

SESSION 45: PARTIAL PANEL — FLYING WITHOUT THE ATTITUDE AND HEADING INDICATOR

1. "Partial panel" flying refers to controlling the aircraft after the loss of:
 - A. One or more primary gyroscopic instruments (typically the attitude and/or heading indicator)
 - B. The radios only
 - C. The engine
 - D. The landing gear

2. After a vacuum failure (losing the attitude and heading indicators), the pilot maintains pitch control primarily using the:
 - A. Magnetic compass
 - B. Airspeed indicator, altimeter, and VSI
 - C. Turn coordinator
 - D. Heading indicator

3. After a vacuum failure, the pilot maintains bank/heading control primarily using the:
 - A. Attitude indicator
 - B. Turn coordinator and magnetic compass
 - C. Altimeter
 - D. Airspeed indicator

4. With the attitude indicator failed, level flight is maintained by keeping the:

- A. Magnetic compass steady only
- B. VSI showing a climb
- C. Altimeter steady (pitch) and the turn coordinator wings-level with the ball centered (bank)
- D. Airspeed increasing

5. A standard-rate turn on partial panel is flown by referencing the:

- A. Attitude indicator
- B. Heading indicator
- C. Magnetic compass alone
- D. Turn coordinator to the standard-rate index, with the ball centered

6. Because the magnetic compass has turning errors, the pilot executing a partial-panel turn to a heading often uses:

- A. Timed turns at a known rate (e.g., standard rate) to roll out near the desired heading
- B. The attitude indicator
- C. The heading indicator
- D. The VSI

7. A timed standard-rate turn changes heading at:

- A. 1 degree per second
- B. 6 degrees per second
- C. 10 degrees per second
- D. 3 degrees per second (so a 90-degree turn takes about 30 seconds)

8. To turn 90 degrees at standard rate on partial panel, the pilot holds the standard-rate turn for approximately:

- A. 15 seconds
- B. 30 seconds
- C. 45 seconds
- D. 60 seconds

9. When rolling out of a partial-panel turn using the magnetic compass, the pilot must account for the compass:

- A. Northerly turning error (lag rolling out near north, lead rolling out near south)
- B. Showing the airspeed
- C. Pitch indication
- D. Inability to show heading at all

10. A "compass turn" to a northerly heading requires the pilot to:

- A. Roll out exactly on the indicated north heading
- B. Roll out after passing north
- C. Roll out before the compass reaches north (because it lags on north)
- D. Disregard the compass

11. A "compass turn" to a southerly heading requires the pilot to:

- A. Roll out after passing south (because the compass leads on south)
- B. Roll out exactly on the indicated south heading
- C. Roll out before reaching south
- D. Disregard the compass

12. The most reliable bank instrument in a partial-panel (no attitude indicator) situation is the:

- A. Magnetic compass
- B. Turn coordinator (with the ball for coordination)
- C. Altimeter
- D. VSI

13. A "no-gyro" approach with ATC is valuable on partial panel because the controller:

- A. Restores the gyros
- B. Provides a backup attitude reference
- C. Flies the aircraft remotely
- D. Issues "turn left/right" and "stop turn" commands the pilot executes with the turn coordinator

14. During a no-gyro approach, ATC instructs the pilot to make turns at standard rate, except:

- A. The pilot uses the attitude indicator instead
- B. The pilot ignores the ball
- C. On final approach, where half-standard-rate turns are typically used
- D. The pilot uses the heading indicator

15. Smooth partial-panel flying depends heavily on:

- A. Aggressive control inputs
- B. A disciplined cross-check of the remaining instruments and small, smooth corrections
- C. Fixating on the magnetic compass
- D. Relying on bodily sensations

16. A pilot on partial panel who needs to descend should use:

- A. The magnetic compass for the descent rate
- B. The turn coordinator for pitch
- C. The heading indicator for pitch
- D. Pitch and power referencing the airspeed, altimeter, and VSI

17. On partial panel, the pilot should reduce workload by:

- A. Increasing airspeed to maximum
- B. Making rapid heading changes
- C. Choosing the simplest approach available and requesting ATC assistance (e.g., a no-gyro or course-based approach)
- D. Disabling the turn coordinator

18. The magnetic compass is least reliable for reading heading when the aircraft is:

- A. Straight, level, and unaccelerated
- B. At cruise altitude
- C. Turning or accelerating/decelerating (dip and acceleration errors)
- D. On a westerly heading in smooth air

19. A pilot losing only the heading indicator (attitude indicator still good) can maintain heading using the:

- A. Turn coordinator only
- B. VSI
- C. Altimeter
- D. Magnetic compass (with attention to its errors) and the attitude indicator for wings-level

20. Practicing partial-panel flying builds proficiency so that a real instrument failure:

- A. Can be handled with a smooth transition to the remaining reliable instruments
- B. Always requires an immediate emergency descent
- C. Forces a visual landing in IMC
- D. Cannot be managed

21. When transitioning to partial panel after a vacuum failure, the pilot should first:

- A. Maintain aircraft control with the remaining instruments, then troubleshoot and advise ATC
- B. Immediately shut off the master switch
- C. Begin a rapid descent
- D. Disregard the turn coordinator

22. The danger of continuing to reference a failed attitude indicator on partial panel is that:

- A. It improves the scan
- B. The compass becomes unreliable
- C. The airspeed reads high
- D. The pilot may follow the false attitude into a loss of control

23. A standard-rate timed turn requires the pilot to use the clock together with the:

- A. Magnetic compass for pitch
- B. Turn coordinator to hold the standard-rate index
- C. Altimeter for bank
- D. VSI for heading

24. Partial-panel proficiency is part of the instrument currency and IPC requirements because:

- A. Loss of primary instruments is a realistic emergency requiring practiced skill
- B. It is required only for commercial pilots
- C. It replaces the need for an attitude indicator
- D. It is a purely academic exercise

25. The fundamental skill of partial-panel flying is to:

- A. Rely on a single instrument
- B. Trust bodily sensations when the gyros fail
- C. Maintain precise control by smoothly cross-checking and interpreting the remaining reliable instruments
- D. Descend immediately in all cases

ANSWER KEY & EXPLANATIONS – SESSION 45

1. A. Loss of gyro instruments — Partial panel refers to controlling the aircraft after losing one or more primary gyroscopic instruments (typically attitude and/or heading indicator).
2. B. ASI/altimeter/VSI for pitch — After a vacuum failure, pitch control is maintained primarily using the airspeed indicator, altimeter, and VSI.
3. B. TC and compass — After a vacuum failure, bank/heading control is maintained primarily using the turn coordinator and magnetic compass.
4. C. Altimeter steady + TC level — Level flight with a failed attitude indicator is maintained by keeping the altimeter steady (pitch) and the turn coordinator wings-level with the ball centered (bank).
5. D. TC standard-rate index — A standard-rate turn on partial panel references the turn coordinator to the standard-rate index, ball centered.

6. A. Timed turns — Because of compass turning errors, partial-panel turns to a heading often use timed turns at a known rate to roll out near the desired heading.

7. D. $3^\circ/\text{sec}$, $90^\circ = 30 \text{ s}$ — A timed standard-rate turn changes heading at 3 degrees per second, so a 90-degree turn takes about 30 seconds.

8. B. 30 seconds — A 90-degree standard-rate turn is held for approximately 30 seconds.

9. A. Northerly turning error — Rolling out using the compass requires accounting for northerly turning error (lag near north, lead near south).

10. C. Roll out before north — A compass turn to north requires rolling out before the compass reaches north (it lags on north).

11. A. Roll out after south — A compass turn to south requires rolling out after passing south (the compass leads on south).

12. B. Turn coordinator — The most reliable bank instrument with no attitude indicator is the turn coordinator (with the ball for coordination).

13. D. ATC turn commands — A no-gyro approach is valuable because ATC issues "turn left/right" and "stop turn" commands the pilot executes with the turn coordinator.

14. C. Half-standard on final — In a no-gyro approach, turns are standard rate except on final approach, where half-standard-rate turns are typically used.

15. B. Cross-check + smooth — Smooth partial-panel flying depends on a disciplined cross-check of the remaining instruments and small, smooth corrections.

16. D. Pitch/power via ASI/alt/VSI — A partial-panel descent uses pitch and power referencing the airspeed, altimeter, and VSI.

17. C. Simplest approach/ATC help — Partial-panel workload is reduced by choosing the simplest approach and requesting ATC assistance (e.g., a no-gyro or course-based approach).

18. C. Turning/accelerating — The magnetic compass is least reliable when turning or accelerating/decelerating (dip and acceleration errors).

19. D. Compass + AI — Losing only the heading indicator, the pilot maintains heading using the magnetic compass (allowing for its errors) and the attitude indicator for wings-level.

20. A. Smooth transition — Practicing partial panel allows a real failure to be handled with a smooth transition to the remaining reliable instruments.

21. A. Control first, then troubleshoot — On transitioning to partial panel, the pilot first maintains control with the remaining instruments, then troubleshoots and advises ATC.

22. D. Follow false attitude — Continuing to reference a failed attitude indicator risks following the false attitude into a loss of control.

23. B. Clock + TC — A standard-rate timed turn uses the clock together with the turn coordinator to hold the standard-rate index.

24. A. Realistic emergency — Partial-panel proficiency is part of currency/IPC because loss of primary instruments is a realistic emergency requiring practiced skill.

25. C. Cross-check remaining instruments — The fundamental skill of partial-panel flying is to maintain precise control by smoothly cross-checking and interpreting the remaining reliable instruments.