

## Private Pilot Maneuvers Cheat Sheet

### Normal Takeoff Procedure

Once cleared for takeoff

- Mixture – RICH
- Light switches – all ON
- Fuel pump – ON
- Align with centerline
- Note wind and adjust ailerons as necessary (Ailerons into the wind!)
- Heels on the ground (off the brakes!)
- Apply full power smoothly
- Maintain centerline with rudder
- Rotate at  $V_r$  and climb at  $V_y$
- Climb checklist at safe altitude ~1000' AGL

### The Four Flight Fundamentals:

Climb

- Power - FULL
- Pitch – SET (About 2 fingers below the horizon)
- Trim – as necessary

Level-Off From Climb

- Pitch – SET (About 4 fingers below the horizon)
- Power – Reduce to 2200-2400 RPM **after** airplane accelerates
- Trim – as necessary

Descent

- Power – Reduce to 1500-1700 RPM
- Pitch – SET (About 6 fingers below the horizon)
- Trim – as necessary
- Adjust power/pitch so rate of descent is 500FPM

Level-Off From Descent

- \*Power – 2200-2400 RPM
- \*Pitch – SET (About 4 fingers below the horizon)
- Trim – as necessary

\*Simultaneously

### Slow Flight

- Pre-maneuver checklist:
  - Fuel pump – ON
  - Lights – ON
  - Mixture – RICH
  - Clearing turns
- Note altitude/heading and pick an outside reference point
- Reduce power to 1500-1700 RPM
- Maintain altitude by applying INCREASING back pressure
- Extend flaps once in the white arc
- Pitch for airspeed
- Power for altitude
- Maintain 50-55 knots
- Rudder/Power – as necessary to maintain heading/altitude
- Turns no more than 10° bank
- Recovery:
  - Power – FULL forward
  - Pitch – down to accelerate
  - Flaps – retract in increments
- Power-off stall:
  - Reduce power to 1500-1700 RPM
  - Establish stabilized descent while maintaining airspeed/heading, after 100' descent:
    - Power – IDLE
    - Induce the stall by pitching up, maintaining coordination and wings level
    - recover at full stall and call out "stall"
- Recovery:
  - Reduce angle of attack, pitching forward below the horizon
  - Power – FULL forward
  - Flaps - retract in increments
  - Climb to original cruise altitude

### Power-off Stall

- Pre-maneuver checklist:
  - Fuel pump – ON
  - Lights – ON
  - Mixture – RICH
  - Clearing turns
- Note altitude/heading and pick an outside reference point
- Reduce power to 1500-1700 RPM
- Maintain altitude by applying INCREASING back pressure
- Extend flaps once in the white arc
- Pitch for airspeed
- Power for altitude
- Upon reaching 50-55 knots
- Establish stabilized descent while maintaining airspeed/heading, after 100' descent:
- Power – IDLE
- Induce the stall by pitching up, maintaining coordination and wings level
- recover at full stall and call out "stall"
- Recovery:
  - Reduce angle of attack, pitching forward below the horizon
  - Power – FULL forward
  - Flaps - retract in increments
  - Climb to original cruise altitude

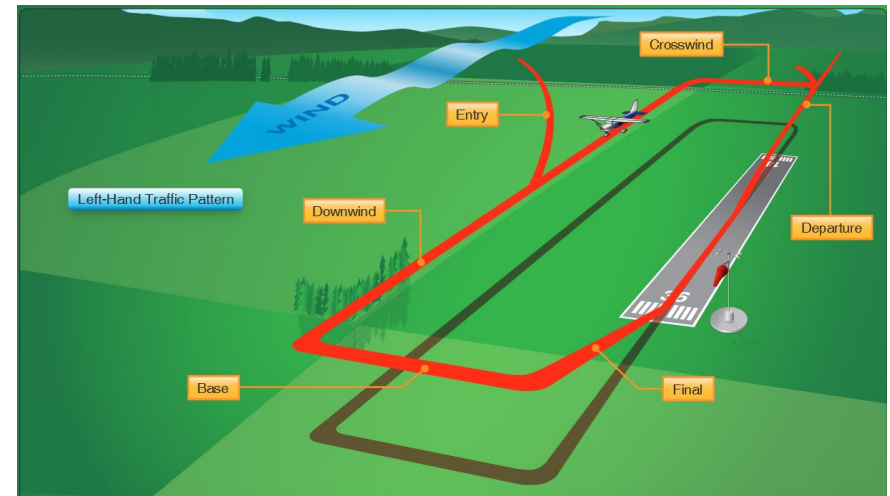
### Power-on Stall

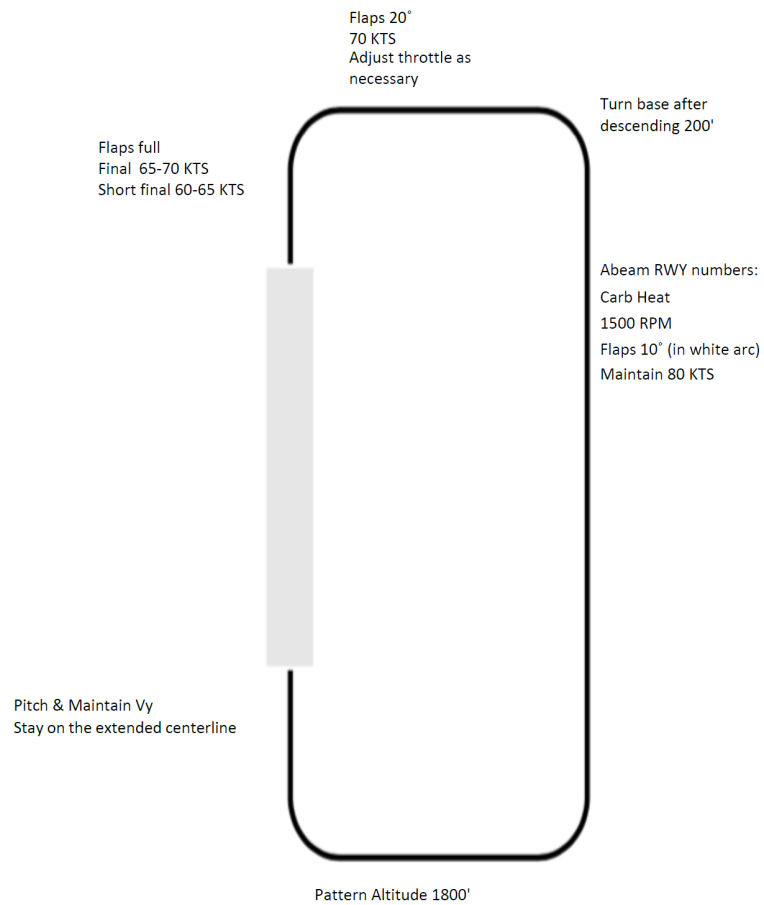
- Pre-maneuver checklist:
  - Fuel pump – ON
  - Lights – ON
  - Mixture – RICH
  - Clearing turns
- Note altitude/heading and pick an outside reference point
- Reduce power to 1500-1700 RPM
- Maintain altitude by applying INCREASING back pressure
- Slow to Vr and then:
- Power – FULL forward
- Pitch – up to induce stall
- Maintain coordination with rudder
- (If turn is requested, no more than 20° bank)
- recover at full stall and call out "stall"
- Recovery:
  - Reduce angle of attack, pitching forward below the horizon
  - Return to cruise configuration

### Engine-out Procedures

- Pitch and trim for best glide speed ( $V_g$ )
- Look for a place to land and stay close to it!
- Troubleshoot if altitude permits:
  - C172:**
    - Fuel selector – BOTH
    - Mixture – Rich
    - Carb Heat – ON
    - Magnetos – Both (attempt restart if prop not wind milling)
    - Master – ON
    - Primer – IN and LOCKED
  - PA28:**
    - Mixture – Rich
    - Fuel pump - ON
    - Carb Heat – ON
    - Master – ON
    - Primer – IN and LOCKED
    - Magnetos – Both (attempt restart if prop not wind milling)
    - Fuel selector – switch tanks
- Run through emergency checklist
- (If still no start) Declare EMG on 121.5 and squawk 7700
- Before landing, shut fuel sources off
  - Fuel selector – OFF
  - Magnetos – OFF
  - Mixture – CUTOFF
- Pop door(s) open
- Brace

### Traffic pattern





## Task A: Certs + Docs

### 61.113

- Can't make money
- Can't pay more than pro rata share
- May fly for charity

### 61.56

- Flight review req. every 24 calendar months from instructor

### 61.57

- 3 TO/L within 90 days to carry PAX in same category class and type if type rating is required can be T+G
- 3 TO/L within 90 days to full stop which occur 1 hour after sunset to 1 hour before sunrise to carry PAX at night

### 61.23

- 3<sup>rd</sup> class req. for private
- Valid 60 months if under 40, 24 months 40+

### 61.51 – Logbooks

- Private pilot does not need to carry logbook
- Only need to log what is required to show currency or show req. time for certificate or rating

### Required aircraft documents:

Airworthiness certificate – Issued by FAA, gives authorization to operate aircraft

Registration – Like a car, check N number and exp. Date

Radio operators permit – Only required if leaving US

Operating handbook – Must be serial # match to AC

Weight and balance – Form with exact weight and arm of aircraft

-All Placards in POH Section 2 must be visible in AC for it to be airworthy

-Sometimes additional placards are required by AD

## Task B: Airworthiness Requirements

### 91.205: Required Equipment

#### Day VFR

Airspeed indicator

Tachometer – each engine

Oil pressure gauge

Magnetic compass/direction indicator

Altimeter

Temp gauge – if water cooled

Oil temp gauge – if air cooled

Fuel quantity indicator

Landing gear position indicator

Anti-collision lights – if manufactured after 1996

Manifold pressure gauge – each altitude engine

Elt

Seat belts

#### Night VFR

Fuses - 3 of a kind or a full set

Landing light – if for hire

Anti-collision light

Position light

Source of power

### 91.213

Procedure for determining if aircraft is legal to fly with inoperative equipment:

If you can answer yes to any of the following questions, the aircraft is not legal to fly

1. Is it a structural component of the aircraft like a wing or strut...Duh
2. Is the item listed in the TCDS for the aircraft?
3. Is the item required by an AD?
4. Is the item required by the MEL? Some airplanes have a list of things on the aircraft that can be broken and still allow that aircraft to fly called an MEL. The MEL comes from the FAA. It is highly unlikely that a light general aviation training aircraft has an MEL.
5. Is the item required by 91.205?
6. Is the Item required by the Kinds of Operations List in section 2 of the POH? Some airplanes have a Kinds of Operations List in their POH. If there is a list, you are required to comply with it. New model C-172's have one.
7. Does the broken piece of equipment affect the safety of flight? If you as a pilot do not know enough about the broken piece of equipment to make this determination, then you cannot fly.

If you answered no to the above questions, the inoperative piece of equipment must be removed or deactivated, and placarded inop.

**Special Flight Permit (Ferry Permit)** – allows you to fly AC with something wrong with it → Ex: overweight ferry, flight to MX base, expired annual

-Obtain from FSDO of origin of flight  
**AD** – Airworthiness Directive – like an airplane recall, can ground AC until certain MX is done.

-Obtain ADs from FAA website

**Compliance Records** - Records in AC MX records that verify compliance with Ads. Ask flight school for location of MX records before CR. They are not kept in AC.

#### Required aircraft inspections:

**Annual** – 12 calendar months for all aircraft

**100 Hour** – 100 hours TIS – only Req. If AC is for hire

**ELT** – 12 Calendar months - ELT batteries must be replaced after half of their usable life or 1 hour of use

**Static system** – 24 calendar months (IFR ONLY)

**Transponder** – 12 Calendar months

-Annual can count for 100 hour, 100 hour cannot count for annual

-All MX except preventative MX on AC must be performed by A&P cert. mechanic. Annual inspections and major repairs must be approved by A&P with IA

#### Task C: Weather

Most common METAR Codes (also used in TAF)

Modifiers (changes precip.)	
+	Heavy
-	Light
VC	Vicinity -5-10sm from AP
FZ	Freezing
SH	Showers
Precipitation	
RA	Rain
SN	Snow
TS	Thunderstorm
Obscuration	
FG	Fog
HZ	Haze
BR	Mist

#### METAR

-Issued every hour, usually 5 minutes before the hour  
 -SPECI denotes METAR issued for significant WX change

#### Decoding:

KJFK 110351Z 02005KT 1/2SM -DZ BR OVC003 03/02  
 A3027 RMK AO2 SFC VIS 1 1/2 RAE42DZB42 SLP248  
 P0001 T00280017 \$

**KJFK** - Station ID

**110351Z** – Day of the month and time issued in Zulu (11<sup>th</sup> day at 3:51 Zulu)

**02005KT** – Wind (020 @ 05 kts)

**1/2SM** – Visibility

**OVC003** – Sky Condition height in 100' increments (Overcast at 300)

**03/02** – Temp. and dew point in Celsius. If negative an M will precede number.

**A3027** – Altimeter setting in InHg

RMK section rarely asked on PPL CR.

#### Common RMK section terms:

**A02** – Automated station is smart enough to tell rain from snow

**A01** - Automated station cannot tell rain from snow

**SLP** – Sea level pressure in Millibars excluding the 10 or 9

**P0002** - .02" of liquid has fallen from the sky

**T0250222** – Accurate temp. is 25.0° and DP is 22.2°

#### TAF

Terminal Aerodrome Forecast

-Forecast from 5nm radius of airport

- 24 or 30 hour forecasts (sometimes 18)

- Issued 4 times a day

#### Decoding:

KJAX 102320Z 1100/1124 00000KT P6SM SCT035

FM110300 00000KT 5SM BR BKN010 BKN020

FM110600 16003KT 2SM BR BKN005 OVC010

TEMPO 1108/1112 1SM BR OVC003

FM111400 20010G18KT P6SM VCSH BKN015

OVC025

FM111700 24014G23KT 5SM -SHRA OVC015

**KJAX** – Station ID

**102320Z** – Day of month and time of issuance

**1100/1124** – Validity period (11<sup>th</sup> day from 00Z to 24Z)

**00000KT P6SM SCT035** – WX at issued time, same as METAR

**FM** – indicates predicted weather at time time listed after to the next from statement

**TEMPO** – Indicates short duration WX which occurs between FM statements

**WX Observing Systems:**

**AWOS** – Automated Weather Observing System

**ASOS** – Automated Surface Observing System – Improved AWOS

**ATIS** – Automatic Terminal Information Service – comes from tower

**Other forecasts/reports**

**FA** – Area Forecasts – Large forecasts for 6 sections of the US. Use for enroute WX

**PIREP** – Pilot issued WX report

**AIRMET** – WX advisory for turbulence, icing, IFR conditions, or mountain obscuration

**SIGMET** – Very bad WX

**Sources of WX information:****Ground:**

-Aviationweather.gov

-FSS from 1-800-WXBRIEF

**Air:**

-ATIS, ASOS, AWOS

-FSS

-Flight Watch on 122.2

**Task D: Flight Planning**

Assure you are familiar with VFR flight planning

**Picking cruising altitude:**

-Must have reason for selecting altitude, cannot pick randomly

**Steps:**

1. Must comply with 91.159 - if above 3000' AGL if the DG will read between 0-179 odd thousands + 500 (3,500, 5,500). If the DG will read between 180-359, even thousands + 500 (4,500, 6,500)
2. Must meet terrain and obstruction clearance requirements
3. Must be high enough to allow suitable navigation via visual reference
4. Preferably high enough to allow time to troubleshoot a failed engine
5. Check cloud height predictions using TAF or Area Forecast– you must be able to remain VFR. Do not plan 5,500 if the forecasted WX says BKN040
6. Performance considerations – The higher you climb, the faster your TAS will be for the same fuel burn... however, altitudes

above 6,500' are usually impractical for short duration XC flights in small planes.

**Picking a route:**

- Route does not need to be a straight line, Plan as needed to avoid restricted areas and tricky airspace
- Plan a route with easily identifiable checkpoints
- Plan a route with plenty of emergency landing fields if possible

**Picking checkpoints:**

- Most examiners like pilots to have checkpoints no more than 20nm apart... couldn't tell you why

**Best checkpoints in order:**

1. Land features – a big lake, bend in river, inlet, mountain, island, Adrien Brody's nose
2. Easily visible airports – avoid grass strips or small private airports
3. Easily identifiable manmade obstacles like groupings of antennas or tall towers.
4. Intersections or bends in roads, railways, or power lines

**Pitfalls:**

- Avoid city boundaries during the day
- Avoid terrain features at night
- Do not pick a straight road or river as it will not provide your exact position
- If selecting a checkpoint for your CR that you have not visually identified before, make sure you can spot in on Google maps

**Task E: National Airspace System**

Not as bad as you think =)

**VFR WX mins.**

All are 3-152 except the following (in order of importance:

1. G day below 1200: 1SM CC
2. B: 3 SM CC
3. E above 10k: 5-111
4. G day above 12000: 1-152
5. A: no VFR

**Airspace equipment and operating requirements:****In general:**

1. Only **A** cannot be accessed by a private pilot
2. **B** and **C** need a mode C transponder
3. **D, B, C** require 2 way radio comms.
4. Establish 2 way comms. with tower in **D**
1. Establish 2 way comms. with approach controller in **B, C**

#### More complex:

1. **A** starts at 18,000 MSL and extends up to FL600
2. **B** Has no typical dimensions
3. **C** – typically SFC-4000 inner 5nm radius, 1200-4000 outer 10nm radius
4. **D** – typically SFC – 2500 MSL 4nm radius
5. **G** usually starts at the surface and extends up to 1,200 AGL or 14,500 MSL depending on the area
6. **E** is everywhere that isn't occupied by other airspace

#### Special use Airspace (common ones):

Prohibited area	No entry
Restricted area	<b>IF HOT:</b> No entry <b>IF COLD:</b> Can enter with ATC permission
MOA	<b>IF HOT:</b> Can enter but EXERCISE EXTREME CAUTION! <b>IF COLD:</b> Can Enter
Alert Area	Marks an area with some hazard to aircraft
Special Conservation areas	Pilots are requested to above 2000' AGL so the manatees don't cry

**TASKS F AND G: ARE USUALLY AIRCRAFT SPECIFIC, MAKE SURE YOU REVIEW THESE WITH YOUR INSTRUCTOR. AIRCRAFT SPECIFIC SHEETS COMING SOON!**

#### Runway Markings:

Type of Sign	Action or Purpose	Type of Sign	Action or Purpose
<b>4-22</b>	Taxiway/Runway Hold Position: Hold short of runway on taxiway		Runway Safety Area/Obstacle Free Zone Boundary: Exit boundary of runway protected areas
<b>26-8</b>	Runway/Runway Hold Position: Hold short of intersecting runway		ILS Critical Area Boundary: Exit boundary of ILS critical area
<b>8-APCH</b>	Runway Approach Hold Position: Hold short of aircraft on approach		Taxiway Direction: Defines direction & designation of intersecting taxiway(s)
<b>ILS</b>	ILS Critical Area Hold Position: Hold short of ILS approach critical area		Runway Exit: Defines direction & designation of exit taxiway from runway
	No Entry: Identifies paved areas where aircraft entry is prohibited	<b>22 ↑</b>	Outbound Destination: Defines directions to takeoff runways
<b>B</b>	Taxiway Location: Identifies taxiway on which aircraft is located		Inbound Destination: Defines directions for arriving aircraft
<b>22</b>	Runway Location: Identifies runway on which aircraft is located		Taxiway Ending Marker: Indicates taxiway does not continue
<b>4</b>	Runway Distance Remaining: Provides remaining runway length in 1,000 foot increments		Direction Sign Array: Identifies location in conjunction with multiple intersecting taxiways

Sourced from FAA-H-8083-25

#### Task J: Aeromedical Factors

Aliment	Cause	Symptom	Corrective action
Hypoxia – 4 types 1. Hypoxic 2. Hypemic 3. Histotoxic 4. Stagnant	1. Alt to high 2. CO poisoning (perhaps from exhaust shroud heater) 3. Alcohol or drugs 4. pulling to many G's	Cyanosis – bluing of fingernails and lips  Dizziness Euphoria	1. Decrease altitude 2. open window to vent CO 3. don't do drugs 4. shouldn't have pulled that hard on the stick
Hyperventilation	Stress or anxiety	Dizziness, hard to control breathing	Talking, having them relax
Middle ear and sinus problems	Infection or mucus blocks sinuses and makes it difficult for them to equalize pressure	pain in ear or sinuses especially when descending	Don't fly sick

#### ATC Light Gun Signals:

Color and Type of Signal	Aircraft on the Ground	Aircraft in Flight
Steady green	Cleared for takeoff	Cleared to land
Flashing green	Cleared for taxi	Return for landing (to be followed by steady green at the proper time)
Steady red	Stop	Give way to other aircraft and continue circling
Flashing red	Taxi clear of the runway in use	Airport unsafe, do not land
Flashing white	Return to starting point on airport	Not applicable
Alternating red and green	Exercise extreme caution!!!!	Exercise extreme caution!!!!

Sourced from FAA-H-8083-25

#### Aeronautical charts:

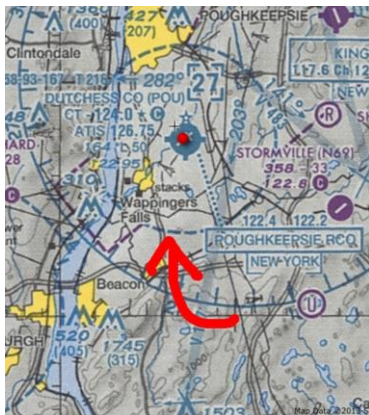
##### 3 VFR charts:

1. **WAC** – Word Aeronautical Chart - Scale 1:1,000,000 – Used for flight planning and by higher flying faster aircraft. Some detail lost.
2. **Sectional** – Scale 1:500,000 – Most common VFR chart
3. **TAC** – Terminal Area Chart – scale 1-250,000 – published for select terminal areas where increased detail is necessary



## 10 most commonly asked aeronautical chart symbols (Sourced from FAA Aeronautical Chart Users Guide):

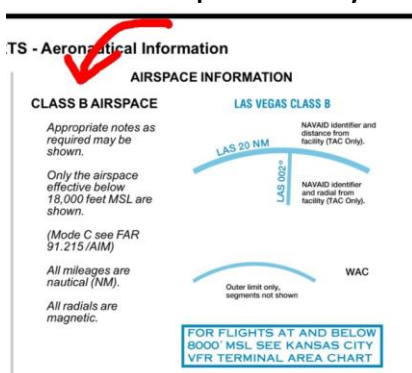
### 1. Class D Airspace boundary



### 2. Class C airspace Boundary



### 3. Class B airspace boundary



### 4. Blue Vs. Magenta airports

#### LANDPLANE: CIVIL

Airports having control towers (CT) are shown in blue, all others are shown in magenta.

All recognizable runways, including some which may be closed, are shown for visual identification purposes.

#### AIRPORTS



Refueling and repair

### 5 and 6. MOA and Restricted airspace



### 7. MEF

MEFs are shown over land masses as well as over open water areas containing man-made obstacles such as oil rigs.

In the determination of MEFs, extreme care is exercised to calculate the values based on the existing elevation data shown on source material. Aeronautical Information Specialists use the following procedure to calculate MEFs:

When a man-made obstacle is more than 200' above the highest terrain within the quadrant:

1. Determine the elevation of the top of the obstacle above MSL.
2. Add the possible vertical error of the source material to the above figure (100' or 1/2 contour interval when interval on source exceeds 200'. U.S. Geological Survey Quadrangle Maps with contour intervals as small as 10' are normally used).
3. Round the resultant figure up to the next higher hundred foot level.

### 8 and 9. Class E starts at 700 and SFC respectively



### 10. Mode C Veil



## Common PPL Vocab

**A&P** – Airframe and Powerplant Mechanic

**AC** – Advisory Circular – Publications from the FAA when they determine a specific topic needs more clarification. (Obtain from FAA site)

**AD** – Airworthiness Directive – Similar to a car recall for airplanes

**Alternator** – Engine driven electrical power generation system that supplies power to the aircraft when the engine is running.

**AOA** – Angle Of Attack – Angle between the chord line of the wing and the relative wind

**ASOS** – Automated Surface Observing System – like an advanced AWOS

**ATIS** – Automated Terminal Information Service – The prerecorded and monitored WX report from tower

**AWOS** – Automated Weather Observing System

**FAA** – Federal Aviation Administration

**Flight Time** – Time when an AC moves under its own power for the purpose of flight and stops after a landing

**FSDO** – Flight Standards District Office – Regional office of FAA that has oversight over a particular area

**IA** – Inspection Authorization - Special mechanic certification which allows a mechanic to sign more important papers

**Magneto** – Engine driven self-contained ignition system which supplies high voltage electrical power to the aircraft's spark plugs to ignite the fuel and air mixture in the engine. The airplane has two of these.

**NOTAM** – NOTice To AirMen – Notices which come from the FAA to warn pilots of a danger. Obtain from FSS or FAA site. Check before each flight.

**NTSB** – National Transportation Safety board – Investigates transportation related accidents

**P-Factor** – Aircraft left turning tendency from asymmetric thrust caused by different angles of attack on the ascending and descending propeller blades. Most significant at high AOA and high power

**PIC** – Pilot In Command – Person who has the sole responsibility for the safety of flight

**Pitot-Static instruments** – Instruments which take readings from the pitot tube and static port – Airspeed indicator, Altimeter, VSI

**Special flight permit** – A permit issued by the FAA that allows an aircraft to be flown with a known issue. (Also called a ferry permit)

**TFR** – Temporary Flight Restriction – A temporary suspension of air traffic in a specific area. Very Serious! Obtain info from FSS or FAA site. Check before each flight.

**TIS** – Time In Service – Wheels up to wheels down time AKA tach time. Timer is usually triggered by a sensor in the AP. (often oil pressure)

**Va** – Maneuvering speed – In brief, max safe speed for maneuvering

**Vg** – Best Glide Speed – furthest distance for a given altitude loss

**Vr** – Rotation speed

**VS1** – Stalling speed in a specified configuration, usually in a clean configuration for light trainers

**VSo** – Stalling speed in the dirty/landing configuration

**Vx** – Best angle climb speed

**Vy** – Best rate climb speed

## Gotchas: some of the most common ones

-No SVFR for a private pilot at night

-High performance endorsement is required for more than 200 hp. A Piper arrow has exactly 200 hp and does not require the endorsement

-Altitudes and info for MOAs on the are on the

bottom of the sectional chart. The altitudes listed indicate the **Floor of the MOA**.

←What do you do at this airport? Info in 91.126 (d). Basically treat it like a Class D airport



←How do you contact FSS here? The Small R means that FSS can only receive on 122.1. They will transmit to you over the VOR Freq. To communicate, Put 122.1 into Com stack and 112.0 into Nav stack and turn up volume. You will hear them talk over VOR freq. from Nav radio.

←What is the minimum wx to take off VFR here? Class G below 1,200 allows you to fly in 1sm and CC. As long as you can maintain those conditions, you can takeoff and fly. In order to climb above 1,200, the WX would have to be better than 3-

152 at that altitude.

**When do you call ground after landing** – The rules say when instructed to do so by the tower (but they usually forget to tell you)

-There is no max airspeed specific to class B airspace. If below 10k, its 250 Kts. 91.117

## Instrument check (Before taxing)

Clock is ticking

Airspeed is reading zero

Altitude indicator blue over brown and less than 5 degrees of bank

Altimeter is within 75 feet of airport elevation

Compass - no cracks, no leaks, ne bubbles and it moves freely

Compass deviation card is present (if required)

Carbon monoxide detector is present (if required)

Gauges are green

HI matches the compass or its with 10 degrees

Vsi reads zero

First protected turn Check (in a turn)

Tc moves to the same direction

Hi moves to the same direction

Compass as well

Vsi is reading zero

Pretakeoff Brief (while holding short before pretakeoff checklist)