SESSION 49: NAVIGATION — GPS OPERATIONS: MODES, ANNUNCIATIONS, AND RAIM

1. An IFR-approved GPS navigator automatically sequences through three CDI sensitivity modes. From cruise to landing these are:

A. Approach, terminal, en route

B. En route, terminal, approach

C. Terminal, en route, approach

D. En route, approach, terminal

2. In the en route mode, the default CDI full-scale sensitivity is approximately:

A. ±0.3 NM

B. ±1 NM

C. ±5 NM

D. ±2.5 degrees

3. As the aircraft nears the departure or destination airport (within ~30 NM), the navigator transitions to terminal mode with a CDI sensitivity of approximately:

A. ±1 NM

B. ±5 NM

C. ±0.3 NM

D. ±2.5 degrees

4. Inside the final approach segment, the navigator transitions to approach mode with a CDI sensitivity of approximately:

A. ±5 NM

B. ±1 NM

C. ±0.3 NM

D. ±10 degrees

5. The increasing CDI sensitivity from en route to approach serves to:

A. Reduce pilot workload by widening the course

B. Disable automatic sequencing

C. Provide progressively finer course guidance toward the runway

D. Pair the DME automatically

6. RAIM (Receiver Autonomous Integrity Monitoring) provides the function of:

A. Pairing the GPS with DME

B. Increasing CDI sensitivity

C. Replacing the database

D. Detecting a satellite signal error and alerting the pilot when integrity cannot be assured

7. A non-WAAS IFR GPS requires RAIM to be available because RAIM:

A. Provides vertical guidance

B. Replaces the magnetic compass

C. Increases the number of satellites

D. Is the integrity check that ensures the position solution is trustworthy for IFR

8. Before relying on a non-WAAS GPS for an IFR approach, the pilot should verify:

A. The autopilot is engaged

B. The DME is tuned

C. RAIM is predicted/available for the approach at the ETA

D. The marker beacons are operative

9. A "RAIM not available" annunciation during an approach means the pilot should:

A. Continue to the published DA regardless

B. Increase the descent rate

C. Disregard it

D. Execute a missed approach or use another approach, as the GPS integrity cannot be assured

10. RAIM availability can be checked before flight using:

A. The magnetic compass

B. The transponder

C. The autopilot

D. A RAIM prediction tool/service or the navigator's RAIM prediction function

11. When the navigator is in approach mode and properly sequenced, it typically displays an annunciation such as:

A. LNAV, LPV, or "approach active"

B. "Terminal" only

C. "En route" only

D. "Suspend" permanently

12. If the navigator fails to transition to approach mode before the final approach fix, the pilot should:

A. Continue to the approach minimums as if it were active

B. Not descend to the approach minimums and consider a missed approach or alternate plan

C. Increase the CDI sensitivity manually

D. Disconnect the autopilot and continue visually

13. Automatic waypoint sequencing advances the active waypoint as the aircraft passes each fix, except when the pilot uses:

A. The "suspend" (SUSP) or OBS mode to hold sequencing

B. The terminal mode

C. The en route mode

D. The RAIM function

14. During radar vectors, the pilot typically places the navigator in suspend/OBS to:

A. Increase sensitivity

B. Disable RAIM

C. Update the database

D. Prevent automatic sequencing to a waypoint not being navigated to

15. In a holding pattern at a GPS waypoint, the navigator is often placed in:

A. En route mode

B. Approach mode

C. Suspend (SUSP) so it does not sequence past the holding fix

D. Terminal mode permanently

16. A current navigation database is required for IFR GPS use because:

A. The receiver will not power on otherwise

B. WAAS requires a daily update

C. The autopilot depends on the revision date

D. Outdated waypoints, procedures, or paths could provide incorrect navigation

17. A suitably equipped IFR GPS may be used as a substitute for which equipment in many operations?

A. The attitude indicator

B. DME and ADF (to identify fixes and intersections)

C. The magnetic compass

D. The altimeter

18. A pilot loading an approach into the GPS must verify the loaded procedure matches:

A. The intended approach and transition/initial fix

B. The aircraft's empty weight

C. The transponder code

D. The departure frequency

19. "Approach mode armed" versus "approach mode active" differ in that "active" means the navigator has:

A. Lost RAIM

B. Increased to ±5 NM

C. Reverted to en route

D. Transitioned to the finer approach sensitivity and is providing approach guidance

20. A pilot monitoring the GPS during an approach should confirm the correct sequencing by watching the:

A. Airspeed only

B. Mode annunciations and the active waypoint advancing as expected

C. Magnetic compass

D. Altimeter only

21. If GPS integrity (RAIM) is lost en route on a non-WAAS unit, the pilot should:

A. Revert to other available navigation (VOR/airways) or request assistance as appropriate

B. Continue solely on the GPS

C. Squawk 7600

D. Descend immediately

22. The CDI on a properly functioning IFR GPS in en route mode behaves:

A. Angularly like a VOR

B. Linearly (constant distance per dot) rather than angularly like a VOR

C. Reverse-sensing

D. Only above 18,000 feet

23. A key difference between GPS course guidance and VOR course guidance is that GPS:

A. Becomes less accurate with distance from a station

B. Provides constant-width (linear) guidance not tied to a ground station's angular geometry

C. Requires a paired DME frequency

D. Uses the magnetic compass

24. A pilot should brief the GPS approach mode behavior so as to:

A. Eliminate the need for a current database

B. Avoid using the autopilot

C. Anticipate the sensitivity transitions and annunciations and verify them in flight

D. Replace the approach chart

25. The fundamental principle of managing GPS modes and RAIM is that the pilot must:

A. Rely on the GPS without monitoring

B. Disable RAIM for approaches

C. Use the GPS at maximum sensitivity at all times

D. Understand and monitor the mode sequencing, sensitivity, and integrity status, reverting or going missed if integrity is lost

ANSWER KEY & EXPLANATIONS — SESSION 49

1. B. En route/terminal/approach — From cruise to landing the GPS sequences en route, terminal, approach.

2. C. ±5 NM en route — En route mode default CDI sensitivity is approximately ±5 NM.

3. A. ±1 NM terminal — Within ~30 NM, terminal mode CDI sensitivity is approximately ±1 NM.

4. C. ±0.3 NM approach — Inside the final approach segment, approach mode sensitivity is approximately ±0.3 NM.

5. C. Finer guidance — Increasing sensitivity provides progressively finer course guidance toward the runway.

6. D. Detect error/alert — RAIM detects a satellite signal error and alerts the pilot when integrity cannot be assured.

7. D. Integrity check for IFR — A non-WAAS IFR GPS requires RAIM because it is the integrity check ensuring the position solution is trustworthy for IFR.

8. C. RAIM predicted — Before a non-WAAS GPS approach, verify RAIM is predicted/available for the approach at the ETA.

9. D. Miss/another approach — A "RAIM not available" annunciation requires executing a missed approach or using another approach, as integrity cannot be assured.

10. D. RAIM prediction tool — RAIM availability can be checked using a RAIM prediction tool/service or the navigator's RAIM prediction function.

11. A. LNAV/LPV/active — In approach mode, the navigator displays an annunciation such as LNAV, LPV, or "approach active."

12. B. Don't descend/miss — If the navigator fails to reach approach mode before the FAF, the pilot must not descend to approach minimums and should consider a missed approach or alternate plan.

13. A. Suspend/OBS — Automatic sequencing advances at each fix except when the pilot uses suspend (SUSP) or OBS mode to hold sequencing.

14. D. Prevent sequencing — On radar vectors, suspend/OBS prevents automatic sequencing to a waypoint not being navigated to.

15. C. Suspend at hold — In a holding pattern at a GPS waypoint, the navigator is often placed in suspend so it does not sequence past the holding fix.

16. D. Outdated data risk — A current database is required because outdated waypoints, procedures, or paths could provide incorrect navigation.

17. B. DME/ADF substitute — A suitably equipped IFR GPS may substitute for DME and ADF to identify fixes and intersections.

18. A. Match intended approach — A loaded approach must be verified to match the intended approach and transition/initial fix.

19. D. Active = finer guidance — "Approach mode active" means the navigator has transitioned to the finer approach sensitivity and is providing approach guidance.

20. B. Annunciations/waypoint advance — Correct sequencing is confirmed by watching the mode annunciations and the active waypoint advancing as expected.

21. A. Revert to other nav — If RAIM is lost en route on a non-WAAS unit, the pilot should revert to other available navigation (VOR/airways) or request assistance.

22. B. Linear, not angular — The IFR GPS CDI in en route mode behaves linearly (constant distance per dot), not angularly like a VOR.

23. B. Constant-width guidance — GPS provides constant-width (linear) guidance not tied to a ground station's angular geometry.

24. C. Anticipate/verify — Briefing the GPS approach mode behavior lets the pilot anticipate the sensitivity transitions and annunciations and verify them in flight.

25. D. Monitor mode/integrity — The fundamental principle is to understand and monitor the mode sequencing, sensitivity, and integrity status, reverting or going missed if integrity is lost.