



## Task A – Pilot Qualifications (Page 4)

### Pilot Currency

- Current Flight Review
- Three take offs and landings within 90 days to carry passengers (night full stop).
- Medical or Basic Med must be current.
- Pilot Currency is always good for 24 calendar months.
- How can you renew your currency? Flight Review, Wings Program, or a higher license or rating.
- What class medical do you have and how long is it valid for?
- What is Basic Med? How is it different than a 3<sup>rd</sup> class medical?

### Documentation you **MUST** carry on your personal possession as a Pilot

- Valid Pilot's License
- Valid Medical Certificate or Basic Med
- Valid Government Photo ID
- What happens if you don't carry these documents or they are expired?
- What about your Pilot's Logbook or Aircraft Logbooks?

### Recordkeeping

If you fly 100 hours a year, how much of that do you have to log? All of it, some of it, or None of it?

- The minimum required to log is to show that you have met the currency requirements (flight review, takeoffs and landings to carry passengers)

### Privileges as a Private Pilot

- Can carry passengers
- Can fly day or night
- Can split plane rental or operational cost with passengers (pro rate share)

### Limitations as a Private Pilot

- Cannot fly in IFR Conditions
- Cannot fly in Class A airspace
- Cannot fly for hire
- Cannot carry people or property for hire

### Aircraft limitations

Single Engine

High Performance (engine is Over 200 Horsepower)

Tailwheel

Complex (Retractable gear)

- What aircraft are you legally allowed to fly? Name a few.
- What if you want to fly a Piper Cub?
- What if you want to fly a Cessna 182?
- What if you want to fly a Beechcraft A-36 Bonanza?
- What if you want to fly a twin-engine aircraft?

### Proficiency vs currency

- Proficiency – Very good at something
- Currency – Legal to fly, but might suck at it. (I had three of the worst landings of my life, but I am now current and can carry passengers)

**Proficiency** – Every pilot is proficient at something and not at something else. Maybe you're very proficient at flying in general, but you are not very proficient at crosswind landings or tower communication. Maybe you're very proficient in a Cessna 172 but it has been 2 years since you have flown a tailwheel aircraft. (Be smart, safe and challenge yourself – hire a flight instructor to help you with what you're not proficient at)

### Personal Minimums –

What are yours? Write them out

- Winds
- Crosswinds
- Ceiling
- Visibility
- Terrain (High Terrain, Water)
- Rain
- Icing
- Storms
- Fog
- Runway lengths and widths

### Fitness for flight

- IMSAFE – ILLNESS, MEDICATION, STRESS, FATIGUE, ENVIRONMENT

Maybe you're ill and it's not smart to fly?

Maybe you're on some allergy medication and you just feel kind of Blah...

Maybe stress with work, divorce/break up, financials, is getting to you, and your mind just isn't in the right place to fly. This is tough because flying is the (getaway) mentally for us, but at the same time, it's not safe to be in the air and not focused on flying the plane.

## Flying unfamiliar Aircraft, Avionics, Flight Displays

### Aircraft

Cessna vs Piper vs Grumman – Do you think it would be quite a big jump going from one aircraft platform to another? What are the Safety Risks for jumping in and flying an aircraft that you have never flown?

Let's keep it in the same Make and Model aircraft and compare the differences....

- 1964 Model 172 Manual Flaps, Steam Gauges, Carbureted Continental 145hp 6-cylinder engine
- 2012 Model Cessna 172, Electric Flaps, G1000 (Glass Panel) Fuel Injected 4 cylinder 180 hp Lycoming engine

### Flight Displays and Avionics

- Autopilot
- GPS/NAV
- Glass Flight/Engine Instrument Displays
- iPad/foreflight

What would be some risks involved with flying an aircraft that you are not familiar with the systems or displays?

Typically, if you are not familiar with the systems, then you spend a lot of time with your head down and less time with your head up and focusing on flying the aircraft which can create a safety issue.

## Task B Airworthiness Requirements (Page 5)

### Aircraft Certificates, Locations, What are they, and do they expire?

- Airworthiness Certificate
- Registration
- Flight Manual vs Pilot Operating Handbook (POH): Which one is Required to always be in the aircraft while it is in operation?

### Required Aircraft Inspections and Airplane Documentation

- **Annual Inspection** – due every 12 calendar months to the end of the month
- **100 Hour Inspection** – only for aircraft used for hire or flight training, due every 100 flight hours.
- **Transponder Check** – every 24 calendar months to the end of the month.
- **ELT** – inspected every 100 Hour or Annual Inspection

**A&P Mechanic** – is a certified FAA Mechanic licensed to work on airframe and powerplants. A&P mechanics can work on aircraft but are not allowed to sign off major repairs, major engine overhauls, or Annual Inspections.

**IA- Inspection Authorization** – is an A&P mechanic that has an additional level of training and is certified to sign off Major Repairs, Major engine overhauls and Annual Inspections.

\*Note – an A&P can perform the work of an annual inspection, Major Repair, Major Engine overhauls as long as an IA oversees the maintenance and signs off the Annual Inspection, Major Repair, or Major Engine overhaul.

#### **Airworthiness Directive –**

- A mandatory bulletin sent out by the FAA to aircraft owners (example – Door Hinges on a Cessna 150 are breaking and the doors are flying off, so all Cessna 150s have to be inspected for cracks on the door hinge, if a door hinge has a crack It has to be replaced, if not, then every 100 hours the hinges have to be inspected by an A&P and the AD has to be signed off.
- AD's could be a one-time inspection or a recurring inspection

#### **Service Bulletin - Special Flight Permit**

- Issued by the manufacture, but are not required to be complied with. (Example, the Door Hinges on a Cessna 150 are getting some wear, and the manufacture recommends lubing the hinges every 50 hours to prevent wear)

#### **Ferry Permit –**

- Used to fly an aircraft that is not airworthy due to damage, or that is out of Annual Inspection to a location where maintenance can be performed.

#### **How do you obtain a Ferry permit?**

- FAA Flight Standards District Office (FSDO) – North Texas FSDO for us located in Irving, Texas.

#### **Pilot Performed Preventative Maintenance –**

- Maintenance that the owner of the aircraft can perform his or her self.
- Limited to small maintenance items such as - oil changes, clean or replace sparkplugs, air filters, tires, brakes, batteries, light bulbs, replenishing hydraulic fluid, cleaning of aircraft, replacement or greasing of wheel bearings, lubrication of nonstructural items, etc.

#### **Aircraft Minimum Equipment for Day and Night Operation**

#### **FAA PART 91.205(b)**

#### Minimum Instruments for VFR Day Time – **TOMATO FLAMES**

- Tachometer
- Oil Pressure
- Magnetic Compass
- Altimeter
- Temperature Gauge for Liquid Cooled Engine
- Oil Temperature Gauge
- Fuel Gauge
- Landing Gear position Indicator
- Airspeed Indicator
- Manifold Indicator
- ELT
- Seatbelts

## FAA PART 91.205(c)

### Minimum Instruments for VFR Night Time – **FLAPS**

- **Fuses** – For aircraft that do not have circuit breakers, the aircraft has to have spare fuses in case a fuse pops during night operations
- **Landing Light** – Only required if the aircraft is used for hire at night
- **Anti- Collision Light**
- **Position Lights** – Have to be used from sunset to sunrise
- **Source of Electricity** – Alternator or Generator and not just to be flown off a battery.

**Flying with Inoperative Equipment** – If an instrument has failed, you have to determine if the instrument is a required instrument for flight or if it isn't, then you can continue to fly. **If it is failed wither it is a required instrument or not, that instrument has to be labeled inoperative.**

### MEL – Minimum Equipment list

Is a list by the manufacture of that specific aircraft that states what instruments have to be in operation to fly. **An MEL is mostly used on larger aircraft such as King Airs and Jets – Small general aviation aircraft just refer to the TOMATO FLAMES & FLAPS of 91.205**

### Required discrepancy records or placards –

Placards in the aircraft or on the instrument panel (ex. no smoking, remove all contaminants from the fuel system or serious bodily injury or death can result, anti-collision lights should not be used in clouds or fog, etc.)

### Inoperative equipment discovered prior to the flight-

Is it a required instrument? Can I continue the flight? If an instrument has failed, what action should you take?

### Task C. Weather (Page 6)

How do you gather weather information? What sources do you use? And can you gather enough information to make a competent decision to go or not to go through with the flight?

It doesn't matter what weather resources you use. You have to walk the examiner through what weather sources you have found and explain to him what weather conditions exist and make a decision that you will make that flight or not. The examiner is just looking to make sure you can gather whatever weather information you need and make a decision off of that to fly or not.

### Acceptable weather Sources –

- 7 day forecast
- 6 o'clock news weather report
- [www.aviationweather.gov](http://www.aviationweather.gov) – **FAA Approved**
- Flight Briefer (1800-WX-BRIEF) – **FAA Approved**
- Foreflight – **FAA Approved**

- Apps – MyRadar, Aeroweather, etc.
- Weather Discussion on Foreflight – **FAA Approved**

**VFR Weather Minimums: Think of 3 Cessna 152's, and 5 F-111's**

Class A – Not allowed... IFR Aircraft Only

Class B – 3sm visibility, clear of clouds

Class C, D and E below 10,000ft – **3sm visibility, 1000ft above a cloud, 500ft below, 2000 ft horizontal**

Class E above 10,000ft – **5sm visibility, 1000ft above a cloud, 1000 below, 1 mile horizontal**

Class G – Day time 1sm visibility, Clear of Clouds

Class G – Night – **3sm visibility, 1000ft above a cloud, 500ft below, 2000 ft horizontal**

**Freezing Level** - The level of the atmosphere where freezing temperatures are at. (most of the time air is freezing above that level, but sometimes there is a temperature inversion and freezing temperatures are below that and warmer air above that. )

**Types of Icing –**

Where would you encounter these? And which is the worst? Can you fly into known icing conditions with your aircraft? What tells you that you can or can't?

- Rime
- Mixed
- Clear
- Frost

**If you start picking up icing, immediately try to get out of it, turn around, divert, etc. Never wait until it starts building up, then decide to divert. It might be too late at that point.**

**Airmets – General Warning Areas**

- Icing (Light to Moderate)
- Turbulence (Light to Moderate)
- IFR (Low clouds and/or visibility)
- Mountain Obscuration (IFR Conditions in Mountainous terrain areas)

**Sigmets- Warning Areas for Severe Weather**

- Icing (Severe)
- Turbulence (Severe)
- Dust storms
- Volcanic Ash
- Hurricanes

**Convective Sigmets (Thunderstorms)**

- How far to stay away from thunderstorms?
- Hazards of Thunderstorms – Turbulence, Lightening, Hail, Rain, Wind Shear, Tornados
- Microburst

**Convective Outlook** – Outlook that thunderstorms are forecasted in a general area (Yellow shade on Foreflight)

**Weather Systems-**

- High Pressure
- Low Pressure
- Cold Fronts
- Warm Fronts
- Stationary Fronts
- Dry Line

**Prognostic Charts** – Charts of weather fronts, High/Low pressures and movements of each

**Winds Aloft**

- Forecasts
- Wind direction/Velocity
- Temperature
- Calm winds - 9900

**Personal weather Minimums – What is yours?**

- Ceiling
- Visibility
- Winds
- Storms
- Rain
- Crosswinds
- Icing

**Limitations of onboard weather conditions?**

- Radio- Flight Service, AWOS, ATIS, Center/Approach Frequencies – **Out of Range, too busy to help**
- ADS-B/ iPad - **Signal, Overheating, Dead battery**
- Cellphone – **no cellphone service or lack of**

**Limitations of Weather Reports and Forecasts?**

**Weather is only predicted accurately 65% of the time.**

TAF Forecasts - 24 Hour forecast, updated every 6 hours, forecast for a 5NM radius around an airport.

METAR – A lot of the time ceiling and visibility readings are not accurate.

MOS – Forecast used on foreflight – computer calculated forecast based on prior history

Discussion – Found on foreflight or aviationweather.gov, Meteorologist write a detailed forecast on what

**Diversions**

What types of weather conditions would make a diversion necessary?  
Where would you divert to due to bad weather? Instrument/Equipment Failure?

How does ADS-B Work to get weather information to your ipad/phone while flying?

#### Task D. Cross Country Flight Planning (Page 7) –

On the Cross-Country section of the oral exam, you have to be able to talk the examiner through your planned flight, be able to explain.

- checkpoints
- types of airspace along the route
- terrain awareness
- how you came up with heading
- airspeed – True Airspeed vs Ground Speed
- effects of winds aloft
- Fuel burn
- Altitude Selection – Easterly heading 0-179 degrees (Odd Plus 500ft) Westerly 180-359 degrees (Even Plus 500Ft)
- Weather and forecasts along the route
- Notam's at Departure and destination airports
- TFR's

#### Diversion –

**On a cross country, what would be some reasons you would have to divert to a different airport?**

- Weather
- Low fuel
- Engine issues – roughness, oil pressure/temperature, generator or alternator outage,
- Health issues
- Can you calculate what heading to fly to your destination? Distance? Time? Required fuel to reach your destination?

#### Fuel Requirements –

- How much extra fuel is required if flying to your destination?
- Day Time – 30 minutes extra Fuel
- Night Time – 45 minutes extra Fuel

#### VFR Flight Plans-

Used to notify the FAA that you never reached your destination and to notify authorities of a missing aircraft.

#### **Elements of the flight plan**

- N-Number of the aircraft
- Make and Model and equipment code of the aircraft
- Departure Airport

- Destination Airport
- Route of flight
- Time of departure
- Time enroute
- Number of Souls on Board
- Color of the Aircraft
- Pilot Contact Information
- Fuel on Board

#### How do you file it? How do you activate it? How do you cancel it?

- Foreflight
- Flight Briefer (1800-WX-BRIEF)

#### External Pressures- IMSAFE Checklist

- **Illness** – are you well enough to make the flight? Are you 100% or 70%? That could be the difference in a safe flight or not.
- **Medication** – Are you taking any kind of medication that will affect you?
- **Stress** – Having personal problems? Maybe you should give it a day or a couple weeks and mentally get yourself back together and in a safe place to make the flight. You need your mind 100% on the flight, if not, that's a recipe to make a mistake because your mind was on other things and not flying.
- **Fatigue** – Lack of sleep? Fatigue along with stress are the number 1 reason for mistakes while flying, such as running a fuel tank empty, forgetting to lower the landing gear, etc.
- **External Pressures** – Is it not safe to make the flight but you or your passengers are in a rush to reach the destination? You have to decide.... And your passengers may be disappointed initially, but will respect you more after realizing it is safer to not make the flight. Remember 90% of accidents that happen due to bad weather have clear skies the following day.

#### Emergency Procedures –

**Emergency Frequency** – 121.5 (Warning – ATC does not monitor this frequency, really only pilots monitor it when they are flying). If you are having an emergency your best bet is to contact a Controller on a Center, Approach Tower Frequency, or CTAF at an uncontrolled field. Now if you are intercepted by a fighter jet, you might try 121.5, even though military aircraft use radios on a different frequency range, they may or may not have a VHF radio to contact you on.

#### Transponder Codes

- Emergency 7700
- Lost Communications 7600
- Hijack 7500
- VFR 1200

#### Task E Airspace (Page 8)

- Where are these airspaces located?
- What are they depicted on a sectional chart?
- What type of aircraft equipment do you need to enter?
- Do you need a clearance from ATC to enter?
- What are the weather requirements?
- Think of it as **Regular Airspace** vs **Special Use Airspace**
- Using Foreflight or Skyvector.com, draw a line from KGLE to KJFK. What airspace will you fly thru or near? What airspace do you have to avoid and what can you fly thru? Use two different aircraft. Aircraft #1 only has a communication radio, Aircraft #2 has a communication radio and an ADS-B In & Out Transponder.

### Class A - Busiest Airspace

- 18,000 Ft to 60,000 ft
- IFR Aircraft on IFR Flight Plans only – VFR aircraft not allowed
- ADS-B Transponder Required
- Radio Communication
- IFR Certified Pilots only

### Class B #2 Busiest Airspace

- Layered like an upside-down wedding cake
- Transponder – ADS-B out Minimum starting January 1<sup>st</sup> 2020
- Radio Communication
- Must receive a clearance to enter by ATC
- You have to make a flight on a straight course from Gainesville to Cleburne (KCPT). What altitude would you fly to avoid flying inside the Bravo?
- Do you need an ADS-B transponder to fly under or above class bravo?
- Do you have to have a clearance from ATC to fly under or above class bravo?
- What is the Mode C veil? How high does it go?
- You are on a flight from Bowie, TX and plan to transition through the bravo airspace on your way to Houston. What frequency would you choose to try to get a clearance to enter the bravo airspace?

### Class C – 3<sup>rd</sup> Busiest Airspace

- Layered like a poor man's wedding cake
- Transponder required – ADS-B out minimum starting January 1<sup>st</sup> 2020
- Radio Communication
- Must establish radio communication prior to entering class c airspace – a specific clearance to enter is not required
- On a flight from Gainesville to Abilene (KABI), what radio frequency would you contact prior to entering their airspace? (Approach Control)

### Class D – 4<sup>th</sup> Busiest Airspace

- Short - Cylinder shaped.

- No Transponder required
- Radio communication required
- No specific clearance to enter required, but have to establish communication prior to entering.

### **Class E – 5<sup>th</sup> Busiest Airspace**

- Typically from 1200ft AGL to 17,999Ft
- Will drop lower to 700 Ft AGL around airports with a magenta purple shaded circle around it (shows an airport has an IFR approach and causing VFR aircraft to have greater weather requirements to fly to help with separation from IFR aircraft)
- Will drop all the way to the surface at airports that have a dashed magenta line around it (See Mineral Wells KMWL)
- Above 10,000ft MSL an ADS-B Transponder is required

### **Class G – 6<sup>th</sup> Busiest Airspace**

- Think of Grass, Gravel, or Ground.
- Class G extends from the surface upward to the bottom of Class E Airspace
- No Radio or Transponder required

### **Visibility Requirements**

- Class B – 3sm visibility clear of clouds
- Class C, D, E (Below 10,000 Ft) and Class G at Night- 3sm visibility, 1000ft above, 500ft Below, 1000 ft Horizontal (think of it as 3- C-152's)
- Class E above 10,000ft – 5sm visibility, 1000ft above, 1000ft below, 1sm horizontal, think of the old Fighter Jet F-111, Except 5 of them..... 5- F111's
- Class G – Day- 1sm visibility, clear of clouds.

### **Special Use Airspace**

- TFR's (Temporary Flight Restrictions)
- Restricted Areas
- Prohibited Area
- MOA's (Military Operation Areas)
- Military Training Routes (Aircraft Flying 250kts or Faster)
- Warning Area
- ADIZ Area
- TRSA
- Alert Area
- Wildlife Refuse Area

### **[Task F. Performance and Limitations \(Page 9\)](#)**

#### **Take off and landing calculations –**

Using the Aircraft POH – Calculate the Takeoff and landing Distance at Amarillo, Texas- Tradewinds (KTDW). Atmospheric conditions are 90 Degrees OAT, 29.90 mb, winds out of the south at 10mph, and the aircraft is taking off at 2300 lbs Max Gross Weight.

**What is Density Altitude? – It is the measurement of the air and how the aircraft will perform.**

**Example- 2000 ft density altitude or 9600 ft Density Altitude. The aircraft will perform as if it is at those altitudes even though you are taking off from a much lower altitude.**

**I have taken off from Amarillo, Texas on a hot summer day, airport elevation is 3600 ft Msl, yet the density altitude was 7000 ft. the aircraft climbed out at 200ft per minute, that is only 200 ft of altitude gain in 1.5 miles traveled after the aircraft lifted off the ground on take-off.**

**How does Temperature, Altitude, Air pressure, and humidity affect Density Altitude?**

- **Higher Temperature – thinner the air is**
- **Higher the altitude – thinner the air**
- **Air pressure, the lower the air pressure, the thinner the air is**
- **Humidity – high humidity means the water particles takes up more space and pushes out air particles.**

#### **Airport Configuration**

- **Runway condition**
- **Uphill verses downhill runways. How would that affect aircraft performance to take off or land?**
- **Asphalt/Concrete vs Grass – How does that affect drag on takeoff? Which types has less drag and would cause your aircraft to take longer to get airborne?**

#### **Winds**

- **Maximum Crosswind Component – What does this mean exactly?** The aircraft can only take a certain amount of crosswind. After that, the airplane will weathervane into the wind so much that you do not have enough rudder authority to straighten the aircraft and it will land sideways on the runway and cause stress or damage to the aircraft.
- **What is the maximum crosswind component for the Cessna 172?** The POH does not list a specific speed, but based off of newer Cessna 172 manuals, they have it listed at 13kts.
- **If you are having to land with a 13 knot direct crosswind, should you land with more flaps, or less flaps?** More flaps will cause the aircraft to weathervane into the wind more and will require more rudder input to straighten it up, which makes it more difficult to land.
- **How does taking off or landing with a tailwind affect aircraft**

#### **Weight and Balance**

**Compute an aircraft weight and balance for your weight and the examiner's weight (185lbs) for your cross country, with fuel tanks full of fuel. Where is your weight and CG location?**

- **What if the C.G is out of range forward or aft, how does that affect the aircraft stability?**
- **Which is worse? CG too far forward or too far aft?**

## Aerodynamics-

- How is lift created?
- How does an aircraft wing stall? – exceeds the critical angle of attack
- What is a Power off Stall?
- What is a Power on Stall?
- What is an accelerated stall?
- Why does the aircraft's stall speed increase with increased bank angles?
- What is Load Factor?
- What is P-Factor?
- What is Torque effect?
- What is Adverse Yaw?
- What is a Spin? How can you get into a Spin? What are the procedures for recovering?

**What is a risk of not using a manufactures performance charts prior to take off and landing from an airport?**

- How can you exceed the aircrafts limitations?
- Possible differences between calculated performance and actual performance? **Remember the aircraft is older, the engine isn't brand new, etc., so your performance will be less than what the aircraft performance charts shows.**

## Aircraft V- Speeds

- Vr – 60 mph
- Vx – 65mph
- Vy – 85 mph
- Vfe- 100mph
- Va – 122mph
- Vne – 174mph
- Vso- 49mph
- Vs1 -57mph
- Engine Out Glide Speed – 75mph
- What does maneuvering speed, Va mean?

**What is True Airspeed? (used for cross country cruise performance) Find the True Airspeed for a cross country flight at a cruise altitude of 5500 Ft and 2400 Rpm. What is the fuel burn rate?**

## Altitudes –

- AGL
- MSL
- Density Altitude
- Pressure Altitude

## [Task G. Aircraft Systems \(page 10\)](#)

### Primary Flight Controls

- Elevator
- Rudder
- Ailerons

### Secondary Flight Controls

- Flaps
- Trim
- Speed Brakes
- Spoilers, etc.

### Powerplant

- Continental O-300-D
- 6 cylinders
- Carbureted
- Air-cooled
- 145 Horsepower
- Magnetos – Why do we have 2? Where are they located? What do they do?
- If the electrical system fails, will the engine quit? Or will it continue to run?

### Propeller

- Fixed or Constant speed? What is the difference?

### Landing Gear

- Fixed vs Retractable
- Tailwheel vs Tricycle
- Which type do we have?

### Fuel System

- What type of fuel do we use?
- Explain the entire fuel system.
- Are there any possible issues with the system? Example – flights above 5000ft?
- Fuel Tanks – Quantity, useable fuel, unusable fuel
- Fuel Selector- where is it located, what positions does it have? When would you turn it off?
- Fuel Strainer – What is the purpose? Where is it located?
- Why do we take off and land with the fuel selector on both?
- Carburetor

### Oil System

- What type oil does the aircraft use? **Phillips 20w50**
- What is its operating Oil level? **6-8 quarts**

### Electrical System

- How many volts is it?

- What charges the electrical system? Alternator vs generator
- Where is the battery located at in the plane?
- How do you know if the charging system has failed? Light? Ammeter?

### **Avionics**

- What type of radios are installed? Nav/Com? Or just communication?
- What type of transponder is installed?
- What is ADS-B? How does it work? ADS-B IN, ADS-B Out, Satellites, Towers
- Intercom – How does it work?
- Audio Panel?
- How do you troubleshoot communication failure? Headsets, Plugs, Audio Panel, Volume, Correct frequency.
- VOR – What is it? How does it work?
- GPS – What is GPS? How does it operate? How many satellites do you need?

### **What is RAIM?**

- How does it work?

### **Pitot Static/ Vacuum System**

What are they? How do they work? If a particular system fails, how do you know? And what instruments will you lose?

- Pitot Static Instruments – Airspeed Indicator, Altimeter, Vertical Speed Indicator
- Pitot Tube & Static Port
- Gyroscopic System – Attitude Indicator, Directional Gyro
- Vacuum Pump, Suction Gauge, OFF Flag on Attitude Indicator

### **Magnetic Compass**

- What are the errors associated with it?
- Acceleration & Deceleration
- Turns
- Oscillation
- Magnetic Variation
- Magnetic Deviation

### **Environmental**

- Lights – Instrument Flood Lights
- Tail Beacon
- Navigation Lights
- Landing Lights
- When do they have to be used? (Optional)

### **Deicing and anti-icing**

- Pitot Heat
- Carburetor Heat

- Defrost

### Oxygen system

- Is there one installed in the aircraft or a portable system?
- What are the Oxygen Requirements?
- 12,500 feet to 13,999 for more than 30 minutes, crew members must go on oxygen
- 14,000 to 14,999 – Crew members must immediately go on oxygen at that time
- 15,000 and above – crew members must be on oxygen and all passengers must be provided oxygen
- Indications of system abnormalities or failures
- Procedures for managing system abnormalities
- Failure to detect system malfunctions or failures
- Improper management of system failure
- Failure to monitor and manage automated systems

### Minimum Instruments for VFR – **TOMATO FLAMES**

- Tachometer
- Oil Pressure
- Magnetic Compass
- Altimeter
- Temperature Gauge for Liquid Cooled Engine
- Oil Temperature Gauge
- Fuel Gauge
- Landing Gear position Indicator
- Airspeed Indicator
- Manifold Indicator
- ELT
- Seatbelts

### Aircraft Inspections

- Annual Inspection
- 100 Hour Inspection (if for hire)
- Transponder Check – 24 Calendar Months
- Pitot Static Check – 24 Calendar Months
- VOR Check – within 30 days

**VOR Checks: Must be documented in the Aircraft Logbooks- Date, Location, VOR, and amount of error on each CDI indicator.**

- Where do you find a list of VOR Check locations? Chart Supplement
- VOT – Avionics Shop
- VOR Ground Check - /+ 4 degrees
- VOR Airborne Check -/+ 6 degrees between 2 CDI Indicators

### Inoperative Equipment –

If an instrument fails that is require or not required. That instrument has to be labeled **INOPERATIVE**

It is up to you as Pilot in Command to determine if a failed instrument must ground the aircraft and the flight, or if you can continue to fly if the instrument is not required to be working for a VFR or IFR flight.

### Task H. Human Factors (Page 11)

Know the following, the symptoms, risks, and how to correct the issue. Watch YouTube videos on each one to learn more.

**Hypoxia** – Lack of oxygen, due to flying at higher altitudes.

- **Symptoms**- feeling light headed, tingly, headache, redness, blue finger nails or lips, lack of focus, and the scariest euphoria!
- **Risk** – could lose consciousness, lose enough focus to the point where you lose control of the aircraft. And at higher altitudes could die in a matter of seconds.
- **Corrective action** – Descend immediately to a lower altitude to get more oxygen into your system, or go on oxygen.
- I personally carry a Pulse oximeter that slips over your finger and will read out your oxygen level and pulse rate when I am flying 10,000 ft or higher.

**Hyperventilation** – excessive loss of carbon dioxide from the body, caused by an increase in breathing rate due to stress, fright, or pain.

- **Symptoms**- headache, decreased reaction time, impaired judgement and vision, euphoria, drowsiness, numbness, skin becomes pale/clammy, and muscle spasms.
- **Risk**- this could lead to unconsciousness while the respiratory system tries to gain control of the breathing rate. It also impairs judgment and piloting ability.
- **Corrective Action**- breathing normally is both the best preventative action as well as treatment. Breathing into a bag can also help as it traps carbon dioxide and allows the person to breathe it back in.

**Middle Ear and Sinus Problems** – there is a difference between the pressure of the air outside of the body, and the air inside the middle ear and sinus. These pressures are able to equalize via passages in the middle ear and sinus, but if these get blocked then the pressure is unable to equalize.

- **Symptoms**- pain in the ears and sinus areas, a feeling of growing pressure and headache inside the head.
- **Risk**- severe pain is the main risk, as well as a potential to burst the ear drums if climbs and descents are made and the inner ear is unable to properly equalize the pressure.
- **Corrective Action**- always avoid flying with sinus problems or respiratory issues. If it is minor it can help to chew gum or stretch the jaw to help open the passages. Ensure that slow descents are made to avoid bursting the ear drums.

**Spatial Disorientation**- refers to the lack of orientation with regard to the position, altitude, or movement of the airplane. Essentially the body is telling you one thing is happening and the instruments are telling you something different. It happens when outside references are lost like in IMC and even at night.

- **Symptoms**- confusion on the orientation and movement of the airplane.
- **Risk**- you can make control inputs based on what you feel is happening, instead of what is actually happening, and put the airplane into an unusual attitude. There are many accident case studies involving spatial disorientation leading to stall spin incidents.
- **Corrective Action**- trust the instruments.

**Motion Sickness** – caused by the brain receiving conflicting messages about the state of the body. This can happen in turns when rapid head movement is made as well as when pulling G's.

- **Symptoms**- discomfort, nausea, dizziness, paleness, becoming sweaty, and vomiting.
- **Risk**- this can cause vomiting, which no one wants in an airplane. This can also lead to impaired judgment or added stress to the person experiencing motion sickness.
- **Corrective Action**- open the air vents, turn the cabin air on, focus on one thing off in the distance, and stop doing whatever made the person sick.

**Carbon Monoxide Poisoning** – carbon monoxide attaches itself to the hemoglobin in the blood, preventing oxygen from being transported. This occurs when exhaust fumes make their way into the cockpit. Cabin heat can let these fumes in if there is a crack in the exhaust pipe, letting carbon monoxide into the exhaust shroud.

- **Symptoms**- headache, blurred vision, dizziness, drowsiness, and loss of muscle power.
- **Risk**- this can as well lead to unconsciousness as it creates a state of hypoxia called hypemic hypoxia.
- **Corrective Action**- immediately turn off the cabin heat, open air vents and windows, and land immediately.
- **We have a Carbon Monoxide Detector mounted to the panel, and it will help us determine if we are breathing in any CO or have an issue.**

**Stress** – this is the body's response to physical and psychological demands placed upon it. It can be caused by physical things like noise or vibrations of the plane, or by psychological things like personal relationships or work.

- *Types of Stress*
  - Acute- involves an immediate threat, and triggers the fight or flight response. Healthy people normally handle acute stress very well as it is just a **one-time** thing.
  - Chronic- exceeds the ability of an individual to cope, and causes performance to fall drastically. Usually derives from **long term** pressures such as loneliness, financial worries, and relationship or work-related problems.
- **Stress that effects performance in the airplane needs to be dealt with before attempting to fly.**

**Fatigue**- the degradation of attention and concentration, as well as impaired coordination.

- **Causes**- sleep loss, exercise, physical work, and stress.
- *Types of Fatigue*
  - Acute- short term, you didn't sleep well last night.
  - Chronic- long term, you haven't slept well in weeks.
- **To avoid fatigue, a proper diet and sleep schedule is needed. Stay on the ground if too fatigued.**

**Dehydration-** this is a critical loss of water from the body.

- **Symptoms-** dizziness, weakness, nausea, tingling of the hands and feet, abdominal cramps, and extreme thirst.
- **Risk-** can lead to fatigue and impaired judgement. We are more susceptible to this at high altitudes due to the dry air increasing water consumption from the body.
- **Corrective Action-** carry water on your flights, wear light clothing, keep the cockpit ventilated.

### **Alcohol and Other Drugs**

- **Alcohol**
  - Causes pilots to be more susceptible to disorientation and hypoxia.
  - Even a hangover can impair pilots attempting to fly.
  - FAR/AIM states 8 hours bottle to throttle, less than a .04 BAC to fly.
- **Medications**
  - Side effects of medications can impair judgement, coordination, and vision.
  - Do not fly while taking medication unless it is approved by the FAA.
- **If you take an FAA approved medication for the first time, make sure you do not fly as it may cause symptoms you are unaware of.**