FLIGHTINSIGHT

PRIVATE CHECKRIDE AT A GLANCE

VFR FLIGHT REQUIREMENTS*

AM I LEGAL?

Experience required for Private ASEL rating (61.109)

- 40 hours of total flight time, including:
  - 20 hours with CFI, including:
    - With CFI:
      - i. 3 hours of xc flight in SE airplane
      - ii. 3 hours of night flight in SE airplane, including:
        - ✓ xc night flight over 100NM total distance, and
        - ✓ 10 T&Ls to a full stop in pattern
      - iii. 3 hours in SE airplane on control and maneuvering solely by reference to instruments
      - iv. 3 hours in preparation for checkride
  - 10 hours solo in a SE airplane, including:
    - Solo:
      - i. 5 hours of solo xc flight
      - ii. One solo flight 150NM or more, full stop landings at three points, one segment with a straight line distance MORE than 50NM

Personal documents required for US VFR flight (61.3)

- Airman Certificate
- Medical (BasicMed if applicable)
- Gov't Photo ID

Currency to act as PIC on VFR flight (61.56)**

- Completed flight review in last 24 cal mo:
  - Minimum 1 hour flight instruction
  - Minimum 1 hour ground instruction
  - With an authorized instructor (CFI)
- May be substituted by:
  - A practical test for a new rating or cert
  - Completion of WINGS program (ground portion only)
  - Flight instructor renewal (ground portion only) (61.197)

Currency to act as PIC with passengers (61.57)

- 3 takeoffs and landings:
  - In the preceding 90 days
  - In same aircraft category, class, & type
  - Must be full stop landings for taildraggers

at night (from end to beginning of civil twilight:

- Make the 3 landings btwn 1 hour after sunset and 1 hour before sunrise, to a full stop

Preflight Info Required for VFR (91.103)

1) NOTAMS, 2) Weather reports and forecasts, 3) Known traffic delays, 4) Runway length of intended use, 5) Alternatives available, 6) Fuel requirements, 7) Takeoff and landing perf data

Other endorsements are needed for (61.31):

- Tailwheel – normal and xwind T&Ls, wheel landings, go around procs
- Complex – aircraft with retractable gear, flaps, and controllable pitch propeller
- High-Performance – engine more than 200hp
- High-Altitude – service ceiling > 25,000 MSL

IS THE AIRPLANE LEGAL?

Required documents on board

A – Airworthiness certificate (91.203)
R – Registration certificate (91.203)
R – Radio station license (Int'l only)
O – Operating limitations & AFM (91.9 & 21.5)
W – Weight & Balance sheet (23.2620)

Required maintenance inspections

A – Annual inspection – 12 cal mo. (91.409)
A – Airworthiness directives complied with (Part 39)
V – VOR check – 30 days – **IFR ONLY**
1 – 100 hour inspection if for hire (91.409)
A – Alt: xpdr and static sys – 24 cal mo. – **IFR ONLY**
T – Transponder – 24 cal mo. (91.413)
E – ELT – 12 cal mo., battery replaced after 1 hour use or past 50% of life (91.207)

Required equipment on board (91.205)***

A – Airspeed indicator
T – Tachometer (each engine air cooled)
O – Oil pressure gauge (each air-cooled engine)
M – Manifold press gauge (for each alt engine)
A – Altimeter
T – Temperature gauge (liq cooled engine only)
O – Oil temperature gauge (air cooled engine)
F – Fuel gauge (each tank)
L – Landing gear position indicator
A – Anti collision lights (cert after 3/11/96)
M – Magnetic compass
E – ELT
S – Safety belts

(at night) all above, plus:

F – Fuses (spare set, not needed with breakers)
L – Landing light (if for hire)
A – Anti-collision lights (cert after 8/11/71)
P – Position lights
S – Source of electricity

Inoperative equipment (91.213)

- No flying w/o special air permit if equipment in 91.205, or required by AD or operation is inop
- Other inop equipment must be removed or placarded and a pilot/mech deems safe to fly
- If the aircraft has an MEL, consult that guidance

Private pilot limitations (61.113)

- Must pay at least pro rate share of operating expenses (fuel, tie down & rental fees with pax)
- No PIC on flight for comp or hire, unless:
  - The flight is for business and is only incidental to that business, with no passengers or property being carried
  - The flight is for a charitable purpose
  - The flight is a demonstration for a potential buyer and the pilot is a salesperson with at least 200 hours logged time
  - The flight tows a glider or unpowered A/C

ARE THE CONDITIONS LEGAL?

3 "definitions" of nighttime

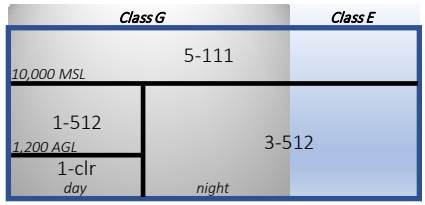
- Official nighttime is from the end of evening civil twilight to the beginning of morning civil twilight (1.1) – use when logging nighttime
- To fly pax one hour after sunset to one hour before sunrise, make 3 T&Ls to a full stop during this time period (61.57b)
- Position and anticollision lights required from sunset to sunrise (91.209)

VFR Minimum Fuel Requirements (91.151)

- Fuel to get from departure to destination, *plus*
- 30 minutes calculated at normal cruise, or
- 45 minutes at night

Basic VFR weather mins (91.155)

Class A – N/A; No VFR
Class B – 3SM, clear of clouds
Class C – 3SM, stay ≥ 500' below, 1000' above, and 2000' horizontally separated from clouds (3-512)
Class D – 3-512

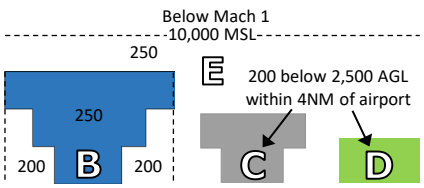


Airspace entry and equipment requirements

Class A – IFR flight plan and clearance, IFR equipment, Mode C transponder and ADS-B Out
Class B – ATC clearance, Mode C xpndr, ADS-B Out
Class C – Two way radio communication established, Mode C transponder
Class D – Two way radio communication established
Class E – No entry requirements for VFR
Class G – No entry requirements

Mode C and ADS-B Out are also required within 30 NM of Bravo airport, above 10,000 MSL, and above C airspace – ADS-B Out is also required 12NM from the coast over the Gulf of Mexico above 3,000 MSL

Speed restrictions in kts indicated airspeed (91.117)



Minimum safe altitudes (91.119):

- Anywhere – an altitude that allows for an emergency landing without danger to surface
- Over congested areas – 1000 ft above highest obstacle in a 2000 foot radius
- Over 'other than congested" areas – 500 feet above the surface
- Over open water or sparsely populated areas – 500 feet away from person, vehicle, or building

*Remember that what keeps you legal doesn't always keep you safe. Ensure that you are both current *and* proficient for a flight!
**See FAR for exceptions such as certain checkrides completed
***Equipment in green required for all aircraft, even the most basic kind like a glider

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PRIVATE CHECKRIDE AT A GLANCE

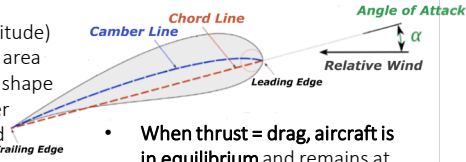
AERODYNAMICS

LIFT

- Lift counteracts weight to keep aircraft aloft
- Curvature and positioning of wings deflect air downwards to produce lift
- In a stall, lift is drastically reduced (but is not zero)

Lift is increased by

- larger angle of attack
- higher air density (pressure, temp, altitude)
- longer wing surface area
- more efficient wing shape
- greater wing camber
- higher true airspeed



THRUST

- Left turning tendencies due to clockwise rotation of propeller:
  1. P-factor - In climbs, the descending propeller blade creates more thrust, causing the aircraft to yaw left
  2. Torque – Clockwise rotation of prop yaws aircraft left
  3. Slipstream – prop wash strikes left side of tail, yawing nose left
  4. Gyroscopic Precession – pitch changes cause a gyro-like reaction from the prop, with forces applied at 90° to spin
- All left turning tendencies are strengthened at high power, low airspeed, and high angle of attack

DRAG

- **When thrust = drag, aircraft is in equilibrium** and remains at constant speed

Types of Drag

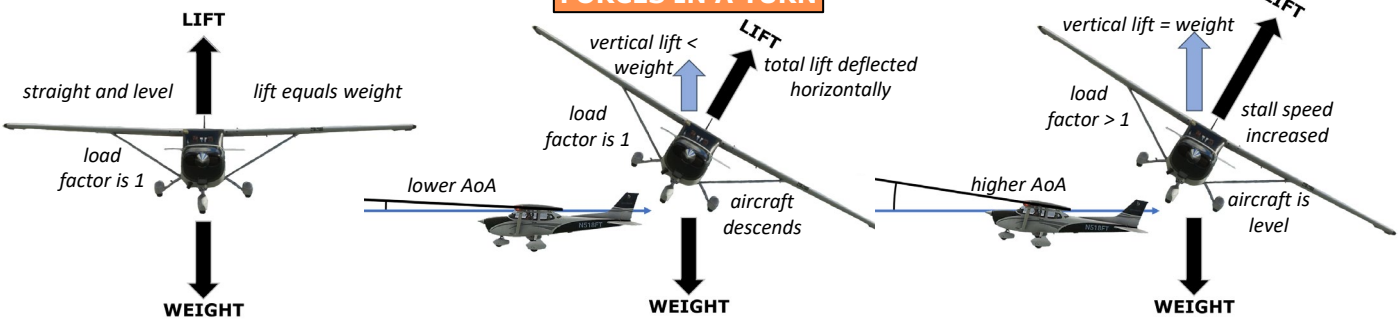
- Parasitic – caused by air resistance on airframe, increases with airspeed
- Induced – caused by wingtip vortices and rearward component of lift, decreases with airspeed

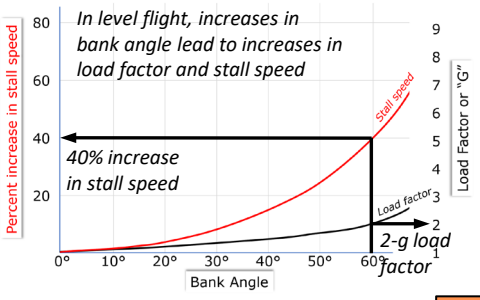
WEIGHT

- Weight is mass from gravity times load factor (g-force)
- Only force always pointed toward center of earth
- V speeds increase with weight

- **When lift = weight, aircraft is in equilibrium** and has steady climb/descent rate
- When lift > weight, rate of climb will increase, vise versa

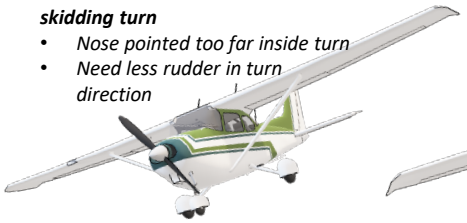
FORCES IN A TURN





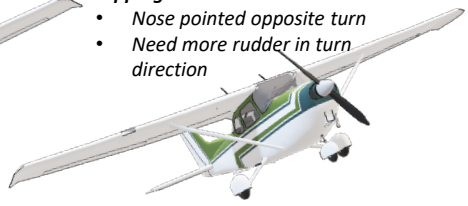
skidding turn

- *Nose pointed too far inside turn*
- *Need less rudder in turn direction*

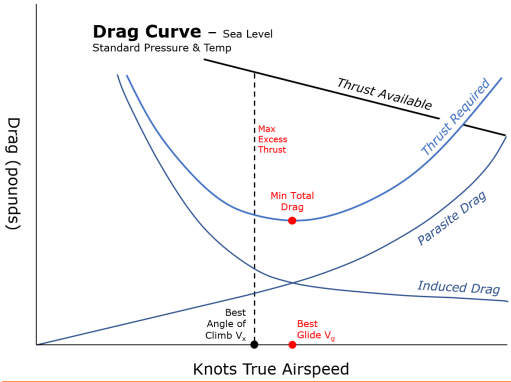


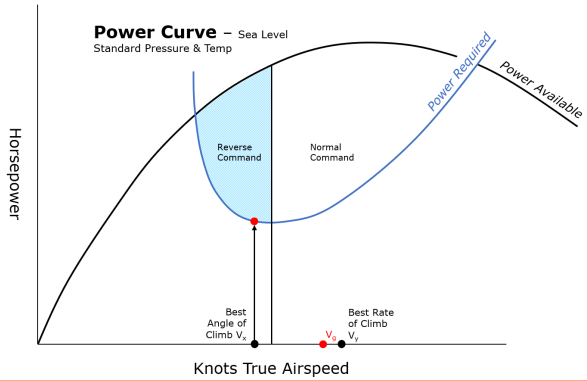
slipping turn

- *Nose pointed opposite turn*
- *Need more rudder in turn direction*



BEST ANGLE (V_X) & RATE (V_Y) OF CLIMB





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FLIGHT INSTRUMENTS

PITOT-STATIC SYSTEM

Airspeed Indicator

Altimeter

Vertical Speed Indicator

Airspeed Indicator (ASI)

- ASI measures difference between ram air pressure in pitot tube and ambient pressure in static port

Altimeter

- Uses an aneroid barometer to compare air pressure in the static port to a known local pressure, set by the pilot
- Above 18,000 feet, the altimeter is set to standard 29.92" Hg
- Susceptible to temperature errors
- Remember: "high to low, look out below!" flying into lower pressure or temperature, the altimeter will indicate higher than true altitude

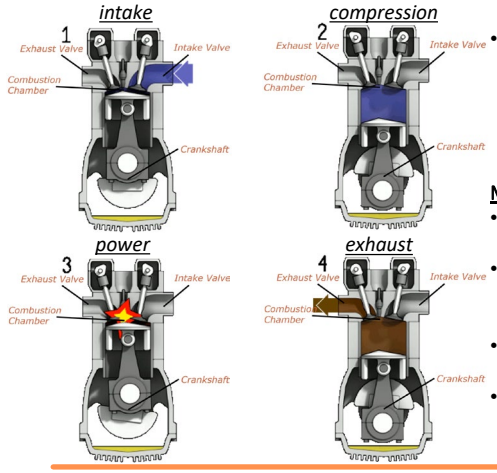
Vertical Speed Indicator (VSI)

- The VSI shows rate of climb using a calibrated leak within the unit's pressure chambers, causing a lag between indicated and actual rate

Pitot-Static System Errors

			
Front of pitot blocked; static port clear	Reads zero	No error	No error
Front and drain of pitot blocked; static port clear	Increases with altitude	No error	No error
Pitot clear; static port blocked	Decreases with altitude	Frozen in place	Reads zero

4-STROKE CYCLE



VACUUM DRIVEN GYRO

Attitude Indicator

Directional Gyro

Gyroscopic Instruments

- Rigidity in Space – will remain fixed in its plane despite outside forces
- Precession – will exhibit a turning force perpendicular to the direction of spin

Attitude Indicator (AI)

- Shows bank and pitch
- Should come erect within a few minutes of engine start
- May show a pitch up (pitch down) during acceleration (deceleration)

Directional Gyro (DG)

- Reflects changes in heading, must be calibrated to magnetic compass
- Due to procession, must be recalibrated to correct magnetic heading periodically

Horizontal Situation Indicator (HSI)

- Combines directional gyro with VOR receiver
- Improves situational awareness by allowing visualization of course deviation in relation to aircraft heading

ELECTRIC GYRO

Turn Coordinator

MAGNETIC

Magnetic Compass

Turn Coordinator (TC)

- Shows rate of turn and rate of roll
- Works off direct current electric source
- One standard rate turn with a wing on the left or right hash mark is a full circle in 2 minutes

Example: A 90° standard rate turn takes 30 seconds

Magnetic Compass Errors

- Deviation – due to electrical fields in cockpit
  - Check compass card
- Variation – difference between true heading and magnetic heading
  - "**East is least, west is best**" subtract east variation from true heading to get magnetic heading and vise versa
- Magnetic Dip* - Turns from a northern heading show a lag, turns from southern heading show a lead, to roll out on correct heading, **UNOS** (Undershoot North Overshoot South)
- Acceleration – Speed changes show a turn **ANDS** (Accelerate North/Decelerate South)

SYSTEMS

Electrical System

- Alternator/Generator produces power driven from the engine
- Powers radios, lights, starter, avionics, some instruments, and sometimes flaps and gear
- Charges a battery which serves as a backup if electrical system becomes faulty
- Most GA aircraft are equipped with either a 14 (Pipers) or 28 (Cessnas) volt DC system

Engine

- Provides power to turn crankshaft and propeller through internal combustion
- Fuel and air are introduced into cylinders through an intake valve, compressed by a piston, and ignited by a spark plug, the resulting combustion pushes the piston down, and its energy is transferred to the crankshaft, spent fuel and air is cleared through the exhaust valve

Magnetos

- Generate electrical current independently of the aircraft electrical system
- Operated when the crankshaft is moving, provide ignition to spark plugs precisely timed to ignite fuel air mixture in cylinders
- Most aircraft have dual magnetos for more efficient burn and for redundancy
- When the ignition switch is "off" a ground wire from the magneto cuts off any electricity travelling to cylinders

Fuel-Air Mixture

- The ratio of the mass (not volume) of fuel to the mass of air used in combustion
- A mixture with too much (rich) or too little (lean) fuel for a given mass of air incombustible or creates problems
- At higher altitudes in thinner air, a leaner setting must be used for optimal performance
- A rich mixture is good for takeoff and climbs, and extra fuel has a cooling effect on engines
- Over-rich mixtures can cause spark plug fouling

Ignition System

- When magnetos are turned on and propeller is moving, sparks are introduced through spark plugs at the top of each cylinder
- Detonation is an uncontrolled, explosive ignition of the mixture, caused by a lower fuel octane, high power/low RPM settings, or an overlly lean mixture
- Preignition is the lighting of the mixture before the piston arrives at the proper position within the cylinder, caused by hot spots within the cylinder chamber igniting the mixture early, wasting some energy as the full force is not able to be applied to the piston

*Applies in Northern Hemisphere only

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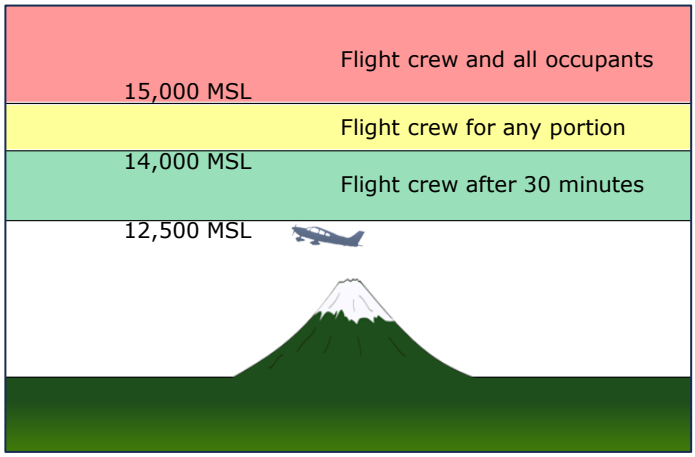
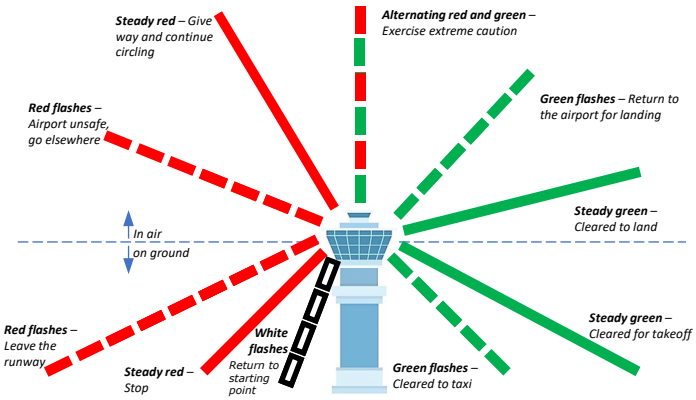
OPERATING RULES

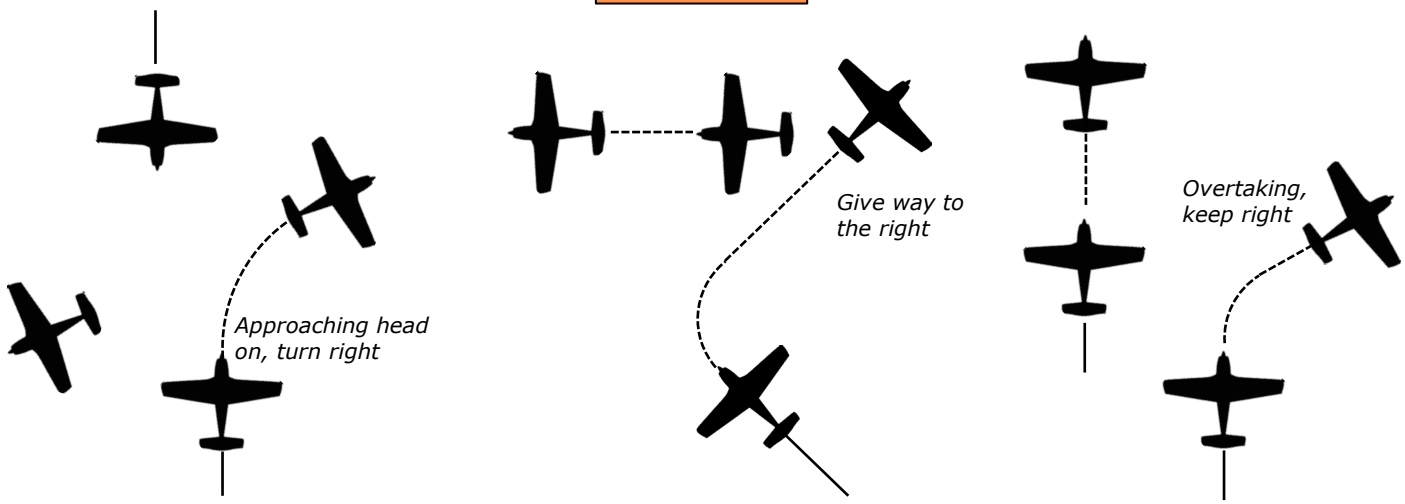
SUPPLEMENTAL O_2 REQUIREMENTS



LIGHT GUN SIGNALS



RIGHT OF WAY



CATEGORY & CLASS

Pilot Certification

Category

Class

Aircraft Certification

Category

Class

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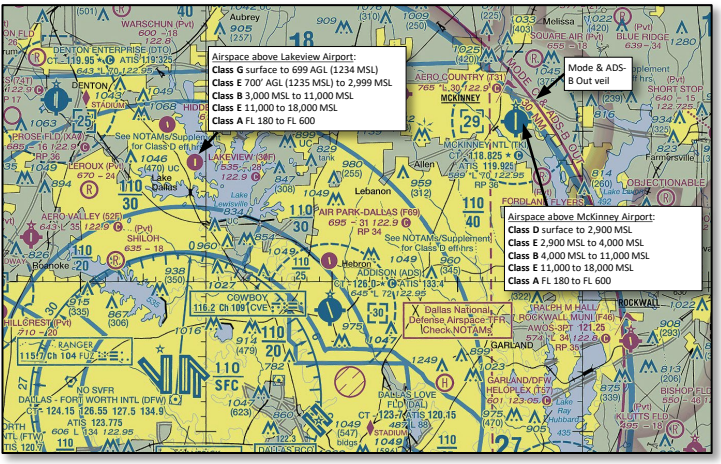
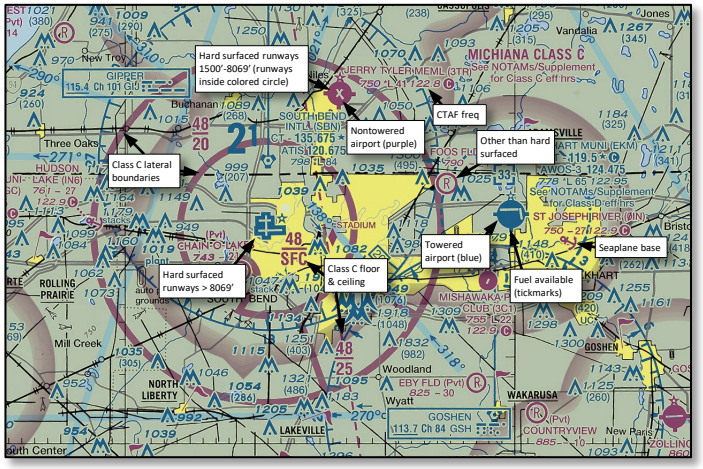
SECTIONAL CHARTS

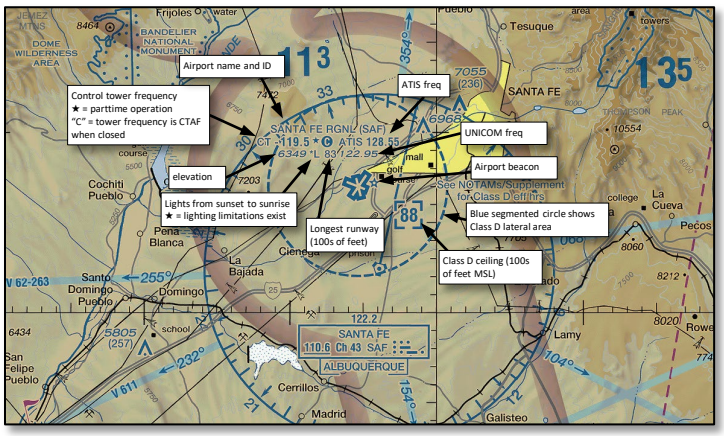
Class B



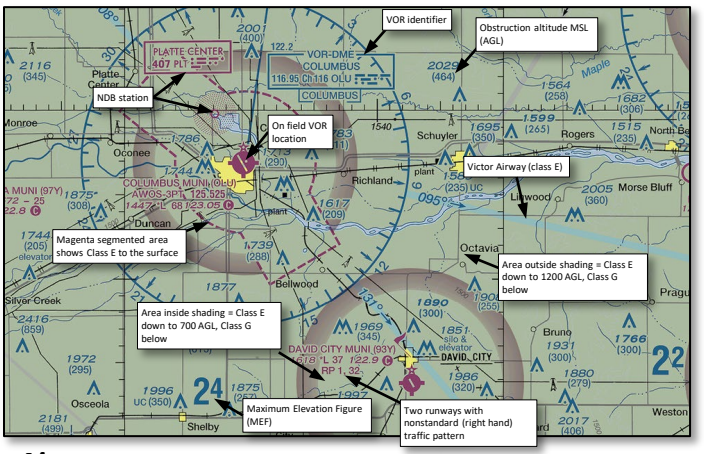
Class C



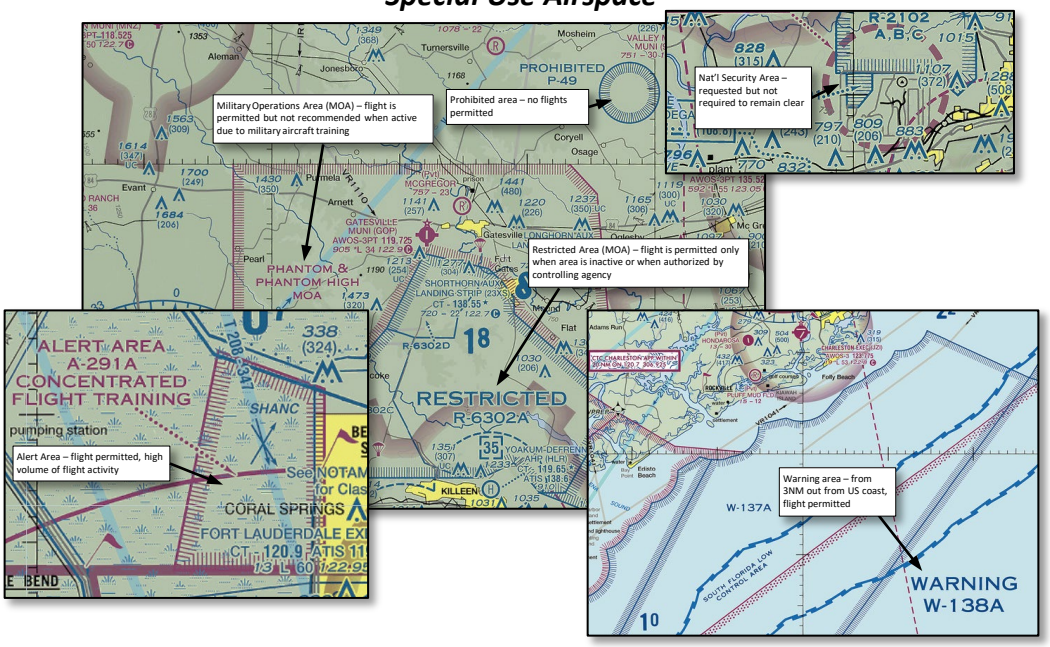
Class D



Class E



Special Use Airspace



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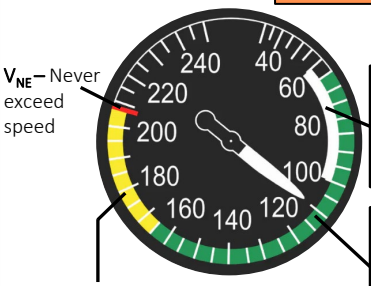
PRIVATE CHECKRIDE AT A GLANCE

AIRSPEEDS

TYPES OF SPEEDS

- **Indicated Airspeed (IAS)** – Speed displayed on airspeed indicator
- **Calibrated Airspeed (CAS)** – IAS corrected for instrument and position errors – most POHs show CAS for a given IAS
- **True Airspeed (TAS)** – Actual speed through the air. CAS corrected for non standard temperature and pressure – lower pressure, and higher altitude or temperature increase TAS relative to CAS
  Example: An aircraft travelling 120 knots CAS at 5,000 feet in standard conditions will be at 130 knots TAS – at 8,000 feet, it will be at 135 knots TAS – it flies faster!
- **Groundspeed –** Actual speed moving over the ground – TAS plus (minus) tail (head) wind component
  Example: An aircraft heading due north at 130 knots TAS, with a 20 knot wind out of 060° will have a headwind component of about 9 knots and a groundspeed of 121 kts
- **Mach Number –** Ratio of TAS to the local speed of sound

V SPEEDS



V_{NE} – Never exceed speed

V_{S0} – Stall speed, landing configuration - bottom of white arc

V_{fe} – Max flap extended speed - top of white arc

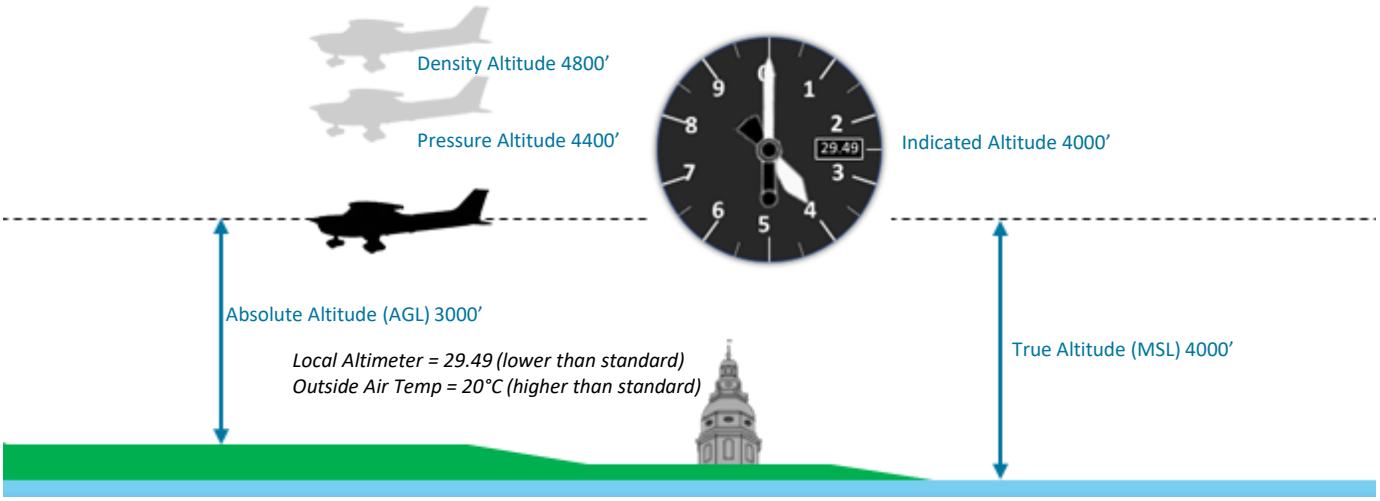
V_{S1} – Stall speed, specified configuration - bottom of green arc

V_{NO} – Max structural cruising speed - top of green arc

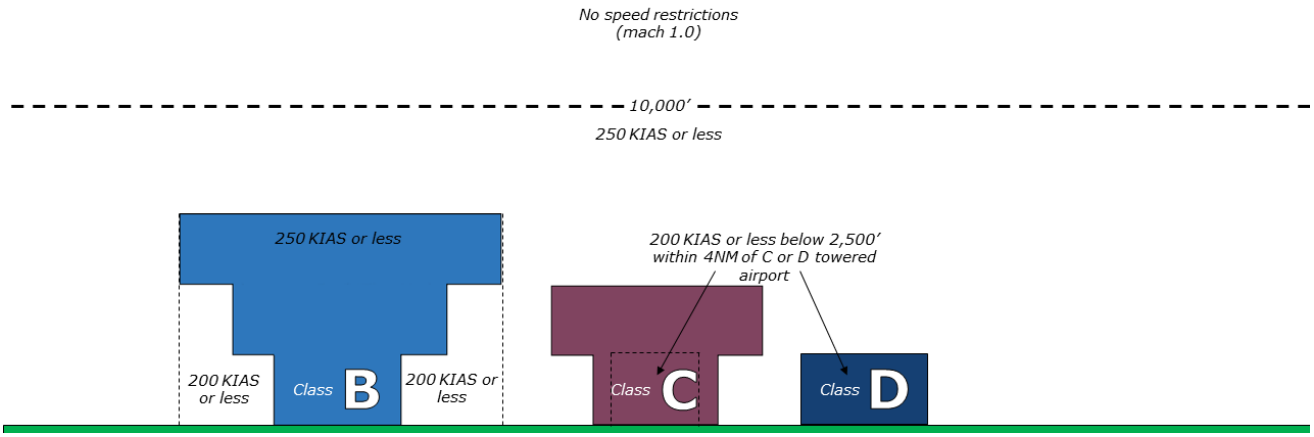
Yellow Arc – Smooth air only speed

V_A – Maneuvering speed V_x – Best angle of climb V_y – Best rate of climb

TYPES OF ALTITUDES



SPEED RESTRICTIONS



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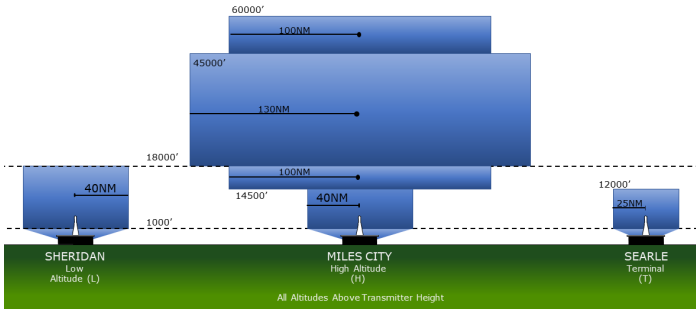
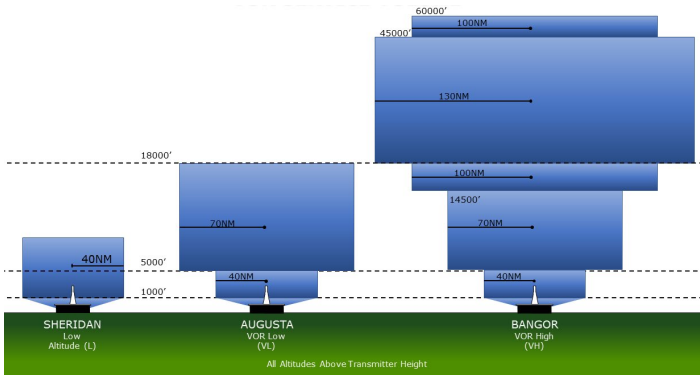
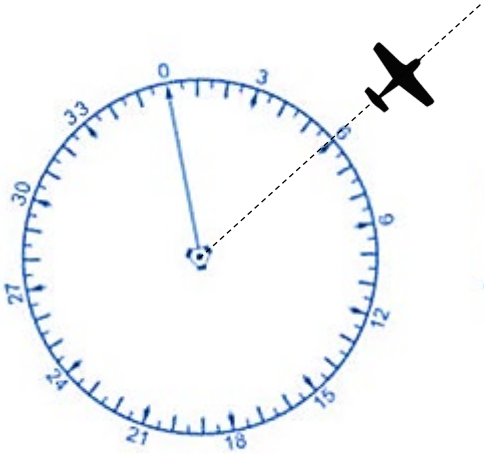
VOR NAVIGATION

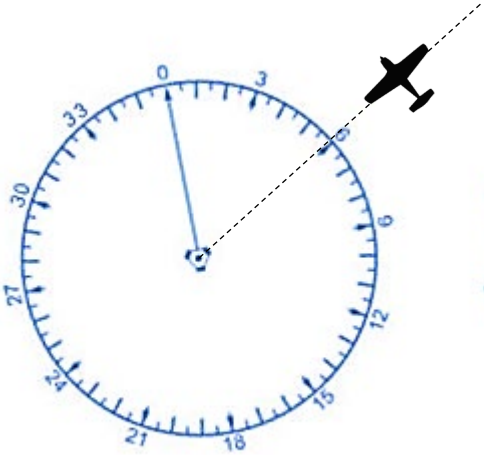
TRADITIONAL VOR SERVICE VOLUME

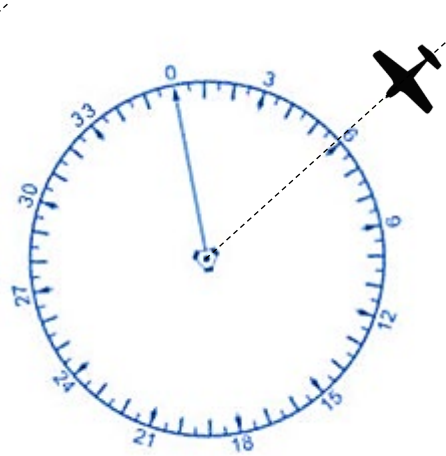


NEW VOR SERVICE VOLUME

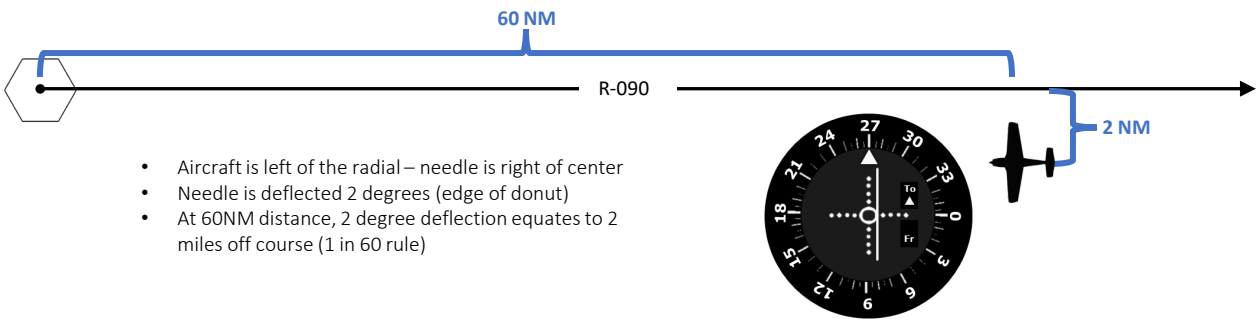








- All three aircraft are on the 060 radial, regardless of which direction they are pointed or flying
- All VOR indicators are correct for all three aircraft
- A heading of 240 will bring the aircraft to the station



- Aircraft is left of the radial – needle is right of center
- Needle is deflected 2 degrees (edge of donut)
- At 60NM distance, 2 degree deflection equates to 2 miles off course (1 in 60 rule)

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PRIVATE CHECKRIDE AT A GLANCE

WEATHER SOURCES

METAR

METAR KINK 121845Z 11012G18KT 15SM SKC 25/17 A3000

Station	Time	Winds	Visibility	Precipitation	Cloud Layers	Temp/Dew Point	Altimeter	Remarks
KINK	12th @ 1845Z	110 @ 12 gusting 18	15 SM		Sky Clear	25/17	30.00	

TAF

KOKC 051130Z 0512/0618 14008KT 5SM BR BKN030 TEMPO 0513/0516 1 1/2SM BR
FM051600 18010KT P6SM SKC BECMG 0522/0524 20013G20KT 4SM SHRA OVC020
PROB40 0600/0606 2SM TSRA OVC008CB BECMG 0606/0608 21015KT P6SM SCT040=

Time of Report	Valid Period	Winds	Visibility	Precipitation	Clouds
5th @ 1130Z	5th @ 1200Z to 6th @ 1800Z	140° @ 8 KT	5 SM	Mist	Broken 3000'
	Forecast Change Temporary btwn 1300Z and 1600Z		1 1/2 SM	Mist	
	From 1600Z	180° @ 10 KT	> 6 SM		Sky Clear
	Becoming btwn 2200Z and 2400Z	200° @ 13 gusting 20 KT	4 SM	Rain Showers	Overcast 2000'
	Probability 40% 0000Z thru 0600Z		2 SM	Thunderstorm and rain	Overcast 800' Cumulonimbus
	Becoming btwn 0600Z and 0800Z	210° @ 15 KT	> 6 SM		Scattered 4000'

PIREP

UA/OV KOKC-KTUL/TM 1800/FL120/TP BE90/SK BKN018-TOP055/OVC072-TOP089/CLR ABV/TA M7/WV 08021/TB LGT 055-072/IC LGT-MOD RIME 072-089

Report Type	Location	Time	Flight Level	Aircraft Type	Sky Cover	Weather	Temperature	Wind	Turbulence	Icing	Remarks
Routine	OK City/Tulsa	1800Z	FL120 (12000')	BE90 (King Air)	Broken 1800' Tops 5500' Overcast 7200' Tops 8900'	Clear Above	Minus 7°C	080° @ 21	Light 5500-7200'	Light/ Moderate 7200-8900'	

WINDS ALOFT

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
ALS			2420	2635-08	2535-18	2444-30	245945	246755	246862
AMA		2714	2725+00	2625-04	2531-15	2542-27	265842	256352	256762
DEN			2321-04	2532-08	2434-19	2441-31	235347	236056	236262
HLC		1707-01	2113-03	2219-07	2330-17	2435-30	244145	244854	245561
MKC	0507	2006+03	2215-01	2322-06	2338-17	2348-29	236143	237252	238160
STL	2113	2325+07	2332+02	2339-04	2356-16	2373-27	239440	730649	731960

@STL*

	3000′	6000′	34000′
Wind Dir	210°	230°	230°
Wind Speed	13	25	106
Temperature		7°C	-49°C

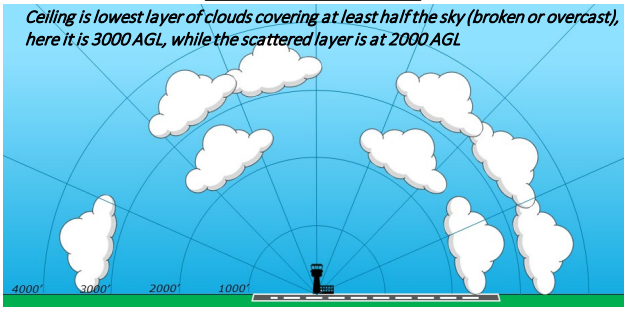
*When wind forecast is over 100 knots, 50 is added to the direction and 100 is subtracted from wind

ABBREVIATIONS

"-" = Light	**No sign** = Moderate		"+" = Heavy
"VC" = Vicinity, but not at aerodrome. In the US METAR, 5 to 10 SM from the point of observation. In the US TAF, 5 to 10 SM from the center of the runway complex. Elsewhere, within 8000m.			
BC – Patches	**BL** – Blowing	**DR** – Drifting	**FZ** – Freezing
MI – Shallow **DZ** – Drizzle	**PR** – Partial **GR** – Hail	**SH** – Showers	**TS** – Thunderstorm **GS** – Small Hail/Snow Pellets
IC – Ice Crystals	**PL** – Ice Pellets	**RA** – Rain	**SG** – Snow Grains
SN – Snow	**UP** – Unknown Precipitation in automated observations		
BR – Mist (≥5/8SM)	**DU** – Widespread Dust	**FG** – Fog (<5/8SM)	**FU** – Smoke
HZ – Haze	**PY** – Spray	**SA** – Sand	**VA** – Volcanic Ash
DS – Dust Storm	**FC** – Funnel Cloud	**+FC** – Tornado or Waterspout	
PO – Well developed dust or sand whirls		**SQ** – Squall	**SS** – Sandstorm

SKY COVERAGE

Ceiling is lowest layer of clouds covering at least half the sky (broken or overcast), here it is 3000 AGL, while the scattered layer is at 2000 AGL



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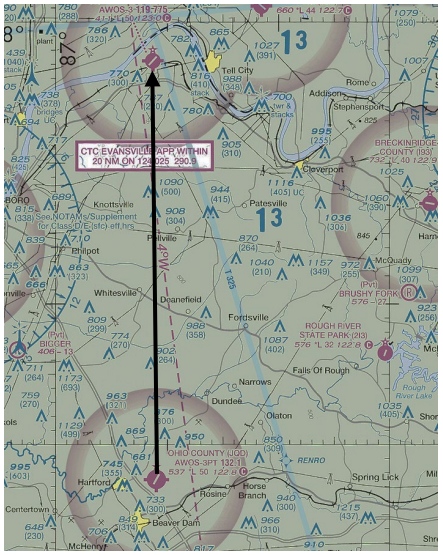
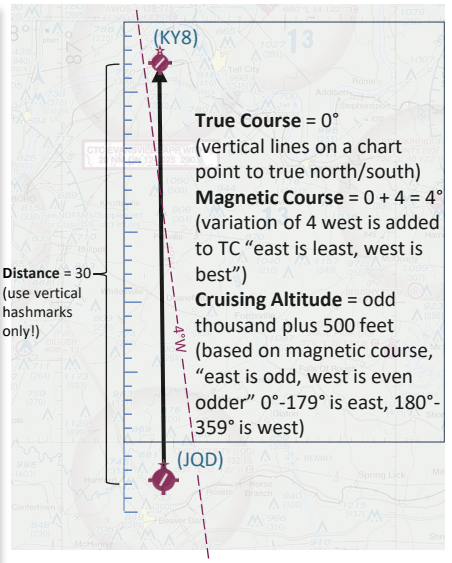
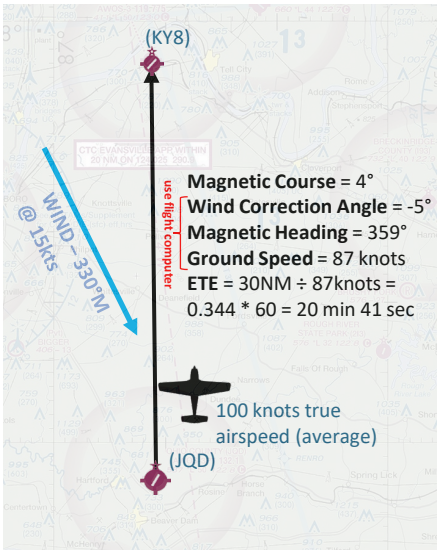
CROSS COUNTRY PLANNING







PERFORMANCE CALCULATIONS

CONDITIONS: Departure Field Elevation = 537' **Altimeter**= 29.48 **Temperature** = 20°C **T/O Weight** = 2400lbs **Headwind Component** = 9 knots **Landing Field Elevation** = 411

TAKEOFF DISTANCE

MAXIMUM WEIGHT 2400 LBS

SECTION 5 PERFORMANCE

SHORT FIELD

CONDITIONS:
Flaps 10°
Full Throttle Prior to Brake Release
Paved, Level, Dry Runway
Zero Wind

CALCULATIONS

Pressure altitude = (29.92 – 29.48) * 1000 + 537 = 977
Figure aligned with 1000 and 20° = 1860
Decrease due to headwind = 10% of 1860 = 186
Total to clear 50 ft obs = 1860 – 186 = 1674

NOTES:
1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.

WEIGHT LBS	TAKEOFF SPEED KIAS		PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
2400	51	56	S.L.	795	1460	860	1570	925	1685	995	1810	1065	1945
			1000	875	1605	940	1725	1015	1860	1090	2000	1170	2155
			2000	960	1770	1035	1910	1115	2060	1200	2220	1290	2395
			3000	1055	1960	1140	2120	1230	2295	1325	2480	1425	2685
			4000	1165	2185	1260	2365	1355	2570	1465	2790	1575	3030
			5000	1285	2445	1390	2660	1500	2895	1620	3160	1745	3455
			6000	1425	2755	1540	3015	1665	3300	1800	3620	1940	3990
			7000	1580	3140	1710	3450	1850	3805	2000	4220	---	---
			8000	1755	3615	1905	4015	2060	4480	---	---	---	---

Figure 5-4. Takeoff Distance (Sheet 1 of 2)

CESSNA MODEL 172P

LANDING DISTANCE

SECTION 5 PERFORMANCE

SHORT FIELD

CONDITIONS:
Flaps 30°
Power Off
Maximum Braking
Paved, Level, Dry Runway
Zero Wind

CALCULATIONS

Pressure altitude = (29.92 – 29.48) * 1000 + 537 = 851
Figure aligned with 1000 and 20° = 1325
Decrease due to headwind = 10% of 1325 = 132
Total to clear 50 ft obs = 1325 – 132 = 1193

NOTES:
1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots
3. For operation on a dry, grass runway, increase distances by 45% of the "ground roll" figure.

WEIGHT LBS	SPEED AT 50 FT KIAS	PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
			GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS	GRND ROLL	TOTAL TO CLEAR 50 FT OBS
2400	61	S.L.	510	1235	530	1265	550	1295	570	1325	585	1350
		1000	530	1265	550	1295	570	1325	590	1360	610	1390
		2000	550	1295	570	1330	590	1360	610	1390	630	1425
		3000	570	1330	590	1360	615	1395	635	1430	655	1460
		4000	595	1365	615	1400	635	1430	660	1470	680	1500
		5000	615	1400	640	1435	660	1470	685	1510	705	1540
		6000	640	1435	660	1470	685	1510	710	1550	730	1580
		7000	665	1475	690	1515	710	1550	735	1590	760	1630
		8000	690	1515	715	1555	740	1595	765	1635	790	1675

Figure 5-10. Landing Distance

SECTION 5 PERFORMANCE

TAXIWAY SIGNS

4-22	**Taxiway/Runway Hold Position:** Hold short of runway on taxiway	⊖	**No Entry:** Identifies paved areas where aircraft entry is prohibited		**Runway Safety Area/Obstacle Free Zone Boundary:** Exit boundary of runway protected areas
26-8	**Runway/Runway Hold Position:** Hold short of intersecting runway	B	**Taxiway Location:** Identifies taxiway on which aircraft is located		**ILS Critical Area Boundary:** Exit boundary of ILS critical area
8-APCH	**Runway Approach Hold Position:** Hold short of aircraft on approach	22	**Runway Location:** Identifies runway on which aircraft is located	J→	**Taxiway Direction:** Defines direction & designation of intersecting taxiway(s)
ILS	**ILS Critical Area Hold Position:** Hold short of ILS approach critical area	4	**Runway Distance Remaining:** Provides remaining runway length in 1,000 feet increments	↙L	**Runway Exit:** Defines direction & designation of exit taxiway from runway

22↑	**Outbound Destination:** Defines directions to takeoff runways	↖MIL	**Inbound Destination:** Defines directions for arriving aircraft		**Taxiway Ending Marker:** Indicates taxiway does not continue	↙A G L→	**Direction Sign Array:** Identifies location in conjunction with multiple intersecting taxiways

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AEROMEDICAL FACTORS

LUNGS

- **Carbon Monoxide Poisoning** – CO is a byproduct of combustion
  - Can enter cabin through exhaust
  - Most heaters work by flowing air over exhaust manifold, a leak in the manifold will introduce CO through heater
  - Symptoms include pain in head, drowsiness, confusion, nausea
- **Hyperventilation** – abnormal increase in oxygen inhaled
  - Caused by stress, panic, anxiety, leading to increased breathing rate
  - Causes lightheadedness and blurred vision
  - Carbon dioxide must be built back up to mitigate the effects, which can be done by talking or laughing loudly
- **Hypoxia** – An insufficient supply of oxygen in the body
  - Hypoxic Hypoxia – low oxygen in the environment such as at high alt
  - Hypemic Hypoxia – lack of oxygen carried in blood (CO poisoning)
  - Stagnant Hypoxia – reduced blood flow to tissue causing numbness
  - Histotoxic Hypoxia – alcohol impairs ability of tissue to absorb oxygen

VISION

- **Daytime Scanning** – Pilots should systematically scan ten degrees of view for at least 1 second
  - Binocular vision creates blind spots if one eye is blocked
  - A good consistent scan can mitigate this hazard
- **Night Illusions** – Rods in the eye use peripheral vision to see objects at night
  - Objects can be best viewed by staring just off center from them
  - Autokinesis is the illusion that lights started at at night are in motion
  - Somatogravic Illusion is the feeling of being in a nose up attitude during acceleration
  - Inversion Illusion is the feeling of tumbling forwards when leveling off from a climb
  - False Horizon is orienting the aircraft with a slope or line of lights rather than the real horizon
  - The antidote to illusions is to reference the instruments
  - Bright white lights should be avoided 30 minutes prior to takeoff

SPATIAL DISORIENTATION

- **The Leans** – Abrupt return to level flight from a gradual turn causes pilot to lean in the direction of the original turn, trying to "fix" the wrong feeling
- **Coriolis** – When a pilot has been in a sustained turn and the fluid in the ear canal moves at the same speed as the body, causes pilot to not notice a turn is continuing
- **Graveyard Spiral** – Pilot loses sensation of turn due to Coriolis, a loss of altitude is corrected not by leveling the wings but by pulling up on the stick, further tightening the turn and leading to a further loss of altitude
- The antidote to any disorientation is to reference the instruments and not to trust the sensations of the body

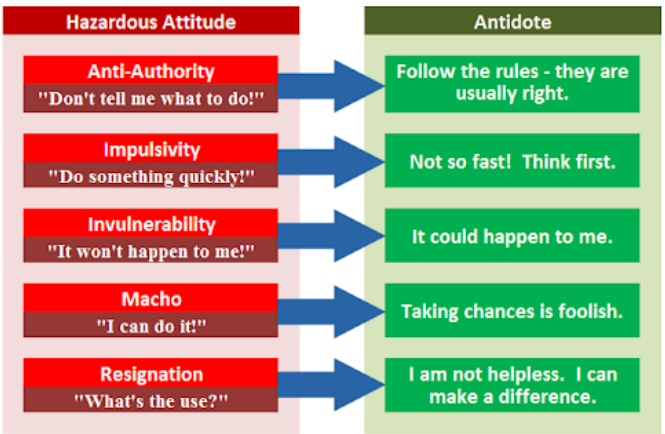
BASICMED

- Allows pilots to act as PIC in some circumstances with an expired FAA medical
- Must possess a US Driver's license, and have held a medical after 7/14/06
- Must get a physical exam from a physician, using official checklist every 48 calendar months
- Must complete a BasicMed course every 24 calendar months
- Cannot fly aircraft authorized to fly more than 7 occupants
- Cannot fly aircraft more than 12,500 pounds
- Cannot carry more than 6 passengers
- Must operate VFR or IFR within the United States, Mexico, or the Bahamas at less than 18,000 feet and not to exceed 250 knots
- Not flight for compensation or hire

RISK ASSESSMENTS

• **P**	**P**ilot-in-Command	• **I**	**I**llness
• **A**	**A**ircraft	• **M**	**M**edication
• **V**	En**V**ironment	• **S**	**S**tress
• **E**	**E**xternal Pressures	• **A**	**A**lcohol
		• **F**	**F**atigue
		• **E**	**E**motion

HAZARDOUS ATTITUDES



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