III.C. Instrument Cockpit Check

References: 14 CFR part 91, Instrument Flying Handbook (FAA-H-8083-15)

Objectives	The student should develop knowledge of the elements related to checking the instruments prior to flight.
Key Elements	1. Develop a pattern 2. Stick to the pattern
Elements	1. Communications Equipment 2. Navigation Equipment 3. Magnetic Compass 4. Heading Indicator/HSI/RMI 5. Attitude Indicator 6. Altimeter 7. Turn-and-Slip Indicator/Turn Coordinator 8. VSI 9. Airspeed Indicator 10. Outside Air Temperature 11. Clock 12. Pitot Heat 13. Electronic Flight Instrument Display 14. Traffic & Terrain Awareness 15. FMS & Auto Pilot
Schedule	1. Discuss Objectives 2. Review material 3. Development 4. Conclusion
Equipment	1. White board and markers 2. References
IP's Actions	1. Discuss lesson objectives 2. Present Lecture 3. Ask and Answer Questions 4. Assign homework
SP's Actions	1. Participate in discussion 2. Take notes 3. Ask and respond to questions
Completion Standards	The student has developed an effective preflight check for the instruments.

Instructors Notes:

Introduction:

Attention

Interesting fact or attention-grabbing story

Overview

Review Objectives and Elements/Key ideas

What

This will explain how to check the communication, navigation, and other equipment prior to flight.

Why

This is important because, you don't want to discover a problem with your instruments in the clouds where you are entirely reliant on your instruments.

How:

1. **Communications Equipment**
   - A. Loss of communications under IFR may be considered an emergency (FAR 91.185)
     - i. Confirm position, condition, and stability of radio antennas
     - ii. Use all radios prior to flight. Request "radio check" if necessary
     - iii. Transponder on standby, reply light ON during warm-up (or per manufacturer's instructions)
2. **Navigation Equipment**
   - A. VORs
     - i. Confirm position, stability of nav antennas
     - ii. FAR 91.171 - VOR accuracy check within 30 days prior to IFR flight
       - a. Record date, place, bearing error(s) and sign - every 30 days
   - B. DME - Note/verify distance from VOR/DME if available
   - C. ILS - If LOC on field, then tune, identify, note correct indication
   - D. GPS - Confirm IFR approved, certified, and current; follow appropriate start-up and self-test procedures
     - i. Check RAIM availability
3. **Magnetic Compass**
   - A. Fluid filled, moves freely, correctly indicates known headings (taxiways, runways)
4. **Heading Indicator (HI)/Horizontal Situation Indicator (HSI)/Remote Magnetic Indicator (RMI)**
   - A. Note correct indications on known headings during taxi
5. **Attitude Indicator (AI)**
   - A. Allow 5 minutes for gyro spin up (or as applicable), note/adjust horizon bar alignment
   - B. Unreliable if more than 5° of pitch or bank during taxi
6. **Altimeter (ALT)**
   - A. Check maintenance logbook for static system and altimeter check within 24 months (FAR 91.411)
   - B. Check static ports open, clear
   - C. Set to current altimeter setting, and check for error
     - i. Record any ALT error – difference between ALT and field elevation (> 75' requires maintenance)
     - ii. Conservative/safe practice: add any ALT error to the approach MDA or DH
7. **Turn-and-Slip Indicator/Turn Coordinator (TC)**

A. During taxi, ball should move freely to outside of turns; Miniature airplane level

8. **Vertical-Speed Indicator (VSI)**
   A. Check maintenance logbook for static system (and altimeter) check within 24 months (FAR 91.411)
   B. Note/set level indication
9. **Airspeed Indicator**
   A. Check maintenance logbook for static system (and altimeter) check within 24 months (FAR 91.411)
   B. Note airspeed alive and appropriately increasing during initial takeoff roll
10. **Outside Air Temperature**
   A. Note correct indication
11. **Clock**
   A. Confirm proper operation and correct time
12. **Pitot Heat**
   A. Turn on the pitot heat and check to ensure it is operating per the manufacturer's instructions
13. **Electronic Flight Instrument Display**
   A. On power up ensure instruments are displayed properly and any cautions/warnings are normal
   B. Most displays are very clear when an instrument has failed (Ex. Red X across the instrument)
   C. Follow the specific manufacturer's instructions to verify proper operation
14. **Traffic & Terrain Awareness**
   A. Ensure proper operation on power up based on the manufacturer's required procedures
15. **FMS & Auto Pilot**
   A. FMS
      i. Check for proper operation of the FMS as required by the manufacturer
      ii. Ensure proper satellite coverage (check RAIM if necessary), be alert for insufficient satellite signal
   B. Auto Pilot
      i. Check based on the manufacturer's procedures and requirements
      ii. Often includes ensuring that the auto pilot can be disconnected in order to avoid a runway

Conclusion:
Brief review of the main points

PTS Requirements:

To determine that the applicant exhibits instructional knowledge of an instrument cockpit check by describing the reasons for the check and the detection of defects that could affect safe instrument flight. The check shall include:

1. Communications equipment.
2. Navigation equipment.
3. Magnetic compass.
4. Heading indicator/horizontal situation indicator/remote magnetic indicator.
5. Attitude indicator.
6. Altimeter.
7. Turn-and-slip indicator/turn coordinator.
8. Vertical-speed indicator.
9. Airspeed indicator.
10. Outside air temperature.
11. Clock.

12. Pitot Heat.
13. Electronic flight instrument display.
14. Traffic awareness/warning/avoidance system.
15. Terrain awareness/warning/alert system.
16. Flight management system (FMS).
17. Automatic pilot.