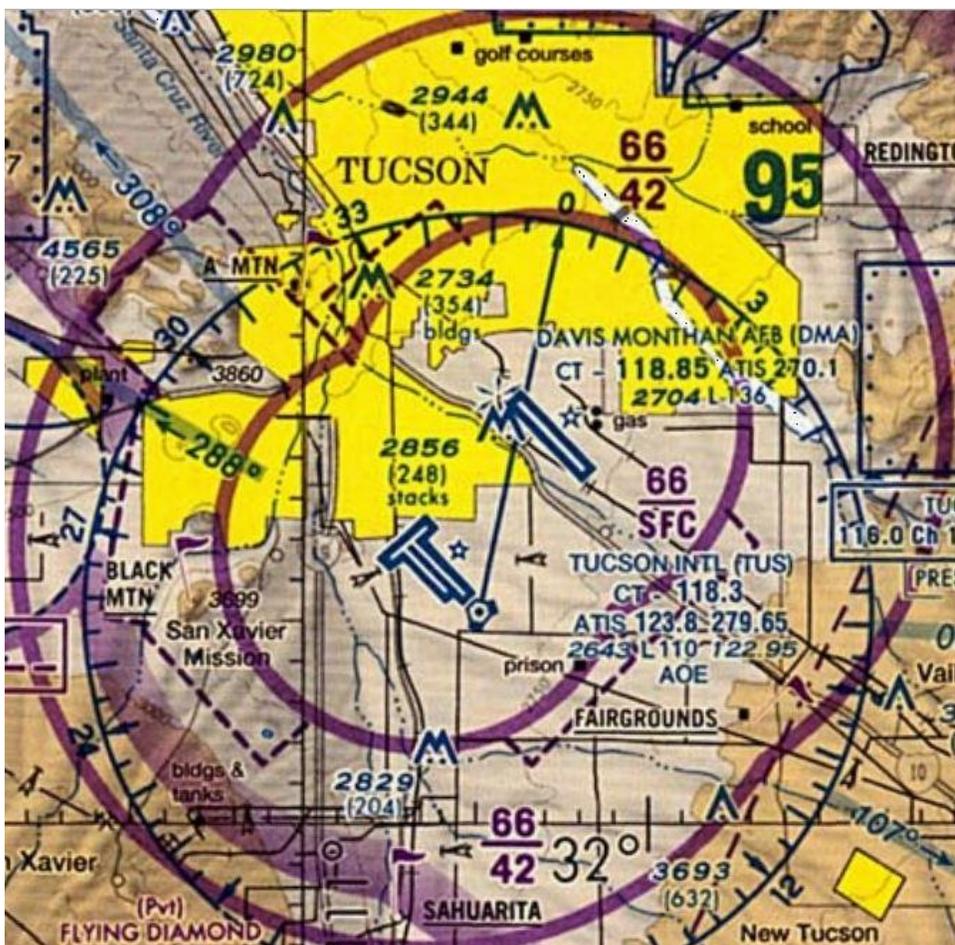
- The core surface area has a **radius of five nautical miles**.



- Extends from the surface to the ceiling of the Class C airspace.
- The upper “shelf” area has a **radius of ten nm** and extends from as low as 1,200 feet up to the ceiling of the airspace. (AIM 3-2-4).
- **An outer area**, (20 nm radius), is not depicted and it's not part of Class C. However, participating VFR aircraft in that area will receive Class C service from ATC. This is a good place to initiate contact with

approach control.

Class C is depicted on WACs and Sectionals by dark magenta lines. Some TACs include Class C airspace. For instance, on the Chicago TAC, the Midway Class C exists below the Chicago O'Hare Class B airspace.



**Class C Traffic Separation Service:** VFR aircraft are separated from IFR aircraft with traffic advisories.

**Class C Special VFR:** Special VFR flights are allowed.



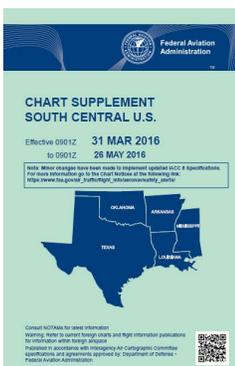
**Class C:** Max 200 knots at and below 2,500 AGL & within 4 nm. (*FAR 91.117*)



**Certificate Requirements:** At least a Student Pilot Certificate.

**To Enter:**

- Two-way communication with ATC must be established. A transponder is NOT required. If the tower controller responds to your call with your call sign and “standby”, you’ve established two-way communication. If the controller responds with “Aircraft calling tower, standby”, two-way communication has NOT been established.
- When the tower is closed, Class D airspace becomes Class E or class G. Check the **Chart Supplement**
- .



CLNC DEL 123.725 For clnc del when twr clsd call SOCAL Apx 800-448-3724  
Ⓡ SOCAL DEP CON 119.6

**AIRSPACE: CLASS D** svc 1400-0500Z‡ other times CLASS G.

**VOR TEST FACILITY (VOT) 109.0**

**RADIO AIDS TO NAVIGATION: NOTAM FILE SAN.**

**NOTE: A class G reversion occurs if, after the tower closes, the airport ceases to provide an official weather report.**

## Class D Structure:

- Generally circular in form
- Normally extends from the surface to 2,500 feet AGL.
- Outer radius generally 5 statute miles.



Class D is depicted on Sectional and TAC charts by blue dashed lines.

“-30” indicates Class D extends up to **but not including** 3,000 MSL. In this case, it’s less than 2,500 feet AGL. This happens when Class D underlies Class B airspace.

“39” indicates that Class D extends to and including 3,900 feet MSL.

If the airport rotating beacon is operating in the daytime, this means that the field is below basic VFR weather minimums

## Class D VFR Weather Requirements (basic VFR minimums)



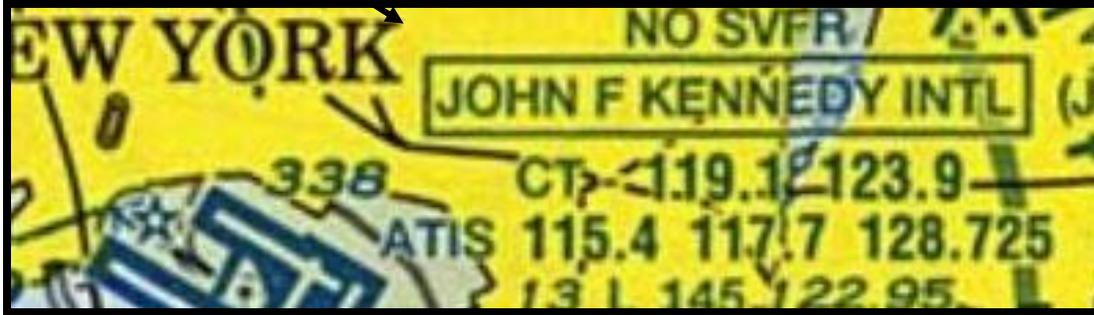
If, during the daytime hours, the airport rotating beacon is operating, this **COULD MEAN** that the field is below basic VFR weather minimums.



**Class D:** Max 200 knots at and below 2,500 AGL & 4 nm. (FAR 91.117)

### **Class D Special VFR:**

Generally, Special VFR is allowed in Class D, day or night . . . unless otherwise depicted by “NO SVFR” on the chart.



When an airport name has a box around it, it means that more information is available in the Chart Supplement.

**Class**

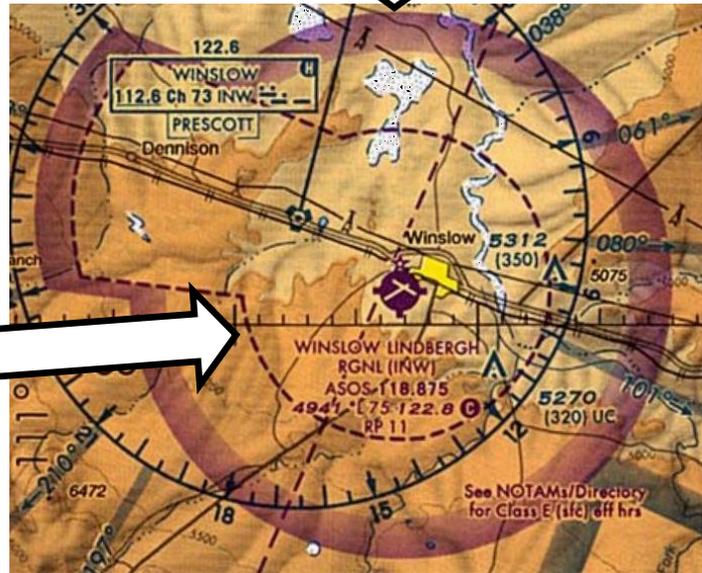


**Certificate Requirements:** None

**Depiction:** Sectional Chart

**Structure:** Extends to 18,000 feet MSL, (meets Class A airspace).

Class E starts at 700 feet AGL, when it's depicted by a magenta-tinted vignette, (continues to 18,000 feet MSL). The hard edge is the extent of Class E where it abuts Class G airspace.



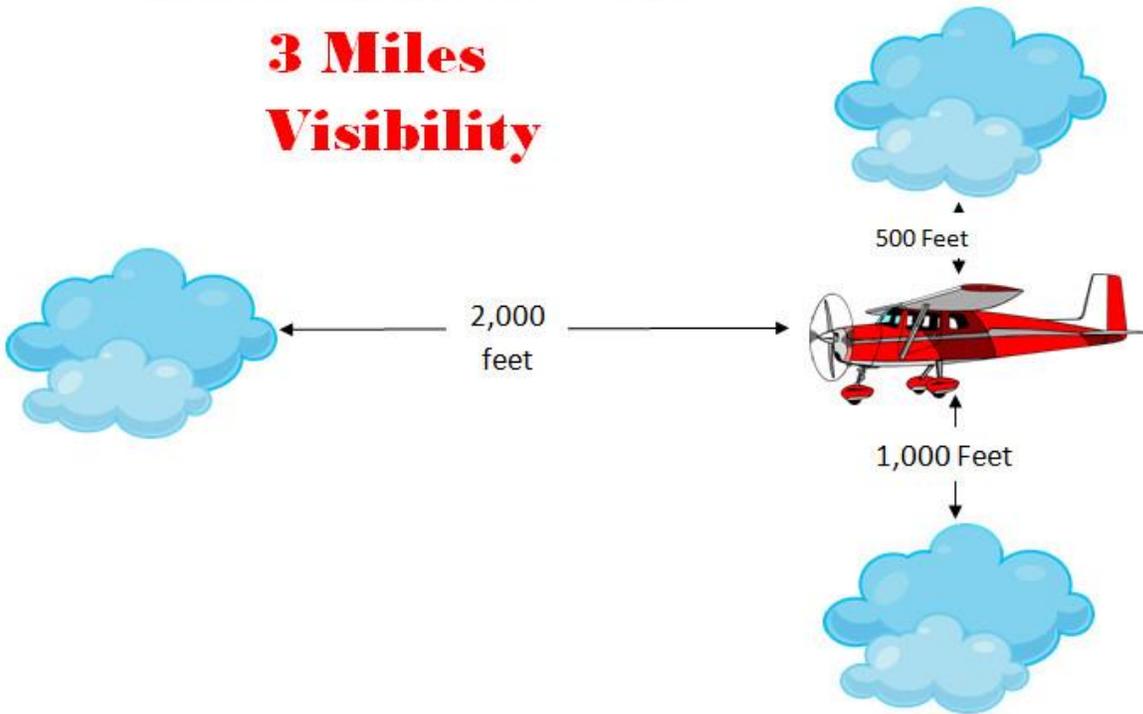
At some, but not all uncontrolled airports with an instrument approach, Class E that is depicted by a **magenta segmented line** starts at the ground.



Magenta Class E areas are used to transition between the terminal and en-route environments around non-towered airports.

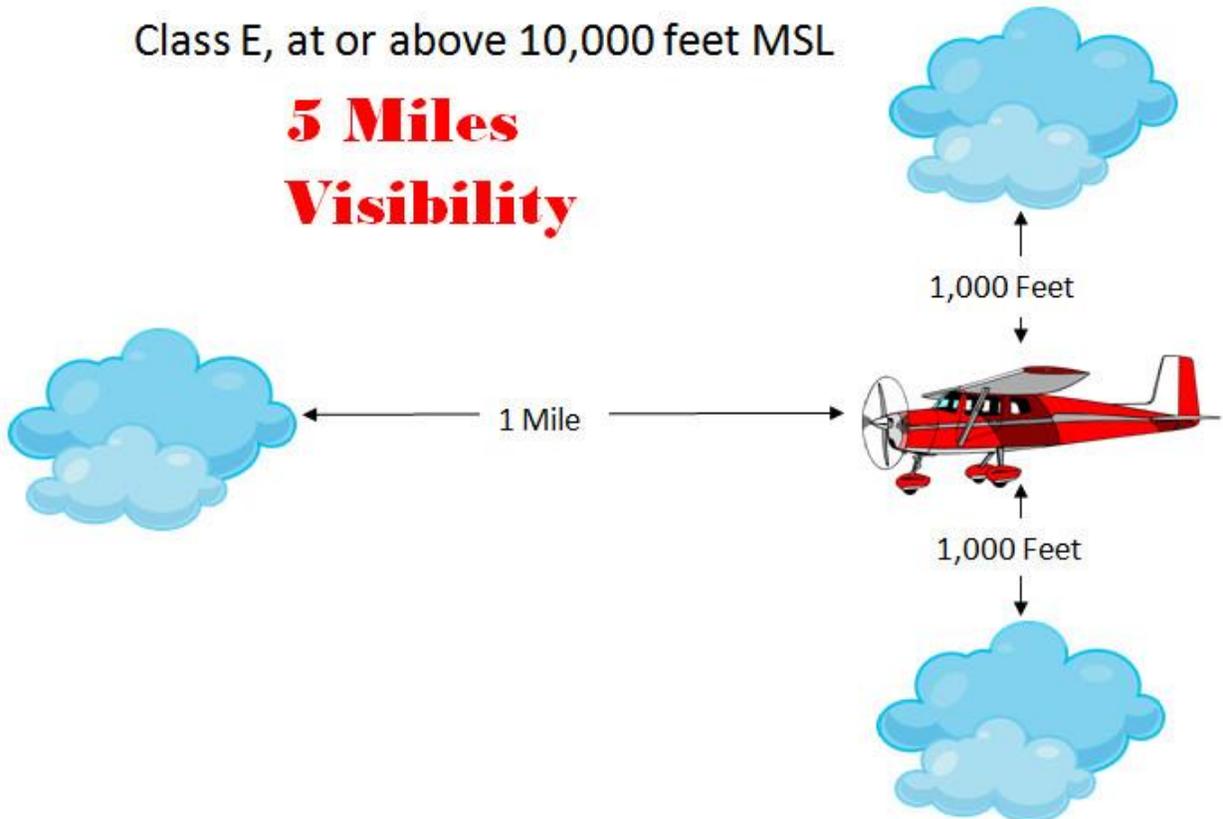
Class E, below 10,000 feet MSL

## **3 Miles Visibility**



Class E, at or above 10,000 feet MSL

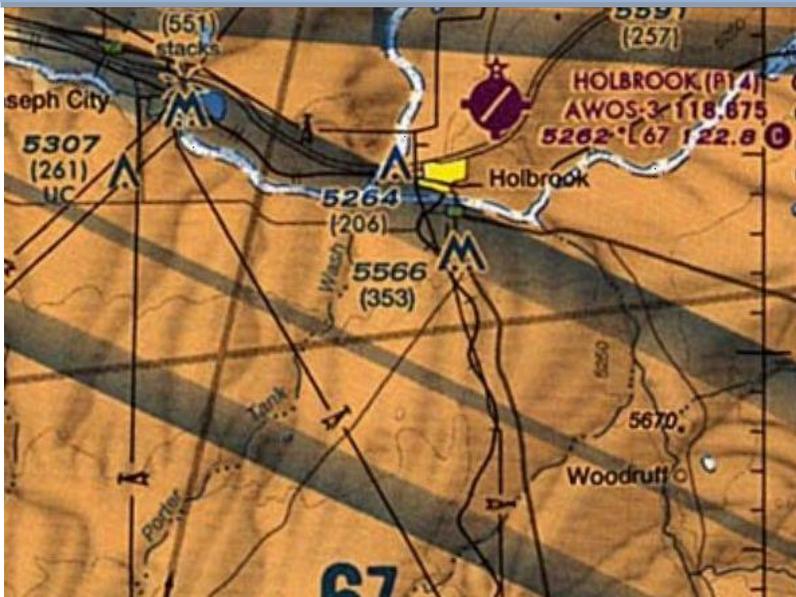
## **5 Miles Visibility**





*Imagine you're flying IFR and pop out of a cloud layer. Suddenly, you spot a VFR aircraft below. VFR weather minimums are designed to give both of you enough time to see and avoid each other.*

Class E starts at 1,200 feet AGL when it's depicted by a blue-tinted vignette, (continues to 18,000 feet MSL). The hard edge is the extent of Class E where it abuts Class G airspace.



This Class E, depicted in blue, is shown around a Victor airway.  
(Basically, Class E is four nm either side of the airway.)



Blue jagged lines differentiate Class E Airspace that starts higher than 1,200 feet AGL. In this case, it starts at 9,500 feet MSL.

## Class **G** **Uncontrolled Airspace**

- Class G airspace exists wherever Class A, B, C, D or E airspace *doesn't*.
- It starts at the surface and extends up until it hits Class E airspace.
- On a Sectional, the Class G ceiling is the floor of Class E airspace, and it's always exclusive. For example, if Class E starts at 700 feet AGL, Class G goes up to, but doesn't include, 700 feet AGL.
- There are no entry or clearance requirements. Radio communication is not required in Class G airspace, even for IFR operations.
- When it abuts Class E, Class G is outside of the hard edge of Class E's blue-tinted or magenta tinted vignettes. Class G airspace is most easily found on a sectional map when a fading, thick blue line appears.
- It's pretty easy to find these airspace markings in the Western US, but on the East Coast, it's rare to find airspace designated in this way

## Class G Weather

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.



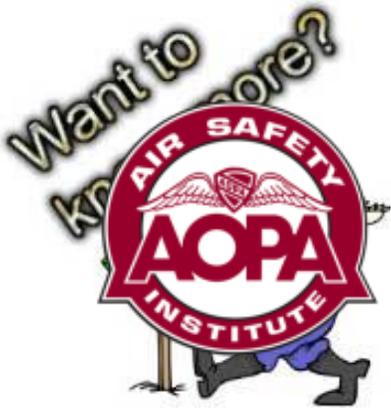
### Why is there a difference in weather minimums at

**different altitudes?** Because at or above 10,000' MSL, aircraft can fly faster than 250 knots, and pilots will need more visibility and distance from the clouds to see and avoid other aircraft.

Class



It's not used in the United States. **In Canada**, Class F Airspace is marked on both VFR and IFR charts. It includes alert areas, danger areas, rocket ranges, restricted areas, forest fire restrictions, and military active areas, air shows or other temporary impediments to navigation. ICAO defines it as a "hybrid" of Class E and Class G, in which ATC separation guidance is available but not required for IFR operation.



*AOPA's Air Safety Institute offers a course entitled, "Know Before You Go: Navigating Today's Airspace". This course qualifies for Wings Credit and AOPA Accident Forgiveness.*



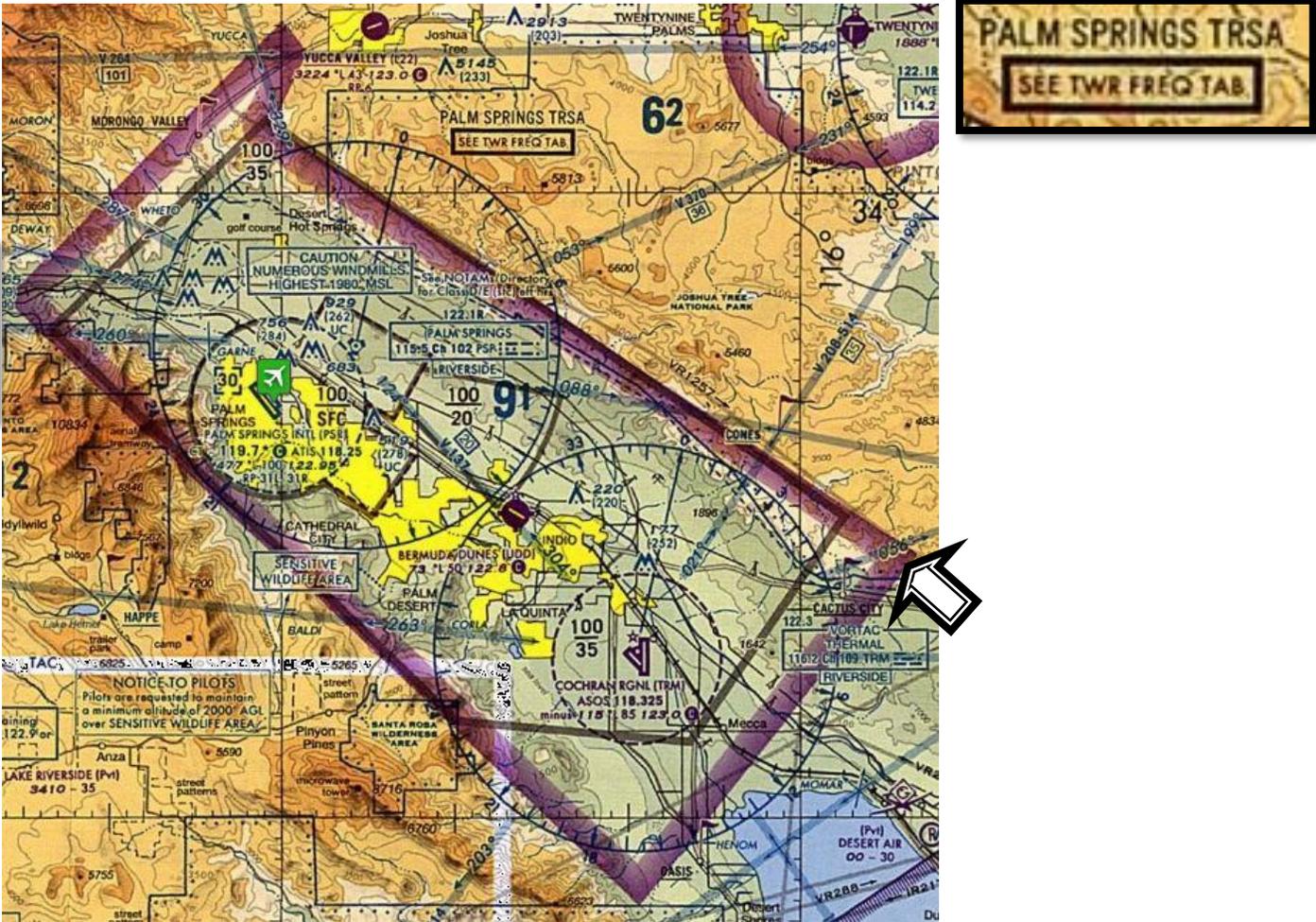
*The ultimate responsibility of the pilot is to fulfill the dreams of the countless millions of earthbound ancestors who could only stare skyward and wish.*

# Terminal Radar Service Area (TRSA)

- Situated over some selected airports.
- Participation is VOLUNTARY.
- Depicted on **sectional charts** by solid **DARK GRAY** lines (see arrows below) and groups of numbers representing the vertical dimensions of the TRSA in hundreds of feet MSL.

Palm Springs Intl. (PSP), in this example, shows the standard depiction of class D airspace (dashed blue lines surrounding PSP), accompanied by solid black lines representing the TRSA dimensions.

The portion of TRSA extending outside the PSP surface area is delegated to radar approach control.



## **TRAFFIC SEPARATION SERVICE:**

- VFR aircraft traffic advisories and separation by ATC.
- Arriving VFR aircraft receiving TRSA services will be handed off to tower from approach control.
- Departing VFR aircraft are assumed to want TRSA service unless the pilot states, “Negative TRSA service,” or a similar comment.

## **Special VFR**



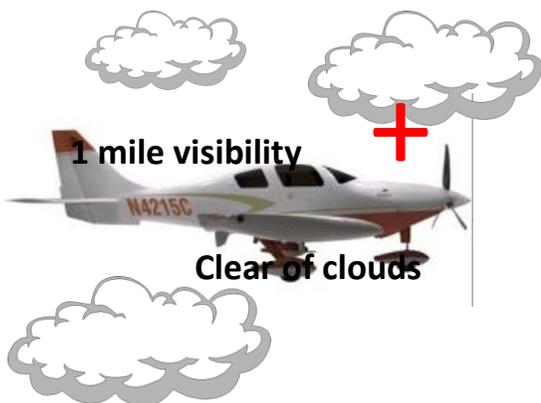
Allowed in Class C, D, E, and some Class B airspace below 10,000 feet MSL within the airspace contained by the upward extension of the lateral boundaries of the controlled airspace designated to the surface for an airport. That is, if the airspace is in the shape of a wedding cake, it's allowed only within the inner / surface core.

- Requires 1 mile visibility
- You must remain clear of clouds.

Special VFR requires a clearance from an instrument controller, usually arranged through the airport's tower. You need to be in contact with a controller who can advise you about, and keep you separated from the IFR traffic that's flying through the clouds – the very same clouds that you'll be dodging.

Don't expect a Special VFR Clearance at a very busy airport. At many class B airspace airports "No special VFR" is specified on the chart.

Smart pilots would never try this at night, although it's legal for instrument rated pilots if they're flying an instrument capable aircraft.



**Clearance from an  
"instrument  
controller"**



**Here are some simple rules that, if committed to long-term memory, will simplify airspace visibility & Cloud Clearance:**

- When flying above 10,000 feet MSL, Weather = 5-F111's
- When flying below 10,000 feet MSL, Weather = 3-152's\*

**3 152's**



**3 miles Visibility**

**CLOUD CLEARANCE: 1,000 above, 500 below and 2,000 laterally**

**3 152's and 5 F-111's are great Visibility and Cloud Clearance Memory Helpers**



**5**



**F-111's**



**5 miles visibility**



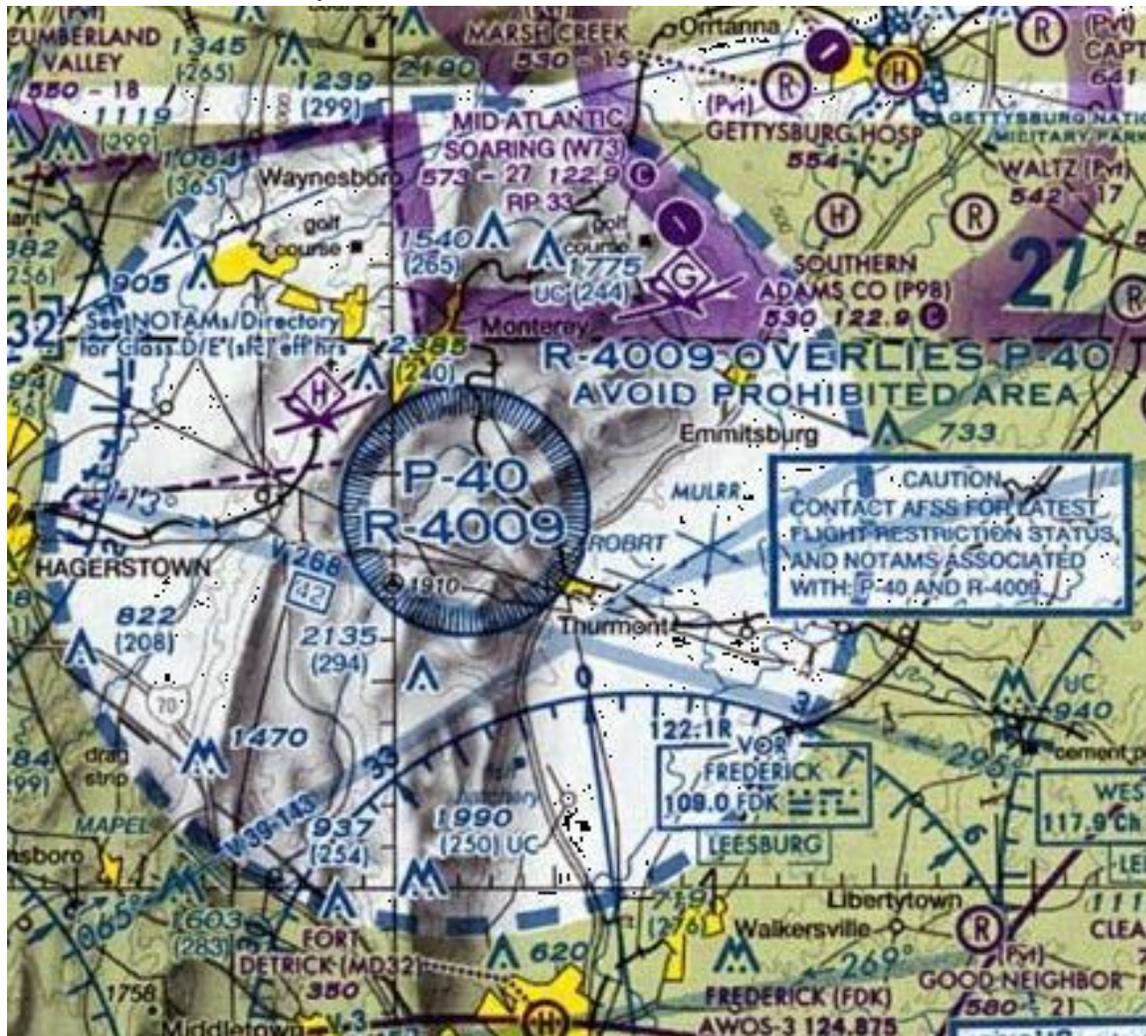
**CLOUD CLEARANCE: 1,000 above, 1,000 below and 1 mile laterally**



# ***Special Use Airspace, Military Airspace and TFRs***

## ***Prohibited Airspace – Never violate it.***

Established for security or other reasons associated with the national welfare.



Check a Flying app, the Sectional, TAC or WAC “Frequency Panel” for altitudes affected, time of use, controlling agency and frequency.





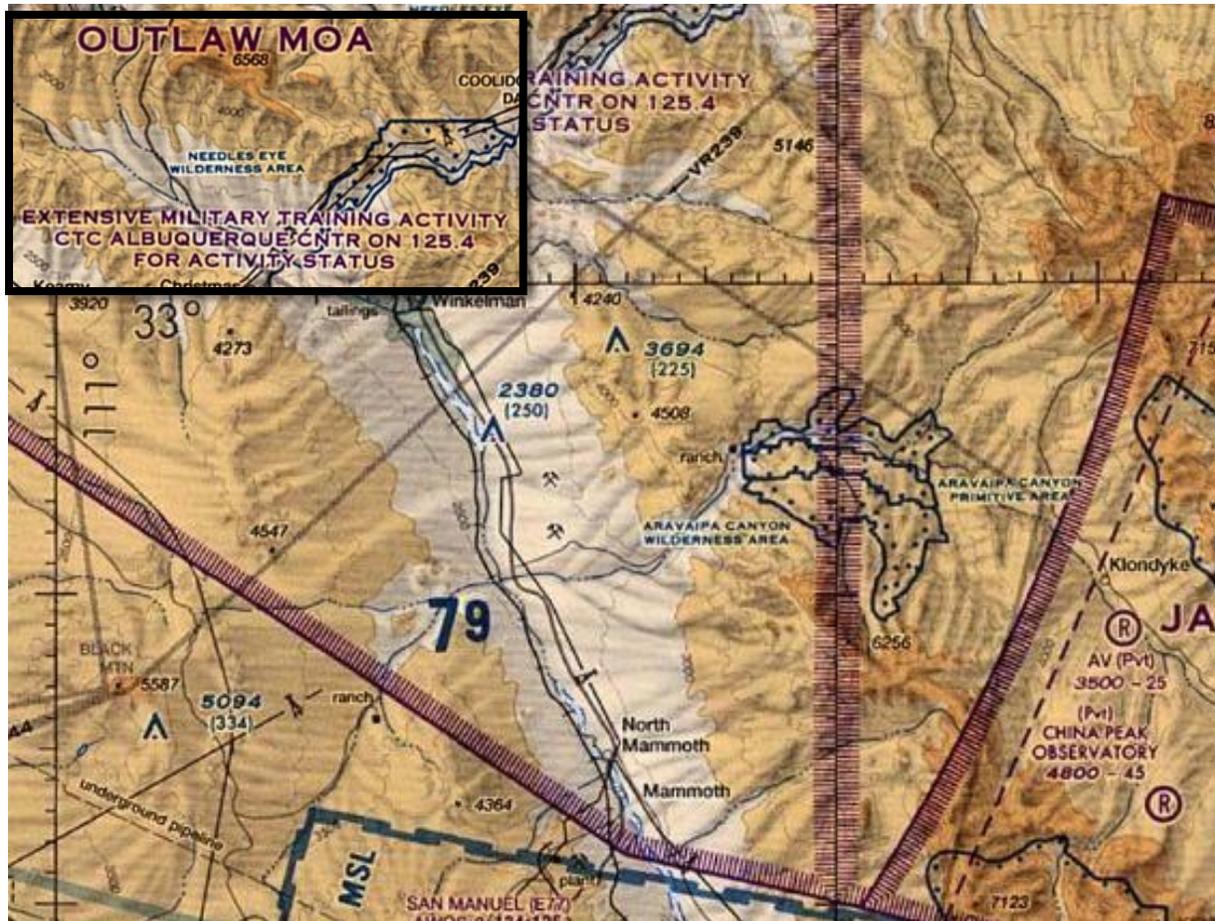
# Military Operating Areas (MOAs)

- Separates military training activities from IFR traffic.
- Pilots operating VFR should exercise extreme caution while flying within a MOA.
- Contact any FSS within 100 miles of the area to obtain the MOA's hours of operation.
- Prior to entering an active MOA, contact the controlling agency for traffic advisories.

Check the Sectional, TAC or WAC frequency panel for altitudes affected, time of use, controlling agency and frequency.

MOA NAME	ALTITUDE*	TIME OF USE†	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
AUSTIN 1	200 AGL	0800-2100 MON-FRI	OAKLAND CNTR SALT LAKE CITY CNTR	128.8 285.5 132.25 338.35

MOA's and the controlling agency's frequency are depicted on Sectional, VFR Terminal Area, and Enroute Low Altitude charts.



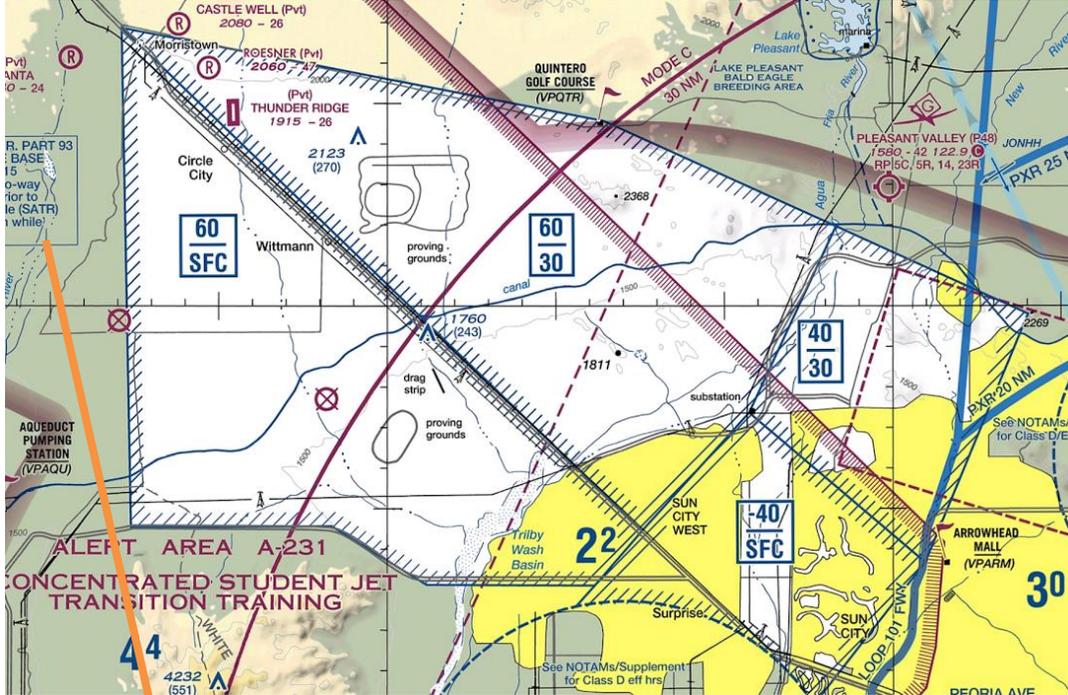
# Alert Areas

- Contain a high volume of pilot training or an unusual type of aerial activity.
- Pilots of participating aircraft as well as pilots transiting the area are **equally responsible** for collision avoidance.



# Special Air Traffic Rule (SATR) in an Alert Area

In the area west of Phoenix, AZ, a SATR has been inserted into Luke AFB's Alert Area. While contacting ATC in an Alert Area is usually voluntary, before flying into the Luke AFB SATR, pilots are required to contact Luke Approach Control.



**SPECIAL AIR TRAFFIC RULE, F.A.R. PART 93**  
**NORTH OF LUKE AIR FORCE BASE**  
**CTC LUKE APP ON 118.15**  
Pilots are required to establish two-way communication with LUKE APP prior to entering the Special Air Traffic Rule (SATR) Area and maintain communication while operating in the area.

# Special Military Activity

You'll find these in a few places in the US. This one, which covers Florida from the Gulf Coast to the Atlantic Ocean, is used for cruise missile testing, as well as supporting aircraft.



These areas may be rarely used, but it's always a good idea to talk to Flight Service to make sure the area isn't active. That is, unless you like Cruise Missiles.



## Controlled Firing Areas (CFAs)

- Controlled firing area activities are suspended immediately when spotter aircraft, radar, or ground lookout positions indicate an aircraft might be approaching the area.
- No need to chart CFA's since they do not cause nonparticipating aircraft to change their flight paths.

CFA locations can be located in the Chart Supplement "Special Notices" section.



# Military Training Routes

- Military aircraft operating below 10,000 feet, sometimes faster than 250 knots.
- Military Training Routes are divided into Instrument Routes (IR), and Visual Routes (VR).
- IR routes are flown under Air Traffic control, while VR routes are not.



*Each route is identified by either “IR” or “VR”, followed by either:*

- Four digits for routes below 1,500 feet AGL, such as: **VR1422** - or -
- Three digits for routes with at least one leg above 1,500 ft AGL, such as: **IR418**.

An arrow by an IR or VR route designation indicates the direction of flight on the route.

## ***Special Flight Rules Areas (SFRAs) or Part 93 Areas***

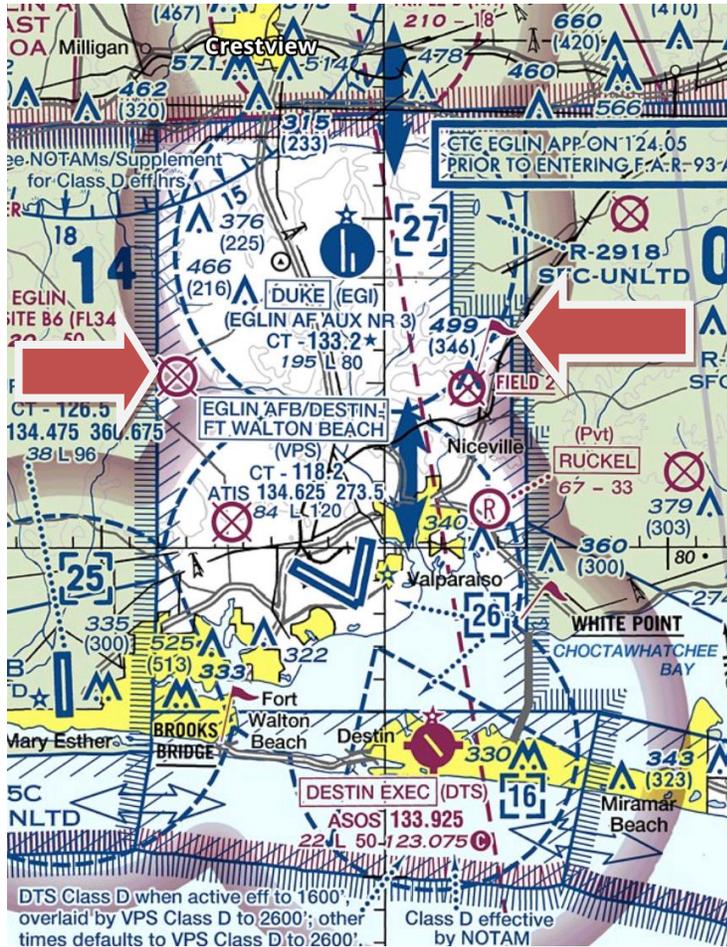
This is an area in which the normal regulations of flight do not apply, especially those concerning airspace classification, altitude, course, and speed restrictions, etc.

Part 93 Areas involve:

- [Anchorage, Alaska, Terminal Area](#)
- [Vicinity of Niagara Falls, New York](#)
- [Valparaiso, Florida, Terminal Area](#)
- [Vicinity of Los Angeles International Airport](#)
- [Mandatory Use of the New York North Shore Helicopter Route](#)
- [Lorain County Regional Airport Traffic Rule](#) (Ohio, KLPR)
- [Ketchikan International Airport Traffic Rule](#)
- [Pearson Field \(Vancouver, WA\) Airport Traffic Rule](#)
- [Vicinity of Luke AFB, AZ](#)
- [Ronald Reagan Washington National Airport Traffic Rules](#)
- [Vicinity of Grand Canyon National Park, AZ](#)
- [Washington, DC Metropolitan Area Special Flight Rules Area](#)
- [New York Class B Airspace Hudson River and East River](#)

## Part 93 Airspace

Shown below is the Eglin AFB / Valparaiso FAR Part 93 area. Associated information is found on the Sectional.



times defaults to VPS Class D to 2600'

**SPECIAL AIR TRAFFIC RULE, F.A.R. PART 93  
EGLIN/VALPARAISO TERMINAL AREA, FLORIDA  
(VFR OR IFR CONDITIONS)**

A SPECIAL AIR TRAFFIC RULE, F.A.R. PART 93, REQUIRES PILOTS TO OBTAIN AN ATC CLEARANCE/ADVISORY PRIOR TO ENTERING AND OPERATING WITHIN THE EGLIN/VALPARAISO TERMINAL AREA

**←→** CLEARANCE REQUIRED PRIOR TO ENTERING NORTH/SOUTH CORRIDOR  
CONTACT EGLIN ON 124.05  
RECOMMENDED N/S ROUTINGS - 3500' OR ABOVE

**↔** ADVISORIES REQUIRED PRIOR TO OPERATING WITHIN EAST/WEST CORRIDOR  
CONTACT EGLIN ON 132.1  
RECOMMENDED E/W ROUTINGS - BELOW 8500'

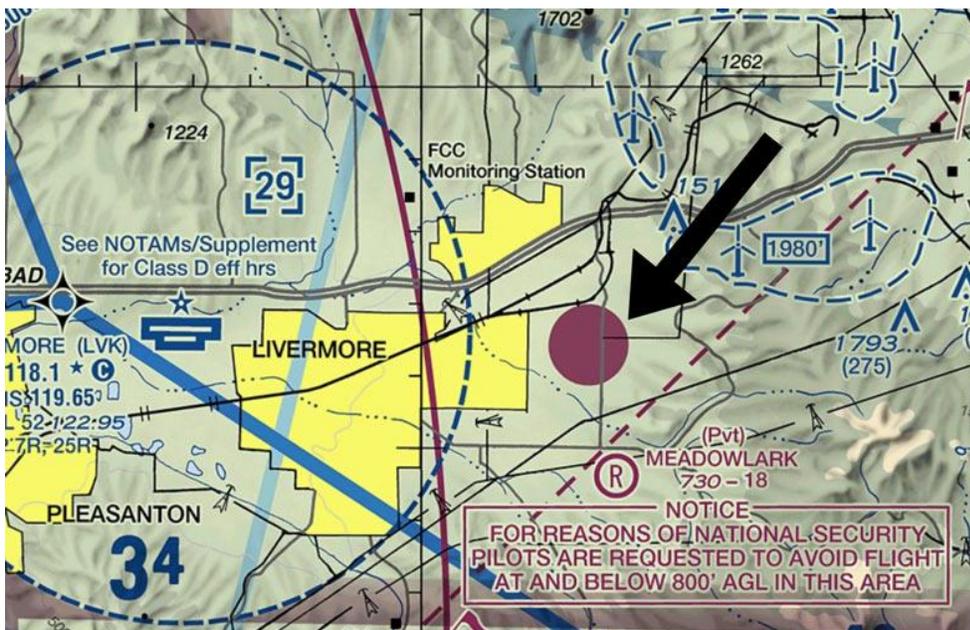
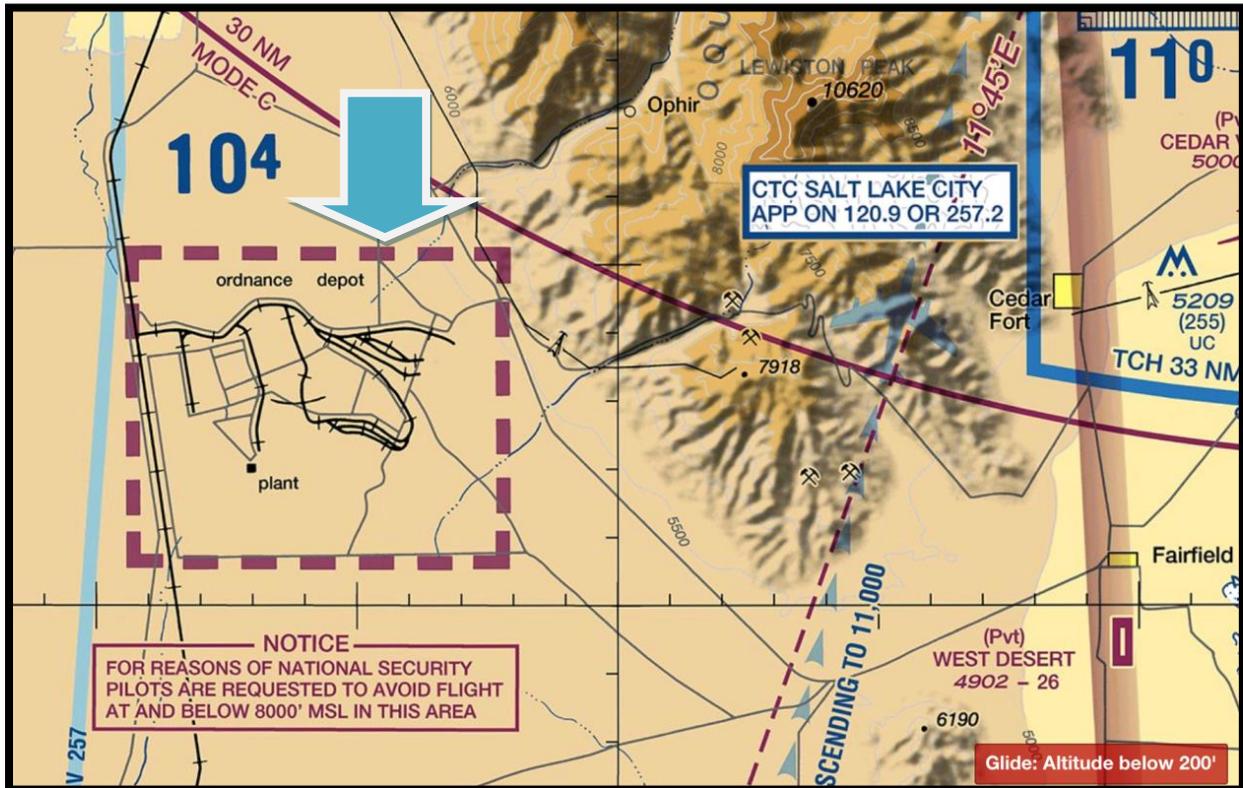
**(HI-DENSITY JET TRAFFIC 3000' AND BELOW)**

FOR DESTIN/EGLIN AFB FL PART 93 OPERATIONS DETAILS, SEE FAASAFETY.GOV  
KNOWLEDGE COURSE AT: [http://faasafety.gov/gstac/ALC/course\\_catalog.aspx](http://faasafety.gov/gstac/ALC/course_catalog.aspx)

To avoid deviations in the air, plan your routes around airspace and terrain **before takeoff**.

Some combinations of airspace and mountainous terrain offer pilots little room for mistakes. For example, North Las Vegas, and East Phoenix

# National Security Areas

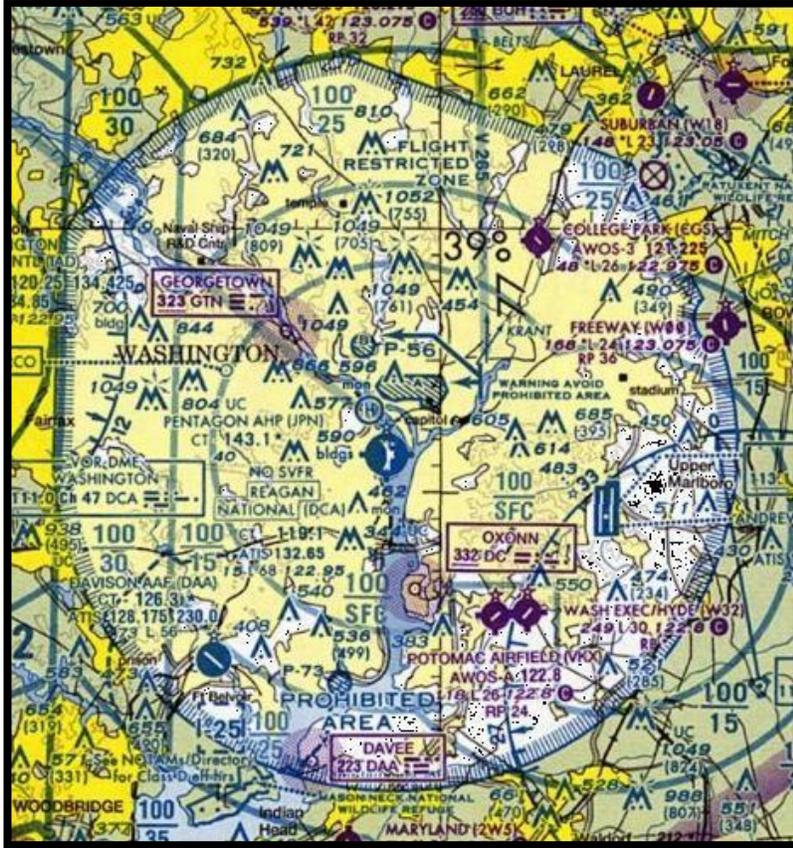


National security areas are shown by a maroon shading or dashed box. These areas are accompanied by a text box indicating how far you need to stay away.

# Washington, DC Special Procedures

Flying into the Washington, D.C. SFRA requires special training, available at

FAASafety.gov. Log in and search the “Course Catalogue” for **ALC-55: Washington, DC Special Flight Rules Area (SFRA)**. After you complete the training, print the certificate of achievement, and keep it with you. You may be required to show it to an official.



AOPA’s Air Safety Institute offers a course entitled

**“Understanding Special-Use Airspace”.**



*This course qualifies for Wings Credit and AOPA Accident Forgiveness.*



# ***Temporary Flight Restrictions (TFRs)***

Check [TFR.FAA.gov](http://TFR.FAA.gov) for active TFRs, which are displayed with the FDC NOTAMS. For the latest information, you should call your local Flight Service Station at 1-800-WX-BRIEF. Most iPad or Tablet aviation apps, such as ForeFlight, graphically display proposed (depicted in yellow) and active (red) TFRs.

## ***Disaster and Fire TFRs***



- Protect persons and property in the air and on the surface.
- Provide a safe environment for the operation of disaster relief aircraft.
- Prevent the unsafe congestion of sightseeing aircraft above an incident or event.

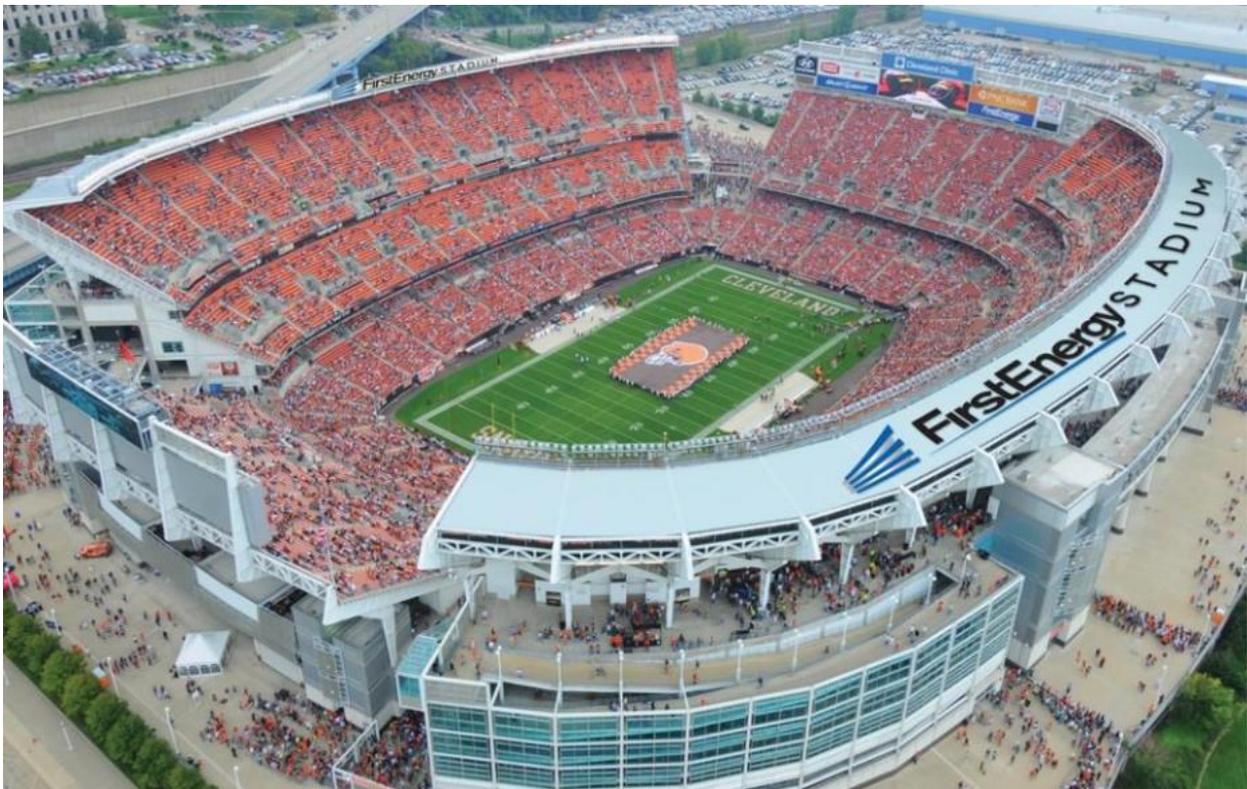
## Stadium and Racetrack TFRs

- During an event, avoid these by **3,000 feet AGL** and **3 nm**.



## DISCLAIMERS:

- Flight Service has no way of knowing if games have been delayed, are in overtime, or have been cancelled.
- Pilots are responsible to ensure that their flight does not violate these TFRs
- ATC ensures IFR flights are clear of TFR airspace, but unless VFR pilots ask, they are only advised if time permits.

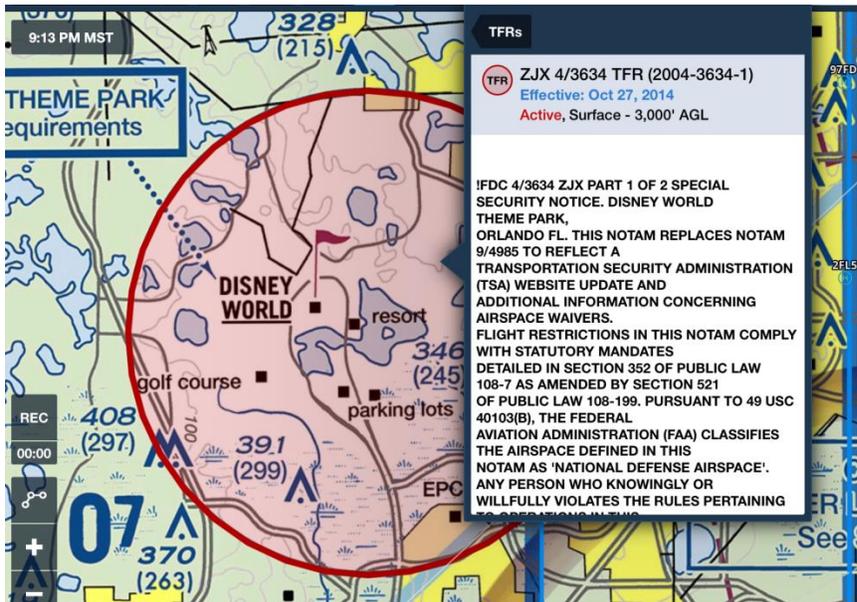




# Presidential TFRs



- Airspace bubbles around the President, Vice President, and other public officials.
- Very secret, so no advanced notice is required.
- It is your responsibility to know that the TFR is there.
- The TFR could involve several airports.



## Disney (Security)

**TFRs** protect Disneyland and Disney World, surface to 3,000 **AGL**





**Missile Launch TFRs** are designated to

protect:

- Aircraft
- Space crews.

## National Defense (Security) TFRs

**TFRs**

**(TFR) ZOA 170326-0402 Beale AFB TFR (2007-9227-1)**  
**Mar 26, 3:00 PM - Apr 02, 2:59 PM MST**  
**Active, 4,100' - 18,000' MSL**

**IFDC 7/9227 ZOA PART 1 OF 2 CA..AIRSPACE BEALE AFB, CA..TEMPORARY FLIGHT RESTRICTIONS.**  
**MARCH 26-APRIL 2, 2017 LOCAL.**  
**PURSUANT TO 49 USC 40103(B), THE FEDERAL AVIATION ADMINISTRATION (FAA) CLASSIFIES THE AIRSPACE DEFINED IN THIS NOTAM AS 'NATIONAL DEFENSE AIRSPACE'. ANY PERSON WHO KNOWINGLY OR WILLFULLY VIOLATES THE RULES CONCERNING OPERATIONS IN THIS AIRSPACE MAY BE SUBJECT TO CERTAIN CRIMINAL**

## ***TFRs are also issued for:***

- Laser demonstrations,
- Special security,
- Air shows,
- Power plants, (nuclear, hydroelectric, and coal),
- Dams,
- Refineries,
- Industrial complexes, and more

Pilots should avoid these areas and never loiter above them.



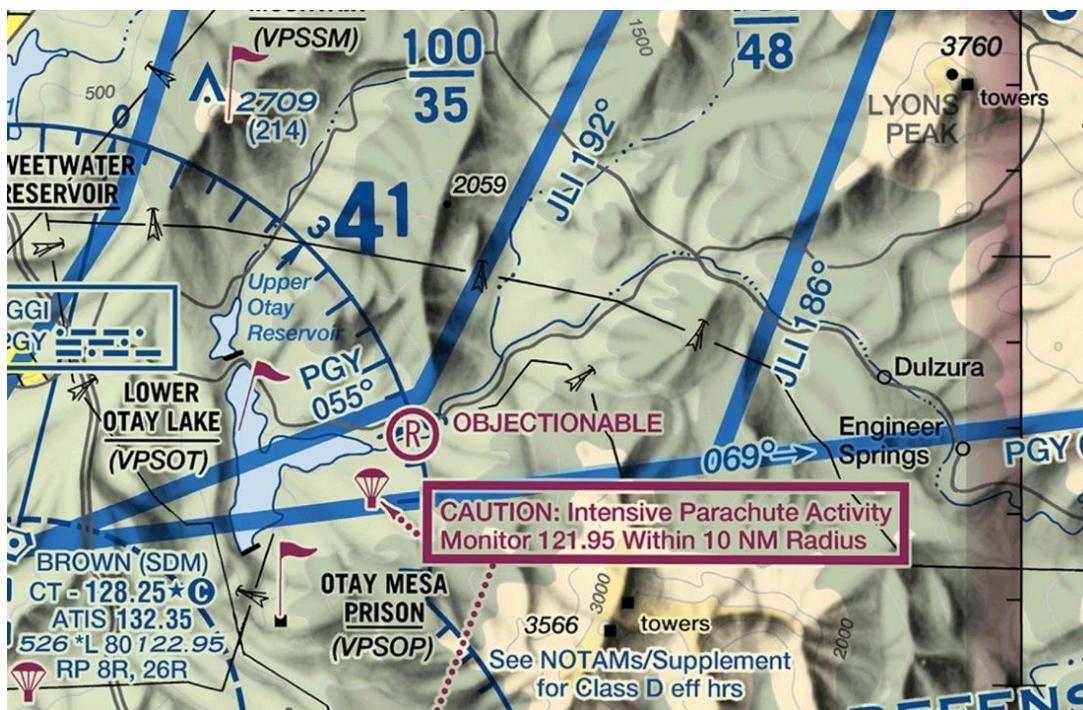
[SUA.FAA.gov](http://SUA.FAA.gov) depicts Special Use Airspace on a map

[tfr.faa.gov](http://tfr.faa.gov) lists TFRs and graphically depicts them on a map.



# Unusual Chart Symbols

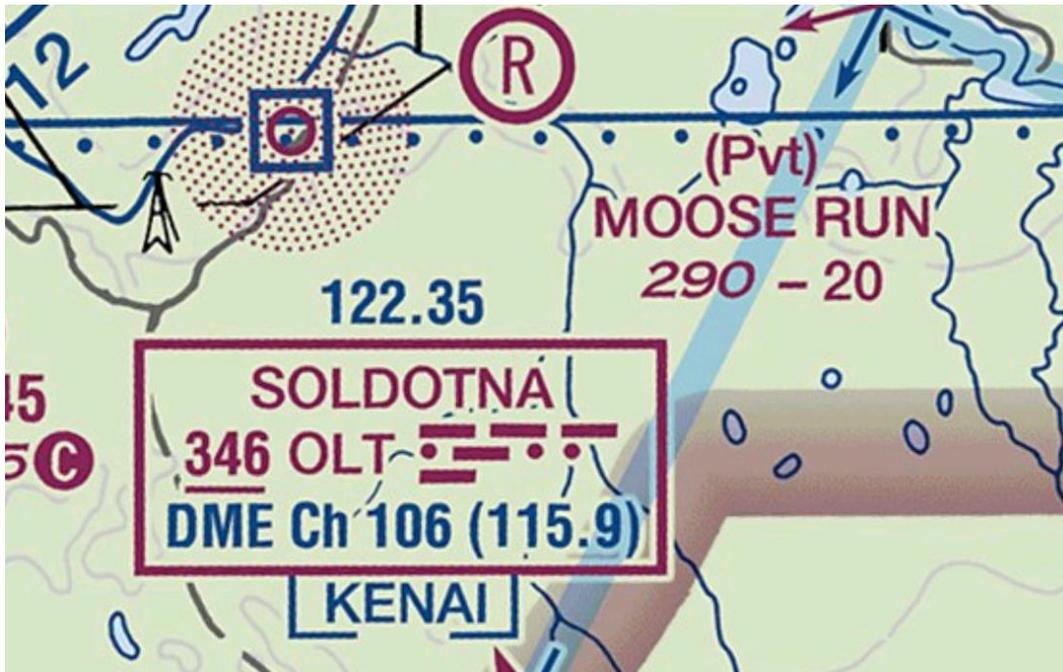
## Objectionable Airspace



Objectionable airspace determinations can be based upon a number of factors, including conflicting traffic patterns with another airport, hazardous runway conditions, or natural or man-made obstacles in close proximity to the landing area. Private airports can be labeled Objectionable when they potentially conflict with their surrounding airspace. In the case above, Nichols Field, is located under the San Diego Class B shelf.

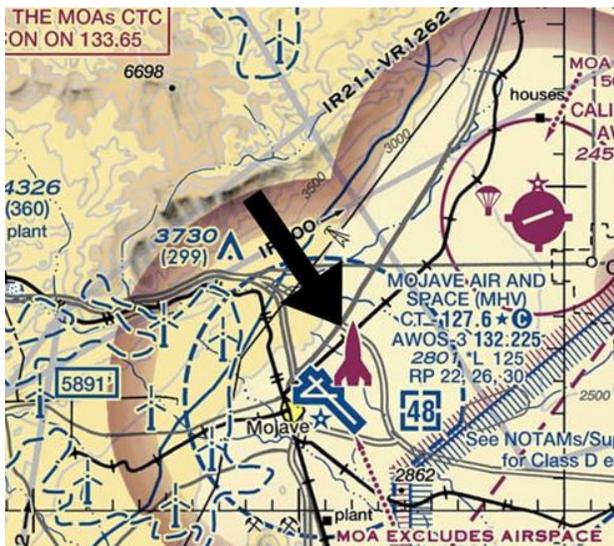
The problem? The Class B starts at 10,000 MSL. The skydivers start the drop at 13,000 feet and float through the Class B.

## An NDB with DME



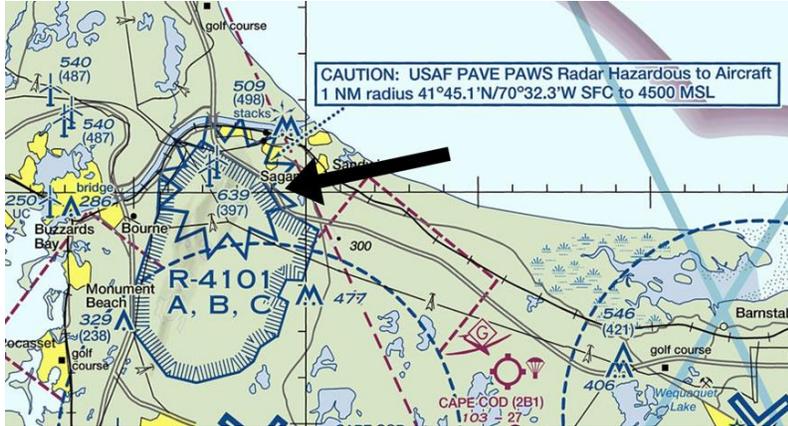
An NDB symbol with a blue square around it is very rare. This symbol means it's an NDB with a DME.

To use it, dial the NBD frequency in your ADF. Then, dial the VOR frequency in your NAV radio or DME controller. You won't get a VOR signal on your CDI, but if you have a DME receiver, you'll receive the DME.



## Space Launches

The rocket ship symbol represents spacecraft launch activity.



**Hazards on the ground – marked by a zig-zag blue line**

This Caution Area warns pilots that within a 1-mile radius and up to 4,500 feet the PAVE PAWS radar system could prove damaging to the health of you and your avionics. The Precision Acquisition Vehicle

Entry Phased Array Warning System is a cold war era radar system designed to detect nuclear missiles from enemy nations.

# ***Aeronautical Charts***

## **Electronic Flight Bags (EFBs)**

A current EFB is a legal replacement for paper charts and you are not required to carry backup if you are operating as part 91 single engine piston. [Advisory Circular 120-76B](#) is in reference to part 91F (Large and Turbine-Powered Multiengine Airplanes).

[AC 91-78](#) is aimed at Part 91 operators, VFR or IFR and states that EFBs can be used in all phases of flight in lieu of paper.

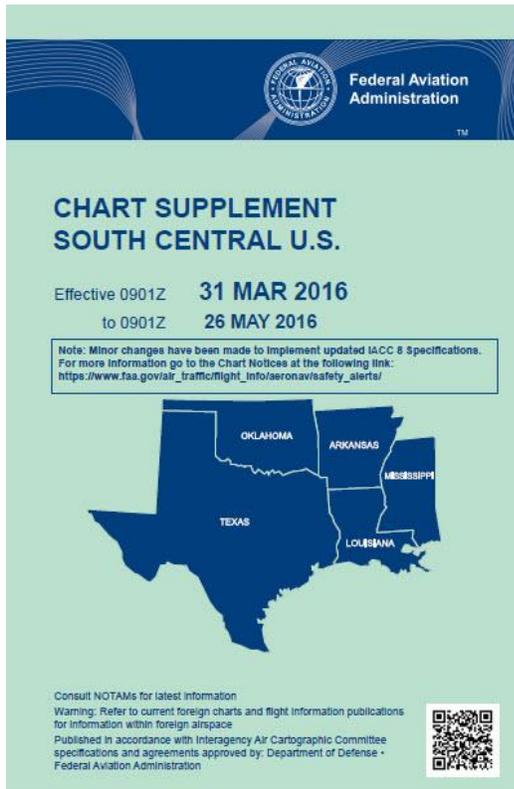
It is suggested that you have a backup data source, but it is not required – just a suggestion.



Your backup can be another electronic device.

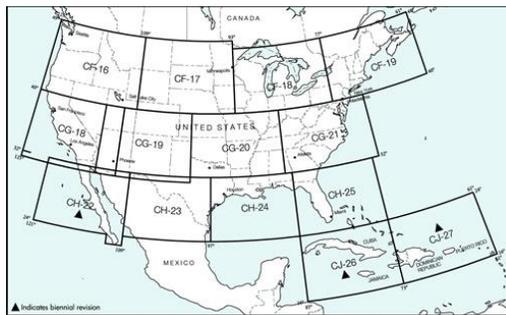
Always fly with a current chart or current EFB.

# The Chart Supplement



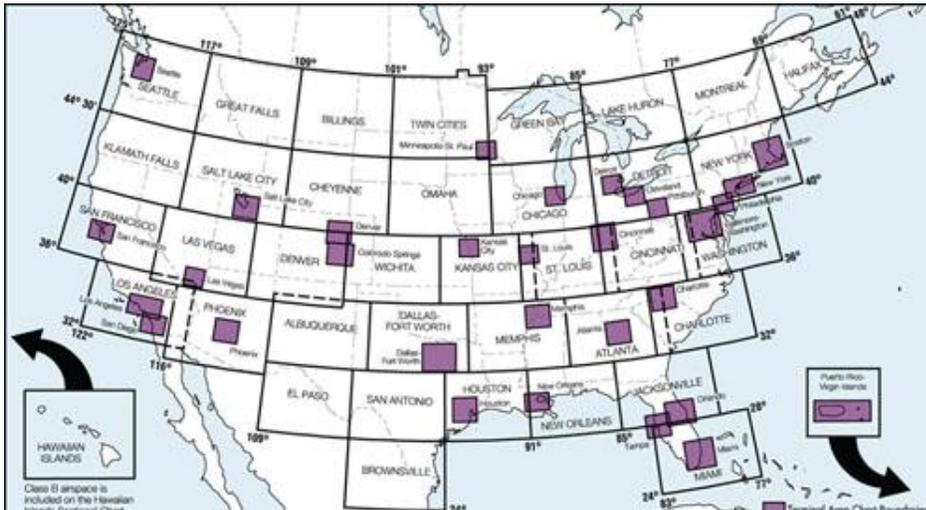
- Contains **Aeronautical Chart Bulletins** and changes to current charts.
- FAA NOTAMS contain changes that may have occurred since a CURRENT chart was published.
- The Chart Supplement is available online at <https://www.faa.gov/>, (or search online for “Chart Supplement”). It’s FREE online.

# World Aeronautical Charts (WAC)



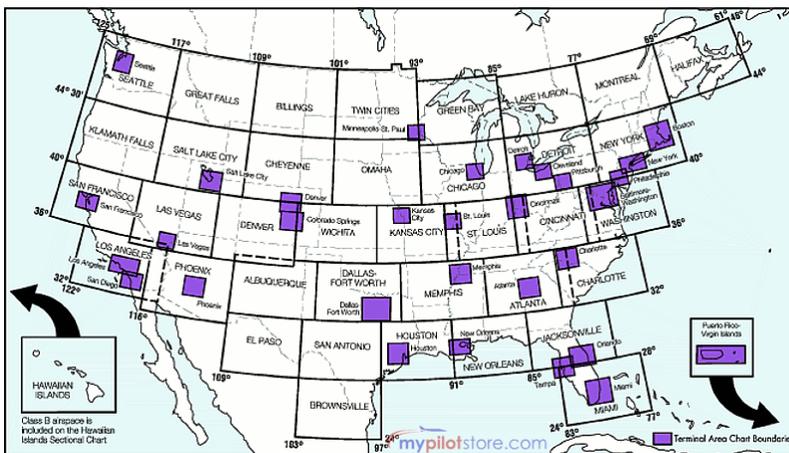
- Revised annually,
- Designed for moderate speed aircraft and visual navigation.
- Some Alaskan, Mexican, and Caribbean WACs are revised every two years.

## Sectional Charts



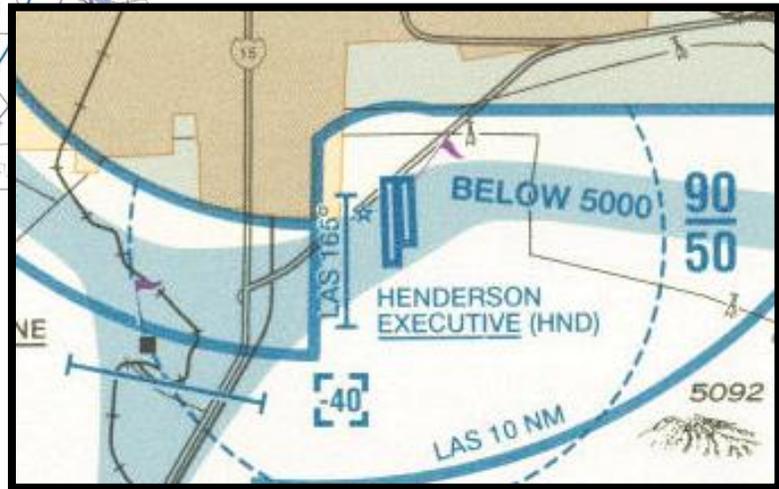
- Revised every six months,
- Designed for slow or medium speed aircraft and visual navigation.
- These are named after a major city on the chart.

## Terminal Area Chart (TAC)



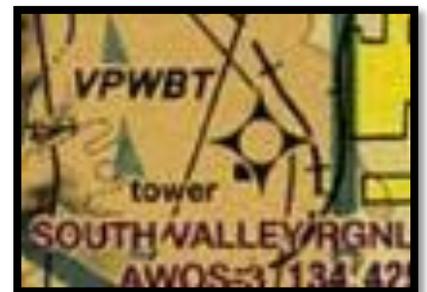
- Revised every six months,
- TACs are designed for slow or medium speed aircraft and visual navigation.
- They have greater detail compared to the Sectional. They are perfect for use in congested areas.

The TAC's VFR Flyway Planning Chart depicts flight paths to help you remain clear of busy traffic. (Printed on the back of the TAC)



**VFR waypoints** are found on the TAC.

- They are named using five letter fixes that start with **VP**, such as **VPGLX**. These waypoints are handy because they can be entered in your GPS.
- They are depicted by either a magenta flag symbol or a black waypoint circle star symbol.



## Correcting for Magnetic Variation



Measure the *TRUE* heading

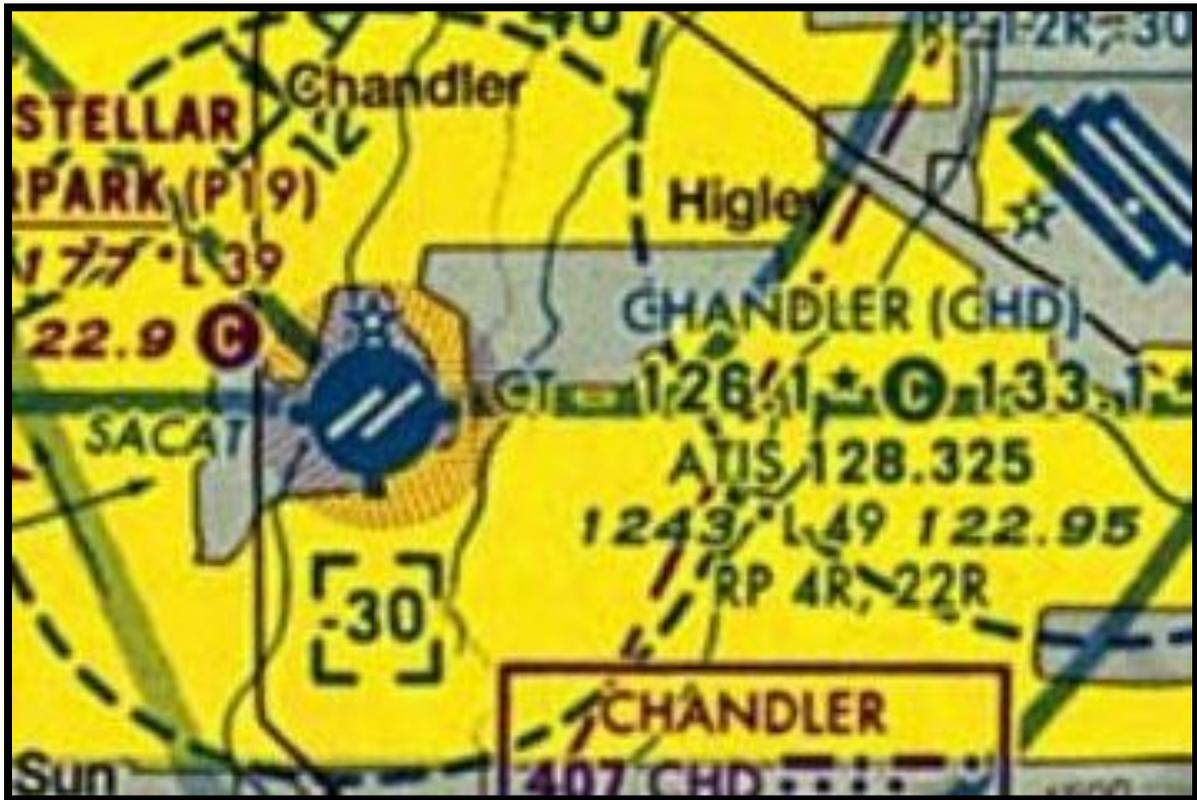
**Using the magnetic variation shown on the chart:**

- **Add** a West variation to the true heading for a MAG Heading
- **Subtract** an East variation from the true heading for a MAG Heading.



## Chart Quiz

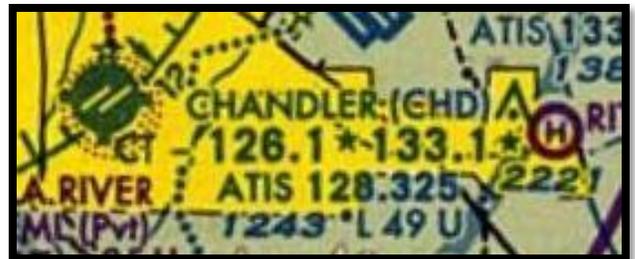
**Questions:** On the below Phoenix Sectional, Chandler (CHD) has a part time tower. (1) This is indicated by \_\_\_\_\_. The tower uses two frequencies. (2) The frequency \_\_\_\_\_ is used for CTAF when the tower is closed. (3) The \_\_\_\_\_ indicates CTAF. (4) Do you fly a Left or Right pattern for runway 4L?



### Answers:

- (1) The star ★
- (2) 126.1 – the frequency to the left of the circled C is the CTAF.
- (3) Circled C
- (4) Left. 4R and 22R use a right pattern.

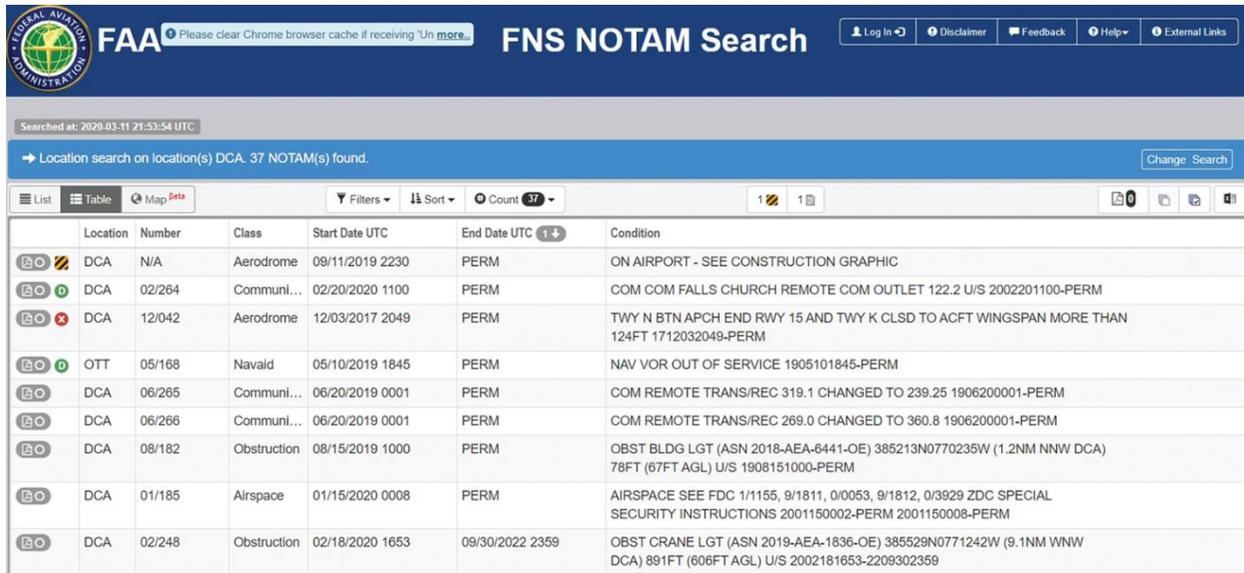
The WAC Chart covering the same area does not indicate the after- hours CTAF frequency, the UNICOM frequency, nor the non-standard pattern directions.



# NOTAMs

## NOTAMs

The FAA's NOTAM search site: [notams.aim.faa.gov/notamSearch](https://notams.aim.faa.gov/notamSearch). It has a fully optimized, interface search tool with digital NOTAMs, this site lets you customize your NOTAM search. You can use criteria such as time and date, location, flight path, geographic area, latitude/longitude, keywords, and more. You can filter and sort results by location, class, start and end date, condition, and more. You'll also find Letters to Airmen and a link to Airport Construction Notices in pdf format.



Searched at: 2020-03-11 21:53:54 UTC

Location search on location(s) DCA. 37 NOTAM(s) found.

Location	Number	Class	Start Date UTC	End Date UTC	Condition
DCA	N/A	Aerodrome	09/11/2019 2230	PERM	ON AIRPORT - SEE CONSTRUCTION GRAPHIC
DCA	02/264	Communi...	02/20/2020 1100	PERM	COM COM FALLS CHURCH REMOTE COM OUTLET 122.2 U/S 2002201100-PERM
DCA	12/042	Aerodrome	12/03/2017 2049	PERM	TWY N BTN APCH END RWY 15 AND TWY K CLSD TO ACFT WINGSPAN MORE THAN 124FT 1712032049-PERM
OTT	05/168	Navaid	05/10/2019 1845	PERM	NAV VOR OUT OF SERVICE 1905101845-PERM
DCA	06/265	Communi...	06/20/2019 0001	PERM	COM REMOTE TRANS/REC 319.1 CHANGED TO 239.25 1906200001-PERM
DCA	06/266	Communi...	06/20/2019 0001	PERM	COM REMOTE TRANS/REC 269.0 CHANGED TO 360.8 1906200001-PERM
DCA	08/182	Obstruction	08/15/2019 1000	PERM	OBST BLDG LGT (ASN 2018-AEA-6441-OE) 385213N0770235W (1.2NM NNW DCA) 78FT (67FT AGL) U/S 1908151000-PERM
DCA	01/185	Airspace	01/15/2020 0008	PERM	AIRSPACE SEE FDC 1/1155, 9/1811, 0/0053, 9/1812, 0/3929 ZDC SPECIAL SECURITY INSTRUCTIONS 2001150002-PERM 2001150008-PERM
DCA	02/248	Obstruction	02/18/2020 1653	09/30/2022 2359	OBST CRANE LGT (ASN 2019-AEA-1836-OE) 385529N0771242W (9.1NM WNW DCA) 891FT (606FT AGL) U/S 2002181653-2209302359

## TFRs

Since TFRs are the subject of many NOTAMs, another FAA website resource is [tfr.faa.gov](https://tfr.faa.gov). TFRs can pop up quickly and violating one because you didn't feel like checking NOTAMs isn't a winning excuse. The website gets updated in real time, so it provides the most current information on published TFRs nationwide. Please do note that the site includes a disclaimer that when planning a flight, always call 1-800-WX-BRIEF for a more complete listing. Select the state where you're operating or expect to fly. Click the hyperlink under the NOTAM column for details and graphical representation on the time, date, and altitude of effectiveness. The "other information" section names the controlling agency and provides contact details.



- TFR List
- TFR Map
- Map Airports
- TFR Help
- NOTAM SEARCH
- SUA

Center  GO State  GO Type  GO MON, 23 NOV 2020 3:02 UTC

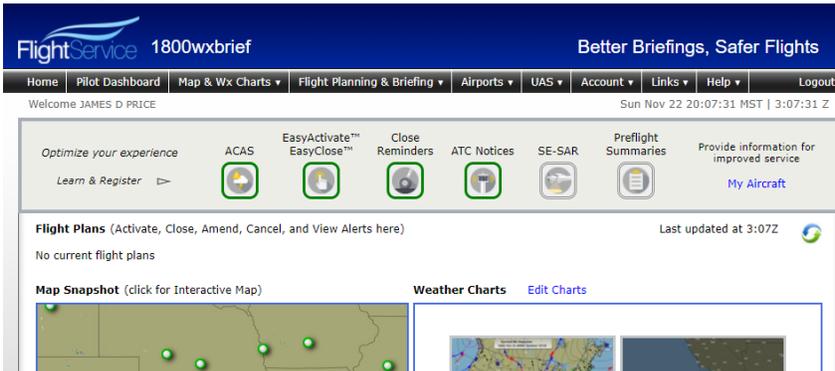
Reset Filter

Click column headings to sort data.

Date	NOTAM	Facility	State	Type	Description	Zoom
11/21/2020	<a href="#">0/4528</a>	ZSE	WA	HAZARDS	BELLINGHAM, WA, Sunday, November 22, 2020 through Sunday, December 06, 2020 UTC	
11/21/2020	<a href="#">0/4527</a>	ZSE	WA	HAZARDS	BELLINGHAM, WA, Sunday, November 22, 2020 through Sunday, December 06, 2020 UTC	
11/20/2020	<a href="#">0/4337</a>	ZJX	FL	SPACE OPERATIONS	CAPE CANAVERAL, FL, Tuesday, November 24, 2020 UTC	
11/20/2020	<a href="#">0/4336</a>	ZMA	FL	SPACE OPERATIONS	CAPE CANAVERAL, FL, Tuesday, November 24, 2020 UTC	
11/20/2020	<a href="#">0/4332</a>	ZAN	AK	SPACE OPERATIONS	KODIAK, AK, Monday, December 07, 2020 through Friday, December 18, 2020 UTC	
11/20/2020	<a href="#">0/3916</a>	ZAB	TX	SECURITY	Van Horn, TX, Sunday, November 22, 2020 through Sunday, November 29, 2020 Local	

# The Flight Service Pilot Web portal

The Flight Service Pilot Web portal at [www.1800wxbrief.com](http://www.1800wxbrief.com) is another online tool for quick and easy NOTAM searches. A free account enables you to get online preflight briefings, file flight plans, and get automatic notifications and alerts that include flight plan closure reminders, NOTAMs and TFRs, notices of new or adverse weather conditions, or pertinent airport closures. If you want someone to verbally translate NOTAMs, you can call Flight Service at **1-800-WX-BRIEF**.



You can also find NOTAMs and TFRs on-the-go with FAA Mobile.

## Third Party apps

Last but certainly not least, third-party providers in the aviation community, such as ForeFlight, Garmin Pilot, FlyQ, and Fltplan.com have done a lot to take the pain out of finding and reading NOTAMs. Most of the popular flight planning and flight management apps fish out the NOTAMs relevant to your specific flight plan. They also make it easier to read the information.



## GPS World Predicting GPS RAIM, Non-WAAS GPS

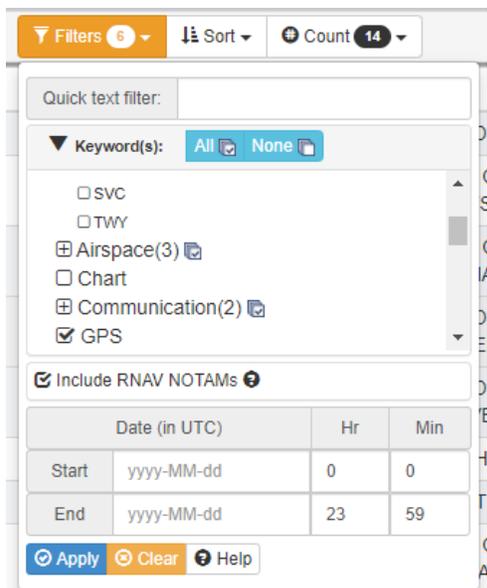
Non-WAAS GPS users must confirm GPS RAIM availability prior to an IFR flight. Checking <http://sapt.faa.gov/default.php> satisfies this requirement.

FltPlan.com automatically checks RAIM for you.



## GPS World Wide Area Augmentation System (WAAS) NOTAMs

GPS NOTAMs can also be located online at <https://notams.aim.faa.gov/notamSearch/>



Enter a location. Then, using the “*NOTAM filter*” menu, select “*GPS*”

**SAMPLE WAAS NOTAM:**

**!BOS BOS WAAS LPV AND LNAV/VNAV MNM UNREL WEF 0305231700—0305231815.**

In a WAAS NOTAM, the term “*UNREL*” means that the expected level of WAAS service may not be available.

***WAAS NOTAMs are Predictive*** and things could change. For instance, consider this sample WAAS NOTAM:

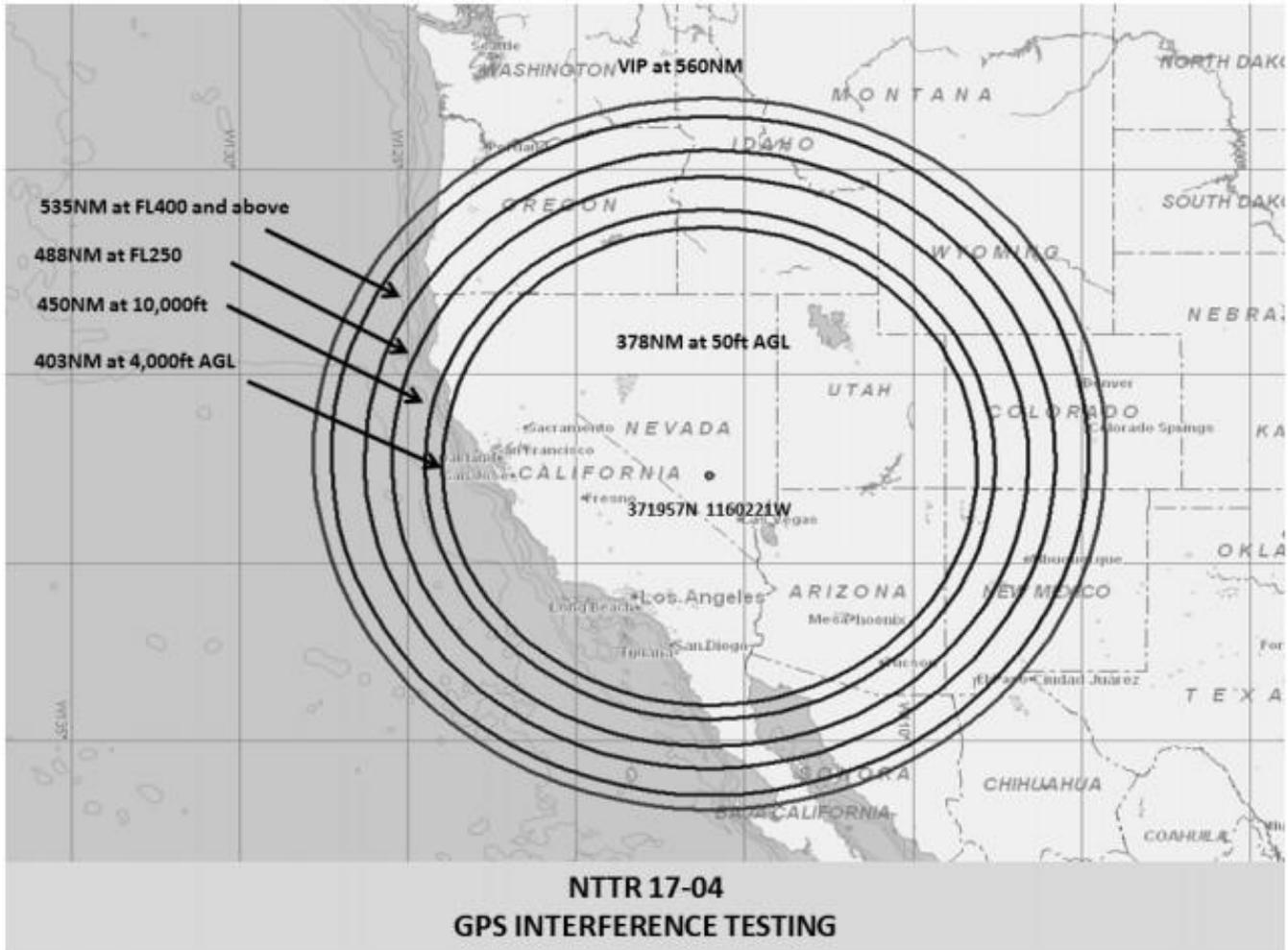
**!BOS BOS WAAS LPV AND LNAV/VNAV MNM UNREL WEF 0305231700—0305231815.**



**Sample NOTAM for GPS Interference Testing at ZLA LOS ANGELES (ARTCC) PALMDALE, CA:**

**!GPS 04/050 (KZLA A0965/17) ZLA NAV (NTTR GPS 17-04) GPS (INCLUDING WAAS, GBAS, AND ADS-B) MAY NOT BE AVBL WI A 535NM RADIUS CENTERED AT 371957N1160221W (BTY033047) FL400-UNL, 488NM RADIUS AT FL250, 450NM RADIUS AT 10000FT, 403NM RADIUS AT 4000FT AGL, 378NM RADIUS AT 50FT AGL. 1704161830-1704162230**

This NOTAM sounds terrible and you wonder, “how am I going to receive the necessary GPS signals flying through that area?” Actually, the biggest threat is an area with a 378 nm radius. However, in this area, you would need to be cruising at 50 feet AGL and below to be affected. There are also small bands affecting aircraft at 4,000 feet AGL and 10,000 feet AGL. (See the graphic, next page)



Why does the military introduce GPS interference testing exercises? The military never wants to rely entirely on GPS in time of war. These exercises are held to test their ability to operate should GPS become compromised or unavailable.



# ***AIRPORT OPERATIONS***

## ***Taxiway and Runway Operations***

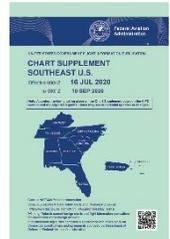
### ***“Taxi To . . .”***

ATC Ground Controllers are required to provide explicit taxi instructions to cross or hold short of each runway that intersects the taxi route . . . (“Cessna XYZ, taxi to runway 21 Left via Alpha and Lima. Cross runway 05, hold short of Runway 21 Right.”)

### ***Land and Hold Short Operations (LAHSO)***

#### ***Requires ceiling and visibility of 1000 & 3 (AIM 4-3-11)***

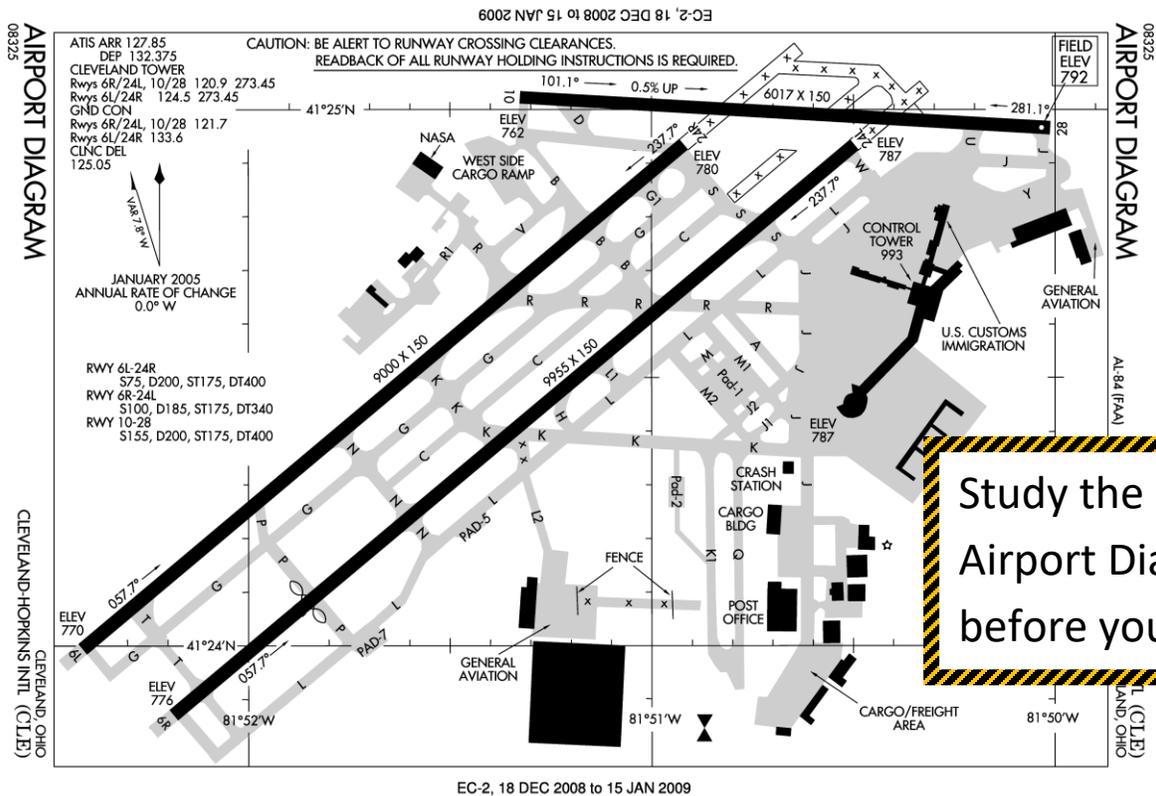
- ATC may clear a pilot to land and hold short, and if the PIC believes there’s enough available landing distance (ALD), he or she can accept a LAHSO clearance.
- ALD data can be found in the Chart Supplement
- Controllers will provide ALD data upon request.
- Student pilots and pilots not familiar with the airport should not accept “Land and Hold Short” clearances.



### ***Safe Taxi Tips***

#### ***Before You Taxi for Takeoff:***

- Study the airport diagram, noting potential hot spots and areas of confusion.
- Plan your taxi using the airport diagram.
- When ATC provides taxi instructions, don’t rely on your memory. Write it down.
- Focus on ATC’s instructions, and not on how you may have done it a thousand times before. This time it might be different. Don’t be tricked by “expectation bias”.
- Resolve questions about your clearance with ATC before you move your aircraft. If you’re taxiing, please stop. It’s much easier to ask ATC now, than to explain yourself later.
- Program the flight navigational and communication equipment on the ramp prior to taxi, or while in the run-up area – never while the aircraft is in motion.



## Taxiing for Takeoff

- Keep a mental map of other traffic.
- All taxi operations are VFR –see and avoid”.
- Observe a sterile cockpit while taxiing. Keep your conversation professional and operationally focused.
- Always monitor the assigned frequency.
- When you’re on the runway, holding in position, the controller will advise you of other aircraft that are on final for your runway, or those that are taking off or landing on intersecting runways. Mentally map other aircraft and their positions.
- When cleared to “line up and wait”, note the time. If the tower controller has not cleared you for takeoff in 30 seconds, ask the controller, “How much longer?” (The controller may have forgotten you).
- Verify compass headings, comparing them to taxiways and to the assigned runway. This will help ensure that you don’t wander onto the wrong taxiway, or take off on the wrong runway.
- At night, use the edge lighting to distinguish between taxiways and runways.

**Always read back “hold short” instructions**

Want to  
know more?



*For a chilling video of what can happen when pilots and controllers are confused, the video is on YouTube. Search for “Runway Incursion Providence”*

*Or click on the following link:*

<https://www.youtube.com/watch?v=qUDFY5qITSA>

## *Runways 2/20 & 13/31*



Some runways make it easy to transpose the numbers.

Please take extra care.

## *A Fighting Chance for the Controller*

When ATC gives you a crossing clearance, read back the clearance, and then wait a few seconds. If the controller does not change his/her mind, (retracting the clearance), then start your taxi.

This technique gives the controller a “fighting chance” to stop you if you misunderstood a clearance, answered for another aircraft, or if the controller made a mistake.

“Read back- Hear back” is a method used by pilots and ATC. When the pilot reads back the clearance and the controller hears back the response, he or she is checking for the correct pilot understanding.

## *Before You Land*

- Review the airport diagram, noting potential hot spots and areas of confusion.
- An early landing clearance is a cause for alert. The controller might forget you and focus on other aircraft.
- *Plan your taxi using the airport diagram, asking yourself:*
  - What runway exit will I probably use?
  - What’s my goal? Left or right to the FBO, fuel pumps, hangar, or tie downs?
  - Which runways will I need to cross (with clearance, of course)?

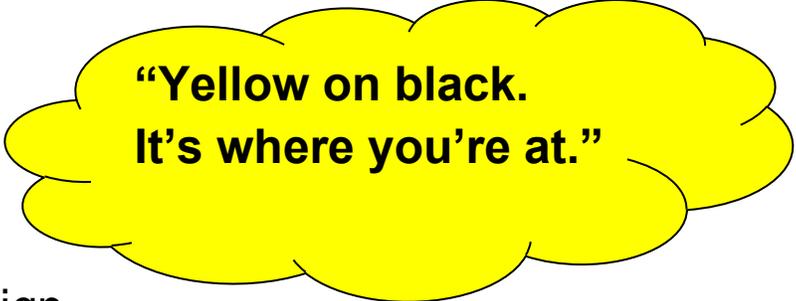
## *After Landing*

- Clear the runway’s protected area, ensuring your entire aircraft is beyond the runway hold line, then stop your aircraft.
- Obtain taxi clearance before proceeding.

## *Airport Signage*



Location Sign

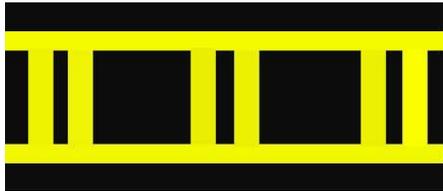


**“Yellow on black.  
It’s where you’re at.”**



***ILS Hold Sign and its associated Taxiway Markings:***

Hold here when instructed by ATC, because approaches are being conducted when ceilings and visibility are less than 800' and 2.

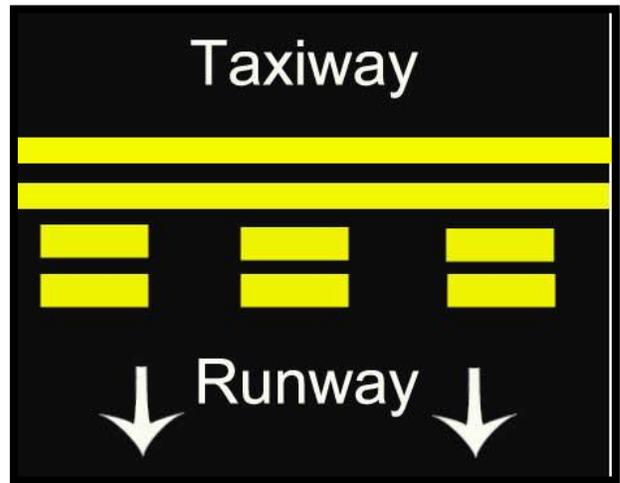


Taxiing beyond the taxiway markings can interfere with aircraft on the ILS approach.

***Edge of the Runway's Protected Area Marking: (Yellow on black).***

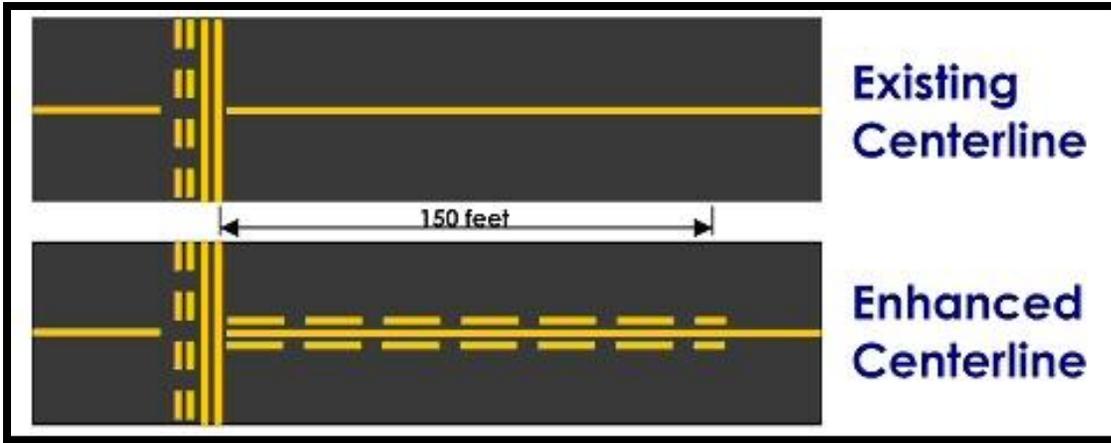
***"Stop solidly before the solid lines."***

***"Dash across the dashed lines."***



## Enhanced Centerline

Yellow dashes placed on both sides of the taxiway centerline indicate that you are within 150 feet of the runway hold-short line.



## Edge of the Non-Movement Area (Ramp) and Taxiways Marking (Controlled, Movement Area): (Yellow on black)

STOP and get a clearance before you taxi beyond the solid line.



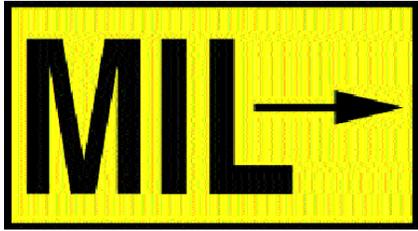
### Common Taxi Route to Multiple Destinations / Runways:

(Black on yellow separated by a "dot"). In this instance, runways 27 and 33 are to your right.



### Different Taxi Routes to Multiple Destinations / Runways:

(Black on yellow separated by a vertical line). Two or more destinations reached by different routes.



***Inbound Destination Sign:***

(Black on yellow). In this instance, the military installation is to your right. Other examples are **Cargo**, **Term** (Terminal), **Ramp**, etc.



***No Entry Sign:***

(White on red). Aircraft are prohibited. This sign would be found at the entrance to a one-way taxiway, or at the intersection of a road intended for vehicles.



***Approach and Hold Sign:***

(White on red). AT a controlled airport, you would hold here IF instructed by ATC.

At an uncontrolled airport, proceed if a traffic conflict does not exist.

***Mandatory Instruction Signs:***

These are white on red and denote an entrance to a runway, ILS critical area, or a prohibited area. This sign indicates that you are on taxiway Alpha and are about to enter runway 18/36.

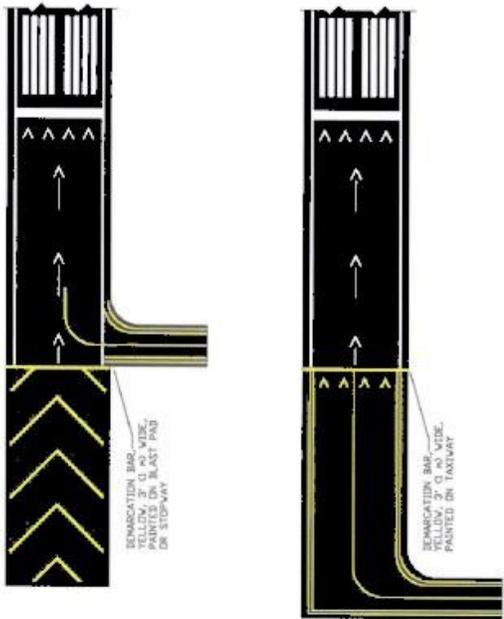


## *Closed Runway Marking*



*AOPA's Air Safety Institute offers a course entitled "Runway Safety".*

## Displaced Thresholds & EMAS



Displacement of a threshold reduces the length of the runway available for landings.  
The portion of the runway behind a displaced threshold **is available for takeoffs** - in either direction, and for **landing rollouts from the opposite direction**.



## Engineered Materials Arresting System (EMAS)

Areas **unusable** for taxiing, takeoff or landing, are marked with yellow chevrons. It could be constructed with solid material, or EMAS material. EMAS has the appearance of a full-strength pavement, but it's actually designed to help *bog down* an aircraft before it runs off the runway.

**Chart Supplement example:** ARRESTING GEAR/SYSTEM RWY 28L: EMAS

## Airport Lighting

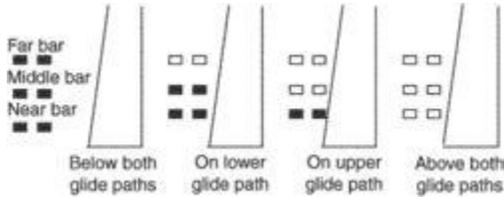
**Runway Threshold Lights** at the end of the runway are marked with green lights.



Some airports have bi-color lights. They are green when you are on approach for landing, and on landing rollout, at the other end of the runway, the lights are red.

## Visual Approach Slope Indicator (VASI)

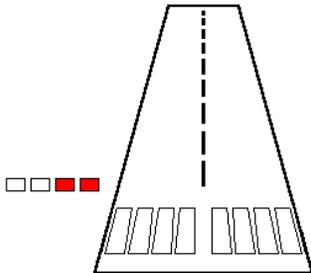
The VASI provides safe obstacle clearance within +/- 10 degrees of the extended runway centerline and out to 4 nautical miles from the runway threshold. VASI glide paths are normally set at 3°. To ensure obstacle clearance, some locations are as steep as 4.5°.



**Three-bar VASI systems** provide two visual glide paths, an upper and a lower. The near and middle bar represents a 3° glide path, used by most general aviation pilots. The far and middle are for “high cockpit aircraft”, like a B-747. VASIs provide safe obstruction clearance within plus

or minus 10 degrees of the extended runway centerline out to 4 NM from the runway threshold.

**The Tricolor VASI System** has a single light: Below glide path – red, above glide path – amber, and on glide path – green.



On Glide Path

**Precision Approach Path Indicator (PAPI)** PAPIs are visible from about 5 miles during the day and up to 20 miles or more at night. (AIM section 2-1-2). Two white and two red lights indicate that you are on the glide path. Three or more red lights and you’re below the glide path. Three or more white lights and you’re above the glide path. PAPIs provide obstacle clearance within plus or minus 10 degrees of the extended runway centerline out to 3.4 NM from the runway threshold.



**Runway End Identifier Lights (REILs)** are pulsating strobe lights on each side of the runway threshold. These help to distinguish or highlight the runway:

**Runway Edge Lights** are white. On instrument runways, yellow replaces white on the last 2,000 feet or half the runway length, whichever is less, to form a caution zone for landings. The lights marking the ends of the runway emit red light toward the runway to indicate the end of runway to a departing aircraft and emit green outward from the runway end to indicate the threshold to landing aircraft.

## Runway Centerline Lights

When viewed from the landing threshold, the runway centerline lights are white until the last 3,000 feet of the runway. The white lights begin to alternate with red for the next 2,000 feet, and for the last 1,000 feet of the runway, all centerline lights are red.



## **Runway Guard Lights or “Wigwag Lights”**

are found only at runway/taxiway intersections. They are either:

- Elevated flashing lights on both sides of the taxiway, or
- A row of flashing yellow in-pavement lights.



**Clearance Bar Lights** are yellow steady-burning, in-pavement lights at taxiway holding positions, making those positions more visible.

**Stop Bar Lights** are a row of red, steady-burning in-pavement lights installed across the entire taxiway at the runway holding position. Following an ATC clearance to proceed, ATC turns the stop bar lights off and the taxiway centerline lead-on lights are then turned on, guiding you to the takeoff position.

## **Airport Rotating Beacon (AIM 2-1-8)**

- Civilian airport beacon lights flash green and white.
- A military airport's rotating beacon flashes green followed by two quick flashes of white.
- A heliport can be identified by its green, yellow, and white beacon.
- A seaplane base beacon flashes white and yellow.

## **Pilot Controlled Lighting (PCL)**

While the CTAF is commonly used to activate pilot-controlled lighting, the proper frequency, if different from the CTAF, can be found in the Chart Supplement and on standard instrument approach procedure charts.

Chart Supplement, sample: **“When twr clsd ACTIVATE HIRL Rwy 10-26 – CTAF”**.

Clicking seven times in five seconds should give you the highest intensity.



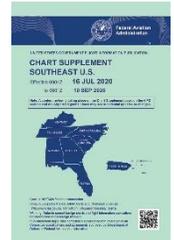
**next to the frequency on the Approach Chart indicates PCL**



## ***Pilot Controlled Lighting (PCL)***

When PCL is activated, a 15-minute countdown starts, after which the lights turn off unless someone turns them on again.

Always initially key the mike 7 times to assure that all controlled lights are turned on to the maximum available intensity. If desired, an intensity adjustment can then be made, (where the capability is provided).



Even when the lights are on, always key the mike as directed when overflying an airport of intended landing, or just prior to entering the final segment of an approach. This will make sure that the aircraft is close enough to activate the system and a full 15 minutes of lighting duration will be available.

## ***Runway Threshold Stripes***

<b>Number of Stripes</b>	<b>Runway Width</b>
4	60 feet
6	75 feet
8	100 feet
12	150 feet
16	200 feet

This runway has 12 threshold stripes, so it is 150 feet wide.



## Traffic Patterns – Non-Towered Airport (FAR 91.126–127)

Unless indicated otherwise, all standard turns are to the left. 1,000 feet AGL is the normal pattern altitude, but there may be different altitudes specified for turbines, jets, helicopters, gliders, etc. Check the Chart Supplement. (AIM 4-3-4)

Some aircraft don't have a radio, so don't assume that everyone hears you. Standard entry is a 45 to downwind, but some people won't do that. Fly defensively and clear like your life depends on it.

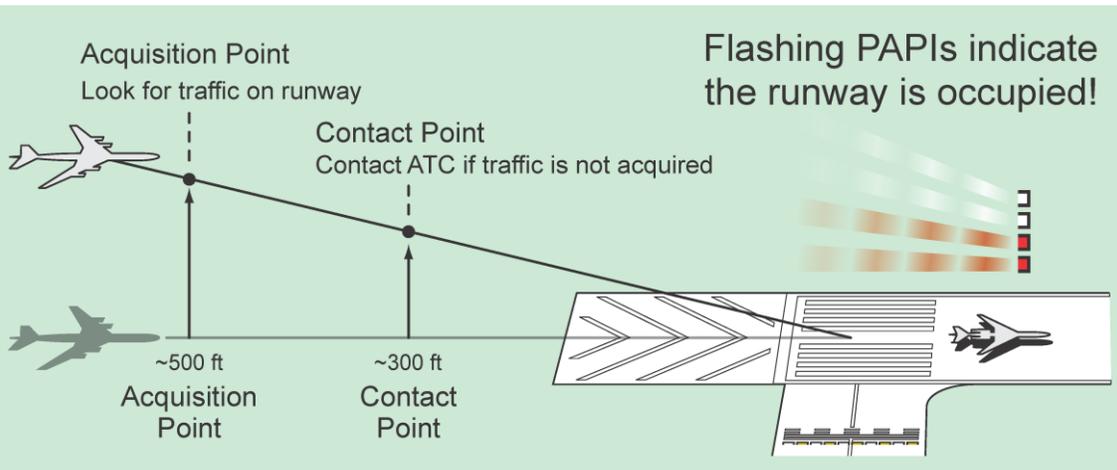


## Final Approach Runway Occupancy Signal (FAROS)

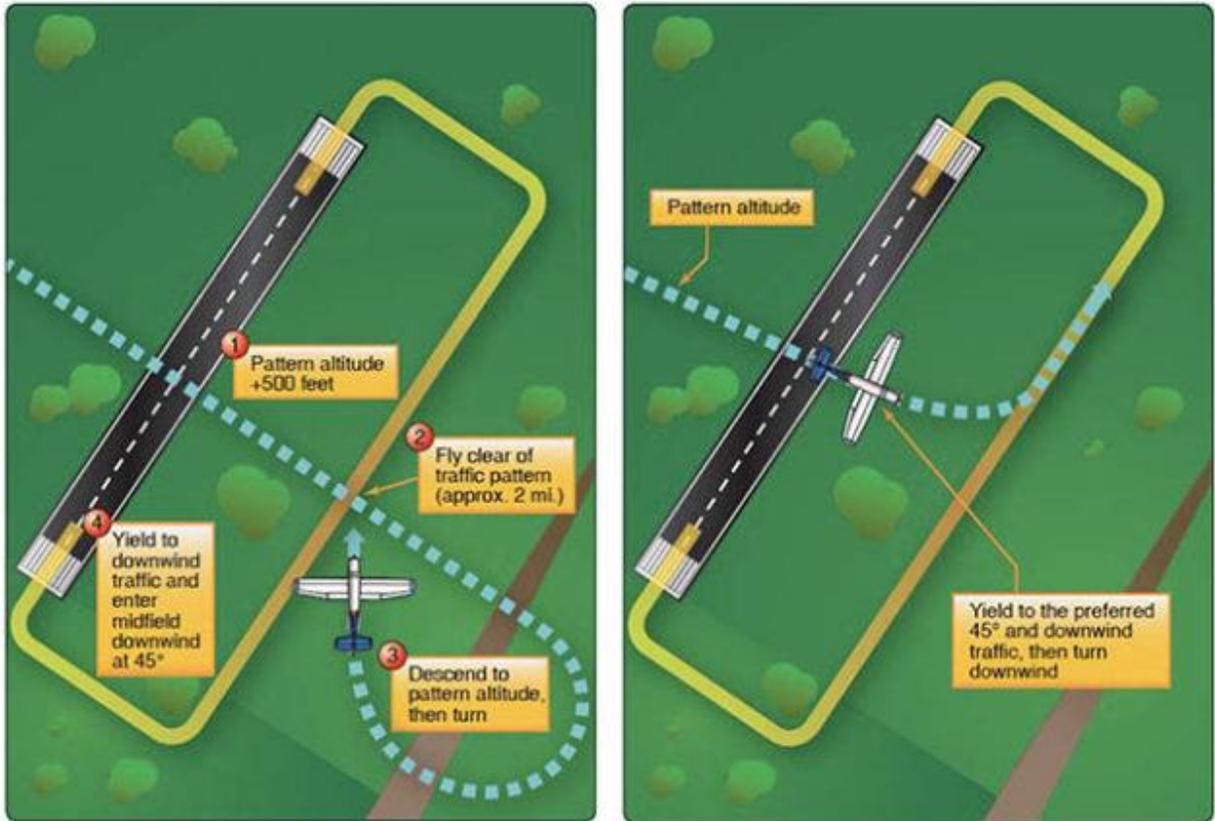
This system can detect an aircraft when it's on the departure end of the runway. The system will flash the PAPI lights as a visual alert to an aircraft on final that the runway is occupied.

When the pilot on approach sees a flashing PAPI, he or she must:

- At 500 feet AGL – look for traffic on the runway
- At 300 feet AGL – contact ATC for resolution
- If no resolution – execute a go-around



# Airport Traffic Pattern Entry

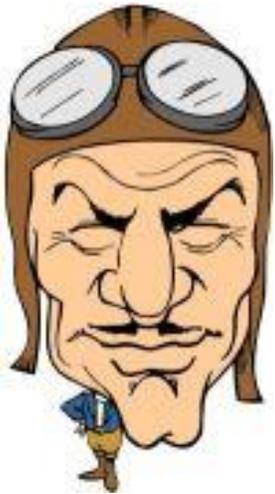


Tetrahedrons can be manually set to show the preferred runway.

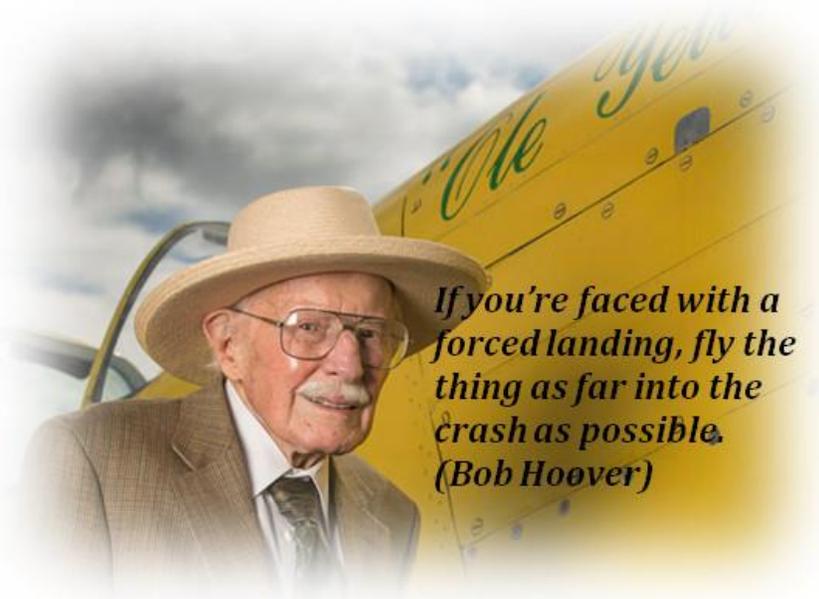


# When Things Go Wrong

## *Pilot Priorities*

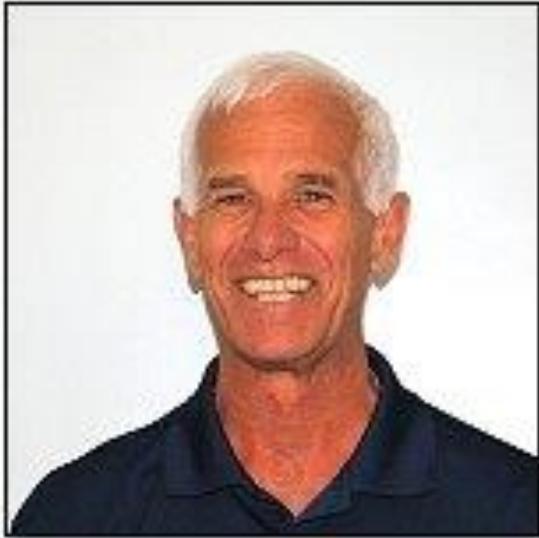


KEEP  
CALM  
AND  
AVIATE, NAVIGATE,  
COMMUNICATE



*If you're faced with a forced landing, fly the thing as far into the crash as possible.  
(Bob Hoover)*

## More Thoughts on a Forced Landing



*“You absolutely have to be sure that you don't stall the airplane. I've been to many aircraft accident scenes, I've evaluated hundreds and hundreds of accidents and pilots are not killed when they fly their airplane to the ground under control. They are killed when they stall an airplane into the ground. So, maintaining airspeed safely above stall speed right on down to the ground is so very, very important.” –*

*Bob Martens, nationally known speaker, consultant and aviation safety expert; Pilot Workshops contributor.*

## When to Notify the NTSB (NTSB 830)

You should notify the NTSB if:

- You've had an aircraft accident.
- You've had a flight control system malfunction.
- A crew member is unable to perform normal duties.
- A turbine engine has a failure of its structural components.
- You've had an in-flight fire.
- You've experienced an aircraft collision in flight.
- You've had property damage, (other than the aircraft), estimated to exceed \$25,000.
- There is an overdue aircraft and you believe that it has been in an accident.



## Lost Communications, Landing VFR at a Controlled Airport

- Remain outside or above the Class D airspace until you determine the direction of traffic and runway in use.
- Squawk 7600 before entering Class D airspace.
- Enter the traffic pattern downwind on “a 45” and fly a typical pattern for landing.
- Look for Tower's light gun signals.



## ATC Light Signals (FAR 91.125)

Color and Type of Signal	Aircraft on the Ground
<b>STEADY GREEN</b> 	<b>Cleared for Takeoff</b>
<b>FLASHING GREEN</b> 	<b>Cleared to Taxi</b>
<b>STEADY RED</b> 	<b>STOP</b>
<b>FLASHING RED</b> 	<b>Taxi Clear of the Runway in Use</b>
<b>FLASHING WHITE</b> 	<b>Return to Starting Point on Airport</b>
<b>ALTERNATING RED/GREEN</b> 	<b>Exercise Extreme Caution</b>

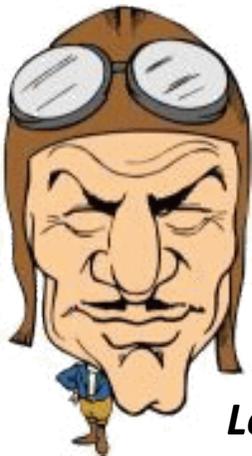
Elevated Guard Lights Hold Short





In-Pavement Guard Lights Hold Short





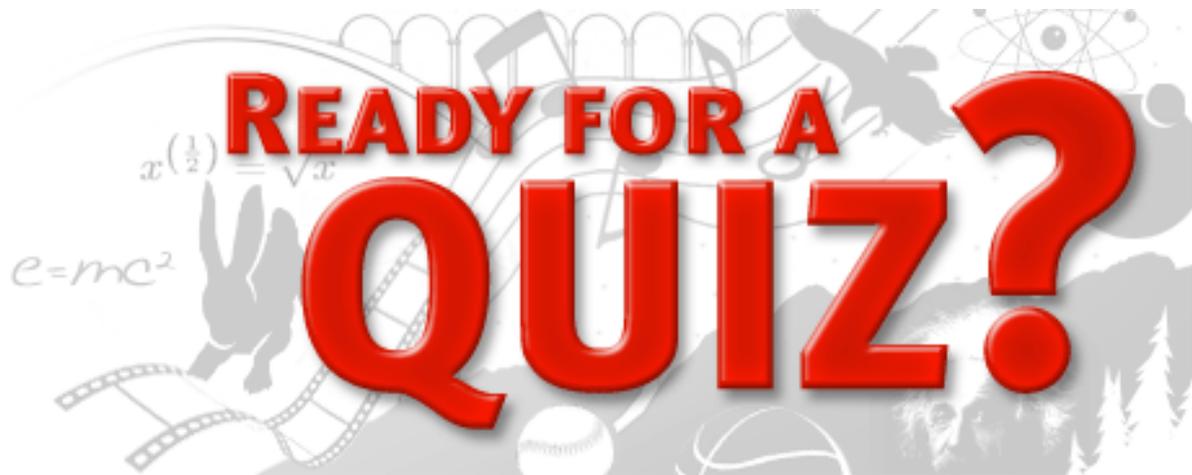
### *To acknowledge a light signal:*

- Day, in flight – Rock wings.
- Day, on ground – Move aileron or rudder.
- Night – Flash landing light lights or nav lights.

### ***Lost Communications, Landing VFR at an Uncontrolled Airport***

- Overfly the airport 500 feet above pattern altitude.
- Look for traffic, wind direction, and runway in use.
- Enter the traffic pattern by flying “a 45” to downwind and then perform a typical pattern for landing.





# READY FOR A QUIZ?

You're flying your 172 in cruise flight when an engine oil line breaks and starts draining oil into the cowling. Your oil pressure starts dropping as you divert to an airport, and by the time you enter the traffic pattern, all the oil has drained from your engine, but it's still running. When you touch down, will your hydraulic brakes work?

**Your hydraulic brakes will work just fine, because they are powered by a completely separate system. They use brake fluid stored in a dedicated reservoir.**

You're caught in a downdraft near the terrain. What airspeed will give you the best angle of climb over the distance between you and the terrain?

**V<sub>x</sub> will give you the best angle of climb.**

You are in cruise flight when your carbureted engine RPM starts dropping. You suspect carb ice is the problem, and you turn your carb heat on. Your engine drops another 200 RPM when you turn it on and runs roughly for about 5 minutes. After that, the RPM increases 100 RPM and the engine smooths out. You wait a few more minutes, turn your carb heat off, and the RPM increases another 100 RPM. Did you have carb ice?

**Yes, you probably had carb ice. When you turn the carb heat on, the RPM drops because you are introducing warmer air into the engine. You are also melting ice from the carburetor and running it through the engine. Eventually, the ice melts and the engine RPM increases a bit. When you turn the carb heat off, you're running cooler air into the engine, and RPM will again increase.**

**You're flying your Piper Arrow when the alternator fails. You've planned your landing at a non-towered airport, so you turn off your battery master to conserve battery power. As you approach the airport, you select your gear handle down to extend the gear. Will your magnetos power the gear down if your battery master is still off?**

**Magnetos only power the spark plugs in your plane. Everything else runs off the alternator or battery.**

**You're flying into a towered airport when your mic sticks and continuously transmits. You turn your radio off so you won't step on other aircraft. What transponder code should you squawk to let ATC know your radio failed?**

**7600 is the lost comm squawk code.**

**You're flying a VFR cross country when you accidentally fly into a cloud. What should you do?**

**You should always maintain altitude and fly out the same way you flew in (do a one eighty). You don't know what's below you, how high the cloud goes, or how long it continues.**



*“There's a big difference  
between a pilot and an  
aviator.*

*One is a technician.  
The other is an artist  
in love with  
flight.” — Captain  
Elrey Jeppesen*

Fly Safe and have a great Flight Review

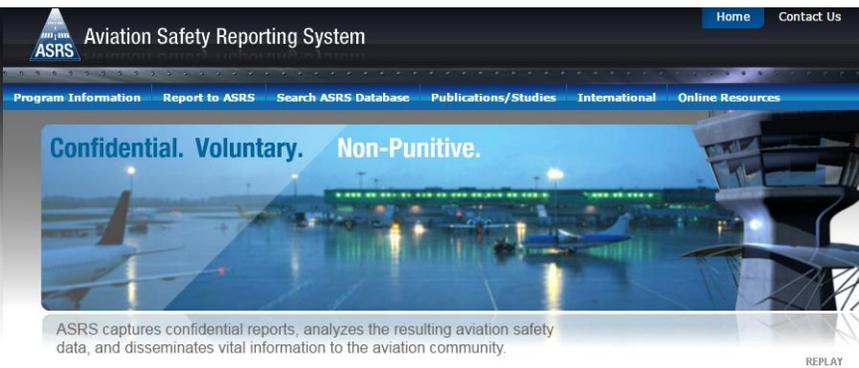
Jim Price

# ***Nice to Know Section***

## ***Aviation Safety Reporting System (ASRS)***

<https://asrs.arc.nasa.gov/>

### **PROTECT YOURSELF AND YOUR CERTIFICATE**



ASRS collects aviation safety incident and situation reports from pilots and controllers. These reports are submitted voluntarily and with anonymity. Reports can be submitted electronically or mailed.

If you file a NASA report after an incident or occurrence, the FAA considers you to have a “constructive

attitude”; dedicated to preventing further violations.

Although in violation, **neither a civil penalty nor certificate suspension will be imposed if:**

- The violation was inadvertent and not deliberate.
- The violation did not involve a criminal offense, or accident, or action under 49 U.S.C. Section 44709 which discloses a lack of qualification or competency, which is wholly excluded from this policy.
- The person has not been found in any prior FAA enforcement action to have committed a violation of 49 U.S.C. Subtitle VII, or any regulation promulgated there **for a period of 5 years prior** to the date of occurrence; & The person proves that, **within 10 days after the violation**, he or she completed and delivered or mailed a written report of the incident or occurrence to NASA under **ASRS**.

# You and ATC

## Radio Frequencies

### Emergency Frequency – 121.5

This is monitored by Flight Service, civilian and military control towers, approach controls, and centers.

### MULTICOM – 122.9

Used at airports without an operating control tower, Flight Service or UNICOM (122.8).

### Local Airport Advisory Service

Flight Service will provide this service when they are located at an airport that doesn't have a control tower, or when the control tower is not in service. The Common Traffic Advisory Frequency (CTAF) at an uncontrolled airport is usually 123.6.



## Getting Along With ATC

Initial call – use your model instead of make – For instance, “Cherokee 7482J”. This helps ATC understand your performance capability.

ATC “sizes up” pilots and their abilities as soon as they check in on the frequency. If you are clear, concise, and use proper phraseology, this gives controllers confidence that you'll understand and do a good job when given ATC instructions. *Here's some phraseology that will send you directly to the penalty box:*

- Saying things like “**sugar**” (instead of “sierra”) “**nickel**” (instead of “fife”), or “**pop**” (instead of “papa”).
- Starting a transmission with, “**and**” or “**ahh**”. If you're not ready to talk, don't press the button. Try not to sound distracted and bumbling.
- Initiating a call to ATC by saying, “. . . **with you.**” It wastes radio time. Besides, the controller knows that you're “with” him or her!
- “**Tally ho**”. It's not a fox hunt! “Negative contact”, or “Traffic in sight”, is fine.
- “**I've got 'em on the fish finder**”. Thanks Goober, but if you have a traffic alert system in your aircraft, that phrase doesn't help ATC. You'll just sound like a hick at the fishin' hole.
- Aviation slang or **CB lingo**. Leave it in the truck.
- “**Roger**” means I've received your transmission. It doesn't mean yes, no, or I'll do it.

## Check in Like a Pro

- **Departure Control** — First call, report the altitude you're passing and the altitude assigned.
- **Center Controller** — First call, report the altitude you're passing, and the altitude assigned.
- There are only three ways to report an altitude: "CLIMBING", "DESCENDING", and "LEVEL." Never use **decimals**, like "2.6" for 2,600 feet.
- **The Approach Controller** — Always check-in with the ATIS letter.
- **The Tower Controller** — If VFR, give tower your bearing and distance from the airport, plus the ATIS letter. Never say, ". . ." with the numbers."

## At Uncontrolled Airports

"Taking the active" or "clearing the active" confuses inbound pilots. The runway has a name, so use it.

## Don't Make Controllers Wonder, "Which frequency is that guy on?"

- If you're in the run-up area, stay on Ground Control. Switch to Tower frequency when you're ready to depart.
- After landing, don't switch to *Ground* control unless you've cleared the runway hold short line and the Tower Controller has told you to switch to Ground. If you have questions, ask.

## Pilot Performed Preventative Maintenance

### (CFR Part 43)

"Simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations."



**Examples of what an aircraft owner, holding at least a Private Pilot Certificate, can accomplish on his or her aircraft, as long as it's not used in commercial service:**

- SAFETY BELTS – replace
- SEAT PARTS – replace
- BULBS, LENSES, REFLECTORS – Replace (includes the wire repair on landing lights)
- WHEEL BEARINGS – Lubricate

- OIL & FILTER – Change
- COWLING – Repair, if it doesn't involve the removal of the prop or flight controls
- SPARK PLUGS – Clean and gap
- HOSE CONNECTIONS – Replace, **but not** hydraulic hoses
- FUEL LINES – Replace prefabbed lines
- FUEL / OIL FILTERS / STRAINERS – Clean and replace
- BATTERY – Clean, service and replace
- RADIOS, FRONT MOUNTED – Remove and replace tray mounted radios, **but not** auto-control or transponder
- TIRES – Remove, install, and repair
- WHEELS and SKIS - Replace
- WHEEL BEARINGS – Clean and Grease
- SAFETY WIRE / COTTER PINS – Replace if defective
- HYDRAULIC FLUID – Replace/refill
- DECORATIVE COATING – Replenish, **but not** if it involves the disassembly of primary or operating system
- UPHOLSTERY – Repair and replace
- SMALL SIMPLE REPAIRS – Fairings, non-structural cover plates (with no interference to air flow)
- ELASTIC SHOCK ABSORBER CORDS - Replace
- LANDING GEAR SHOCK STRUTS – Add air, oil, or both

Before you set about performing preventive maintenance items on your airplane, you must first have the proper maintenance manuals available.

### ***After you perform preventative maintenance:***

- Make a logbook entry to include:
  - Date of completion
  - Description of work
  - Signature and type of Certificate, #

This entry will comply with the legal requirements of the FARs and keep an accurate maintenance history of the aircraft.

YEAR 20 17 DATE	RECORDING TACH TIME	TODAY'S FLIGHT	TOTAL TIME IN SERVICE	Description of Inspections, Tests, Repairs and Alterations <small>Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.)</small>
FEB 6				Removed BOTH LANDING LIGHTS AND REPLACED WITH WHELEN PARMETHEUS PAR 36 LED LANDING LIGHTS (2). James R. Rice ATP 1987915



*Pilots should never exceed their personal skill level when it comes to aircraft maintenance.*



AOPA's Air Safety Institute offers a course entitled **"Say it Right"**.

*This course qualifies for Wings Credit and AOPA Accident Forgiveness.*



AOPA's Air Safety Institute offers a course entitled **"Mountain Flying"**

*This course qualifies for Wings Credit and AOPA Accident Forgiveness.*



AOPA's Air Safety Institute offers a course entitled **"Weather Wise: Precipitation & Icing."**

*This course qualifies for Wings Credit and AOPA Accident Forgiveness.*

