

How do you prepare for a flight? PAVE: Pilot, Aircraft Environment and External Pressures.

PILOT

- A pilot must continually make decisions about competency, condition of health, mental and emotional state, level of fatigue, and many other variables.

AIRCRAFT

- A pilot frequently bases decisions on evaluation of the airplane, such as performance, equipment, or airworthiness. This task will concentrate on the aircraft (ASEL – Airplane Single Engine Land).

ENVIRONMENT

- The environment encompasses many elements that are not pilot or airplane related, including such factors as weather, air traffic control (ATC), navigational aids, terrain, takeoff and landing areas and surrounding obstacles. Weather is one element that can change drastically over time and distance.

EXTERNAL PRESSURES

- The pilot must evaluate the three previous areas to decide on the desirability of undertaking or continuing the flight as planned. It is worth asking why the flight is being made, how critical it is to maintain the schedule, and if the trip is worth the risks.

P – Pilot for the Private Pilot:

Start with I'M SAFE: Illness, medication, stress, alcohol (.04), fatigue (acute and chronic) and eating/emotional factors. If any of these factors apply, you should not fly. As a private pilot, you are required to carry your pilot's certificate, medical and a government ID. As a private pilot, you are allowed to carry passengers (not for hire) – 61.113, fly when visibility is less than 3 miles (SVFR – Special VFR) and can fly without visual reference to the surface. Special requirements for the Private Pilot are: Must be a Private Pilot to take off and land within (KSFO) Class B Airspace (AIM 3-2-3) and can fly at night. Must maintain currency to carry passengers: 1.) 3 touch-n-go's during the day and 3 full stop landings at night every 90 days – 61.57. 2.) Complete a BFR (Flight Review) (minimum 1 hour of ground and 1 hour of flight – every 24 calendar months – 61.56. 3.) Have a First Class (valid for 6 months), Second Class (valid for 12 months) or Third Class (valid for 2 years if over 40 years old or 5 years if under 40 years old) medical certificate to be pilot in command.

A – Aircraft for the Private Pilot:

Remember A R O W. Airworthiness Certificate (Has the aircraft had an Annual, 100 hour, Progressive - 91.409, Pitot Static/Transponder check (24 months - 91.411, 91.413), Aircraft has the required equipment – 91.205 if NOT Special Flight Permit 21.197 & 21.199, ELT check - 91.207 and all AD's have been complied - 91.403 39.3, Registration (Every Three Years) – 47.41, Operating Limits (Section 2 of POH, Pilot's Operating Handbook) – 91.9 and Weight and Balance (Section 6 of POH). Fuel requirements for all flights (30 minutes Day, 45 minutes Night) - 91.151. The required takeoff and landing distances, runway lengths and weather forecasts - 91.103. Avionics familiarity, density altitude and a current sectional information.

V – Environment for the Private Pilot:

Think of the Airport and weather conditions: Crosswind, Takeoff and Landing distances, Ceiling conditions, visibility and your personal minimums. Plan on the weather for your Departure, En-route and Destination. For example: Current Metar, TAF and FA (Area Forecast), surface analysis chart, radar summary chart, winds and temperature aloft, significant weather prognostic chart, convective outlook chart, Airmets and Sigmet, PIREPs, wind shear reports, icing and freezing levels and AWOS, ASOS and ATIS reports for the route and destination. The pilot wants to make a competent “go/no-go” decision based on available weather information. Reference Weather Information – Task C in RAM Study Guide.

E – External Pressures for the Private Pilot:

Think about “Get there Itis.” The determination to reach a destination, combined with hazardous weather, claims the lives of dozens of pilots and their passengers yearly. Think about the hazardous attitudes: Anti-authority, Impulsivity, Invulnerability, Macho and Resignation to see if they may apply to this flight. Allowance for delays and diversions, alternative plans and personal equipment. After you use the PAVE checklist (step 1), use the CARE checklist (Consequences, Alternatives, Reality and External pressures) (step 2) and determine the level and severity of the risk. (Step 3) perform the TEAM checklist. Transfer Risk, Eliminate Risk, Accept Risk and Mitigate Risk.

Aircraft Maintenance:

For an aircraft to be legal to fly, the aircraft must be **Airworthy**, must have current **Registration** and have on board the **Operating limits** (Section 2) and **Weight and Balance** (Section 6) of the POH. Remember **AROW**.

Airworthiness Certificate: The aircraft is airworthy as long as maintenance, preventative maintenance and alterations are performed. Maintenance on aircraft is based on Tach time.

1. **Annual** – An annual inspection is usually done for owner aircraft. This inspection is done once a year. Done Feb 2015, Due Feb 28, 2016. You can substitute an Annual for a 100 hour inspection.
2. **100 Hour** – This inspection is done for all rental aircraft.
3. **Progressive System** – This inspection is done for very large fleets of rented aircraft. 4 events is equal to 1 cycle. 1 cycle has to be completed in one year. Event 1 may be the engine. Event 2 the airframe. Event 3 the interior. Event 4 the propeller.

Basics of maintenance:

When an Annual is performed, an A&P (**Airframe and Powerplant**) mechanic will pull off all inspection covers, perform an oil change, cylinder compression checks, check brakes, brake pads, tires, pull the interior out, check cables, pulleys, check AD's, ect. The inspection can take up to several days and is signed off by the IA (**Inspection Authorization**). An A&P cannot sign off the aircraft. The IA has more training and also is required to do re-currency training to maintain the IA. The airworthy endorsement must contain the name, signature and IA number to be legal.

AD's (Airworthiness Directives) apply to the following products: Aircraft, Aircraft Engines, Propellers, and Appliances.

1. They are Mandatory.
2. Three Types: 1. Standard (Notice of proposed rulemaking (NPRM)), 2. Final Rule and 3. Emergency Airworthiness Directives.
3. Standard AD's are usually One Time or Recurring (every 500 hours, ect.)

SB's (Service Bulletins) are produced by the manufacture and are advised but not mandatory.

Aircraft Logbooks:

1. **Engine Logbooks** – Contain compression checks, AD's, Oil & filter change and engine time. Compression's need to be over 50 to be legal, normal checks are 70 to 75.
2. **Aircraft Logbooks** – Contain the Pitot Static/Transponder Check (Every 24 months), the ELT Battery check (Battery checked every year, replaced every 2 years or if 50% has been used. To check the ELT, 121.50 first 5 minutes of every hour for 3 swipes). Propeller endorsement for single-engine fixed pitch aircraft.
3. **Propeller logbook** – All aircraft that have a variable pitch constant speed propeller must have an endorsement to be airworthy.

Registration – The aircraft registration is valid for 3 years to be airworthy. Is effective, unless suspended or revoked, until the date upon which –

1. The aircraft is registered under the laws of a foreign country.
2. Is cancelled at the written request of the holder of the certificate.
3. The aircraft is totally destroyed or scrapped.
4. Ownership is transferred.
5. The holder of the certificate loses U.S. Citizenship.
6. 30 days have lapse since the death of the holder of certificate.
7. Loses status as a resident alien.

Operating Limits and Weight and Balance – Operating Limits are in section 2 and weight and balance is in section 6 of the Pilot’s Operating Handbook (POH), which has to be in the aircraft to be airworthy.

Checkride – You have to prove the aircraft is airworthy to the Examiner. You will take the aircraft logbooks to the exam and show him the following:

1. Engine Logbook – Show the date, any AD’s and if it’s a Annual, 100 hour or Progressive inspection. Name, date and signature of the IA.
2. Aircraft Logbook – Show the date, any AD’s, ELT check, Pitot Static/Transponder check, name, date and signature of IA that should match the date in the Engine Logbook.
3. Propeller Logbook – If fixed Pitch, should be in the aircraft logbook, if constant speed: Show date, any AD’s, name, date and signature of IA.
4. Airworthiness Certificate – This is usually done in the aircraft.
5. Registration Certificate – This is usually done in the aircraft.

Minimum Equipment List – Is a list of that equipment in an airplane that may be inoperative and allow the airplane to maintain an airworthy condition.

A person may takeoff an aircraft with inoperative instruments and without an approved MEL provided:

1. **Non-turbine powered small airplane** - (GA) without a developed **Master Minimum Equipment List**. All twins have a MMEL, G.A. single-engine do not have a MMEL.
2. **Kinds of Operation Equipment List** – The inoperative equipment is not required in the aircraft’s equipment list. Most POH’s have A is required, B is Optional equipment.
3. **FAR 91.205** – Required equipment VFR Day, VFR Night and IFR. VFR Day: GOOSE/AC/ALT/FM. VFR Night: FLAPE. To fly VFR Night you are required to have all VFR Day and Night equipment working.
4. **Airworthiness Directive** – The inoperative equipment is not required to be operational by an AD.

5. **Placarded or Removed/Deactivated** – The inoperative equipment is removed by an A&P (Airframe and Powerplant) or IA (Inspection Authorization) and placarded in the aircraft logbooks **or** deactivated and labeled “inoperative.”

Example: You are flying VFR Day and you notice your green NAV light is inop.

Corrective Action: We are Non-Turbine, NAV light is optional equipment in the equipment list in the POH, It's not required VFR Day equipment, It's not an AD, so I placarded the NAV light switch “INOP”, put it on the SQUAWK List and go flying.

Example: You fly to Columbia Airport. On your departure roll you notice both Gas gauges are zero. You know you have fuel, so you abort takeoff.

Corrective Action: We are non-turbine, gas gauge is optional equipment, but it is required under 91.205 VFR Day required equipment. Since it is required, you call a local FSDO (Flight Standards District Office) and tell them you need a **SPECIAL FLIGHT PERMIT**. The special flight permit allows you to fly legally VFR Day to your maintenance facility to have the repairs done.

Rules to the Special Flight Permit:

1. Must be made VFR Day Only.
2. Only the required crew.
3. Must have and carry the Permit.

Most Special Flight Permits issued offer several day's and have time periods to follow. The FSDO can send the permit via email.

FAR's related to Airworthiness Requirements

§21.197 Special flight permits.

(a) A special flight permit may be issued for an aircraft that may not currently meet applicable airworthiness requirements but is capable of safe flight, for the following purposes:

(1) Flying the aircraft to a base where repairs, alterations, or maintenance are to be performed, or to a point of storage.

§21.199 Issue of special flight permits.

(a) Except as provided in §21.197(c), an applicant for a special flight permit must submit a statement in a form and manner prescribed by the FAA, indicating—

(1) The purpose of the flight.

(2) The proposed itinerary.

(3) The crew required to operate the aircraft and its equipment, e.g., pilot, co-pilot, navigator, etc.

(4) The ways, if any, in which the aircraft does not comply with the applicable airworthiness requirements.

(5) Any restriction the applicant considers necessary for safe operation of the aircraft.

(6) Any other information considered necessary by the FAA for the purpose of prescribing operating limitations.

§39.3 Definition of airworthiness directives.

FAA's airworthiness directives are legally enforceable rules that apply to the following products: aircraft, aircraft engines, propellers, and appliances.

§61.51 Pilot logbooks.

(a) *Training time and aeronautical experience.* Each person must document and record the following time in a manner acceptable to the Administrator:

- (1) Training and aeronautical experience used to meet the requirements for a certificate, rating, or flight review of this part.
- (2) The aeronautical experience required for meeting the recent flight experience requirements of this part.

§91.205 Powered civil aircraft with standard category U.S. airworthiness certificates: Instrument and equipment requirements.

(a) *General.* Except as provided in paragraphs (c)(3) and (e) of this section, no person may operate a powered civil aircraft with a standard category U.S. airworthiness certificate in any operation described in paragraphs (b) through (f) of this section unless that aircraft contains the instruments and equipment specified in those paragraphs (or FAA-approved equivalents) for that type of operation, and those instruments and items of equipment are in operable condition.

(b) *Visual-flight rules (day).* For VFR flight during the day, the following instruments and equipment are required:

- (1) Airspeed indicator.
- (2) Altimeter.
- (3) Magnetic direction indicator.
- (4) Tachometer for each engine.
- (5) Oil pressure gauge for each engine using pressure system.
- (6) Temperature gauge for each liquid-cooled engine.
- (7) Oil temperature gauge for each air-cooled engine.
- (8) Manifold pressure gauge for each altitude engine.
- (9) Fuel gauge indicating the quantity of fuel in each tank.
- (10) Landing gear position indicator, if the aircraft has a retractable landing gear.
- (11) For small civil airplanes certificated after March 11, 1996, in accordance with part 23 of this chapter, an approved aviation red or aviation white anticollision light

system. In the event of failure of any light of the anticollision light system, operation of the aircraft may continue to a location where repairs or replacement can be made.

(12) If the aircraft is operated for hire over water and beyond power-off gliding distance from shore, approved flotation gear readily available to each occupant and, unless the aircraft is operating under part 121 of this subchapter, at least one pyrotechnic signaling device. As used in this section, “shore” means that area of the land adjacent to the water which is above the high water mark and excludes land areas which are intermittently under water.

(13) An approved safety belt with an approved metal-to-metal latching device for each occupant 2 years of age or older.

(14) For small civil airplanes manufactured after July 18, 1978, an approved shoulder harness for each front seat. The shoulder harness must be designed to protect the occupant from serious head injury when the occupant experiences the ultimate inertia forces specified in §23.561(b)(2) of this chapter. Each shoulder harness installed at a flight crewmember station must permit the crewmember, when seated and with the safety belt and shoulder harness fastened, to perform all functions necessary for flight operations.

(15) An emergency locator transmitter, if required by §91.207.

(16) For normal, utility, and acrobatic category airplanes with a seating configuration, excluding pilot seats, of 9 or less, manufactured after December 12, 1986, a shoulder harness.

(c) *Visual flight rules (night)*. For VFR flight at night, the following instruments and equipment are required:

(1) Instruments and equipment specified in paragraph (b) of this section.

(2) Approved position lights.

(3) An approved aviation red or aviation white anticollision light system on all U.S.-registered civil aircraft. Anticollision light systems initially installed after August 11, 1971, on aircraft for which a type certificate was issued or applied for before August 11, 1971, must at least meet the anticollision light standards of part 23, 25, 27, or 29 of this chapter, as applicable, that were in effect on August 10, 1971, except that the color may be either aviation red or aviation white. In the event of failure of any

light of the anticollision light system, operations with the aircraft may be continued to a stop where repairs or replacement can be made.

(4) If the aircraft is operated for hire, one electric landing light.

(5) An adequate source of electrical energy for all installed electrical and radio equipment.

(6) One spare set of fuses, or three spare fuses of each kind required, that are accessible to the pilot in flight

§91.207 Emergency locator transmitters.

(a) Except as provided in paragraphs (e) and (f) of this section, no person may operate a U.S.-registered civil airplane unless—

(c) Batteries used in the emergency locator transmitters required by paragraphs (a) and (b) of this section must be replaced (or recharged, if the batteries are rechargeable)—

(1) When the transmitter has been in use for more than 1 cumulative hour; or

(2) When 50 percent of their useful life (or, for rechargeable batteries, 50 percent of their useful life of charge) has expired, as established by the transmitter manufacturer under its approval.

§91.213 Inoperative instruments and equipment.

(a) Except as provided in paragraph (d) of this section, no person may take off an aircraft with inoperative instruments or equipment installed unless the following conditions are met:

(d) Except for operations conducted in accordance with paragraph (a) or (c) of this section, a person may takeoff an aircraft in operations conducted under this part with inoperative instruments and equipment without an approved Minimum Equipment List provided—

(1) The flight operation is conducted in a—

(i) Rotorcraft, non-turbine-powered airplane, glider, lighter-than-air aircraft, powered parachute, or weight-shift-control aircraft, for which a master minimum equipment list has not been developed; or

(ii) Small rotorcraft, nonturbine-powered small airplane, glider, or lighter-than-air aircraft for which a Master Minimum Equipment List has been developed; and

(2) The inoperative instruments and equipment are not—

(i) Part of the VFR-day type certification instruments and equipment prescribed in the applicable airworthiness regulations under which the aircraft was type certificated;

(ii) Indicated as required on the aircraft's equipment list, or on the Kinds of Operations Equipment List for the kind of flight operation being conducted;

(iii) Required by §91.205 or any other rule of this part for the specific kind of flight operation being conducted; or

(iv) Required to be operational by an airworthiness directive; and

(3) The inoperative instruments and equipment are—

(i) Removed from the aircraft, the cockpit control placarded, and the maintenance recorded in accordance with §43.9 of this chapter; or

(ii) Deactivated and placarded "Inoperative." If deactivation of the inoperative instrument or equipment involves maintenance, it must be accomplished and recorded in accordance with part 43 of this chapter; and

(4) A determination is made by a pilot, who is certificated and appropriately rated under part 61 of this chapter, or by a person, who is certificated and appropriately rated to perform maintenance on the aircraft, that the inoperative instrument or equipment does not constitute a hazard to the aircraft.

An aircraft with inoperative instruments or equipment as provided in paragraph (d) of this section is considered to be in a properly altered condition acceptable to the Administrator.

(e) Notwithstanding any other provision of this section, an aircraft with inoperable instruments or equipment may be operated under a **special flight permit** issued in accordance with §§21.197 and 21.199 of this chapter.

§91.215 ATC transponder and altitude reporting equipment and use.

(a) *All airspace: U.S.-registered civil aircraft.* For operations not conducted under part 121 or 135 of this chapter, ATC transponder equipment installed must meet the performance and environmental requirements of any class of (Mode A) or any class of TSO-C74c (Mode A with altitude reporting capability) as appropriate, or the appropriate class of TSO-C112 (Mode S).

(b) *All airspace.* Unless otherwise authorized or directed by ATC, no person may operate an aircraft in the airspace described in paragraphs (b)(1) through (b)(5) of this section, unless that aircraft is equipped with an operable coded radar beacon transponder having either Mode 3/A 4096 code capability, replying to Mode 3/A interrogations with the code specified by ATC, or a Mode S capability, replying to Mode 3/A interrogations with the code specified by ATC and intermode and Mode S interrogations in accordance with the applicable provisions specified in TSO C-112, and that aircraft is equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations by transmitting pressure altitude information in 100-foot increments. This requirement applies—

(1) *All aircraft.* In Class A, Class B, and Class C airspace areas;

(2) *All aircraft.* In all airspace within 30 nautical miles of an airport listed in appendix D, section 1 of this part from the surface upward to 10,000 feet MSL;

(3) Notwithstanding paragraph (b)(2) of this section, any aircraft which was not originally certificated with an engine-driven electrical system or which has not subsequently been certified with such a system installed, balloon or glider may conduct operations in the airspace within 30 nautical miles of an airport listed in appendix D, section 1 of this part provided such operations are conducted—

(i) Outside any Class A, Class B, or Class C airspace area; and

(ii) Below the altitude of the ceiling of a Class B or Class C airspace area designated for an airport or 10,000 feet MSL, whichever is lower; and

(4) All aircraft in all airspace above the ceiling and within the lateral boundaries of a Class B or Class C airspace area designated for an airport upward to 10,000 feet MSL; and

(5) All aircraft except any aircraft which was not originally certificated with an engine-driven electrical system or which has not subsequently been certified with such a system installed,

(c) *Transponder-on operation.* While in the airspace as specified in paragraph (b) of this section or in all controlled airspace, each person operating an aircraft equipped with an operable ATC transponder maintained in accordance with §91.413 of this part shall operate the transponder, including Mode C equipment if installed, and shall reply on the appropriate code or as assigned by ATC.