

Task III.C - Operation of Systems 8 - Avionics

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Lesson Overview

Objective

To instruct the student on basic avionics in the PA-28A, Warrior.

Reference

- (PHAK) FAA-H-8083_25B
- PA-28-151 POH
- [Slide Presentation](#)

Elements

1. Avionics Master Switch
2. Navigation Equipment
3. Aspen P1000
4. Transponder

Equipment

1. iPad
2. White board and markers
3. PHAK Chapter 24

Schedule

1. Discuss objectives
2. Review material
3. Development
4. Conclusion

Instructor Actions

1. Discuss lesson objectives with student
2. Present the lecture
3. Answer questions the student has
4. Question the student to verify knowledge and note taking
5. Assign certain areas to focus on for homework

Student Actions

1. Listen to presentation
2. Take notes on the lesson
3. Ask questions if further explanation is needed or just curious

Completion Standards

Be able to explain the basic avionics in the aircraft.

Instructor Notes

Attention

Would you try to navigate while driving in Europe without any type of gps? Why should you try to in an airplane if you don't have to!

What

What are avionics.

Why

Why would we need to understand all this complicated looking equipment.

Lesson Objectives

Basic Equipment

The avionics master switch

- The master switch prevents a voltage spike from damaging the avionics by separating the power from the battery master switch and the avionics.
- The avionics master provides power to the GPS, the second radio and the transponder.
- There are 3 discreet switches for each of the aspend displays.
- There is a seperate rocker-switch for the TruTrak Autopilot.

Aspen EFD 1000 Pro PFD / MFD

- Terrain, traffic, and weather
- Synthetic Vision
- Airspeed and altitude tapes
- GPS flight plan map
- Display of real-time winds aloft, OAT, TAS, and ground speed

Engine Monitor - JPI 930

- Used to monitor vital information on Engine.
- Percentage-Power is often used for more precice approach and landing profiles.
- Leaning procedure involves using eghaust temperatures.
- Has a fuel totalizer, but must be reset when plane is refueled to max fuel to be accurate.
ALWAYS VISUALLY INSPECT AND NEVER SOLEY RELY ON TOTALIZER.

Avedyne IFD440 GPS

- Radio 1 / Nav 1 - frequency control.
 1. Used for navigation and communication through the use of 24 constellation Navstar satellite system.
 2. The GPS has a receiver antenna on the top of the airplane that determines the position of the airplane
 3. The satellites are arranged so that there are 5 able to see you at all times. 4 are needed for a 3D position 5 are needed for RAIM and 6 are needed for WAAS, without baro-reference.
 4. Receiver autonomous integrity monitoring system (RAIM) verifies the integrity of the signals

being used.

5. Wide area augmentation system GPS receivers corrects for GPS signal errors caused by atmospheric disturbances, timing, and errors in satellite error.

Transponder

1. What is a transponder? Reports altitude to a secondary radar system when it is "interrogated"
2. There are 3 different types of transponders. Mode A, C and S
3. Mode A will only report a squawk code where mode C will incorporate pressure altitude data. Mode S has ADS-B in and ADS-B out.
4. ADS-B is designed to help over interrogation of the transponder and allow automatic collision avoidance. Mode C uses ACAS II (airborne collision avoidance systems) and ADS-B

Autopilot - TruTrak Vizion

The Warrior is equipped with a digital, three-axis autopilot. **This autoilot is not approved for student use.** Although a basic overview will be given for use in emergency situations such as disorientation.

1. Use of Autolevel button (Blue Button)
2. How to disengage the autopilot.
 - a. Overpowering servo

Conclusion

Avionics are becoming essential to flying for safety and navigation purposes. Flying can be done without avionics but is generally enjoyed more with some type of automation in the cockpit.

ACS Requirements

To determine that the applicant exhibits instructional knowledge of the elements of principles of flight by describing:

1. Primary and secondary flight controls
2. Trim
3. Powerplant and propeller
4. Landing gear
5. Fuel, oil, and hydraulic
6. Electrical
7. **Avionics including autopilot**
8. Pitot static, vacuum/pressure and associated instruments
9. Environmental