SESSION 12: CROSS-COUNTRY PLANNING — ALTITUDE SELECTION AND MINIMUM ALTITUDES

1. The Minimum Enroute Altitude (MEA) guarantees:

A. Obstacle clearance and acceptable navigation signal reception for the entire airway segment

B. Obstacle clearance only, with no signal guarantee

C. Signal reception only, with no obstacle guarantee

D. Radar coverage throughout the segment

2. The Minimum Obstruction Clearance Altitude (MOCA) guarantees obstacle clearance for the full segment but guarantees navigation signal reception only:

A. Within 22 nautical miles of the VOR

B. Within 51 nautical miles of the VOR

C. For the entire segment, identical to MEA

D. At the segment midpoint only

3. A pilot may operate at the MOCA rather than the MEA when:

A. The aircraft has no GPS installed

B. Operating at night in mountainous terrain only

C. Within 22 NM of the VOR, where signal reception is assured

D. ATC specifically prohibits the MEA

4. The Minimum Crossing Altitude (MCA) specifies:

A. The lowest altitude at which a fix must be crossed when proceeding toward a higher MEA

B. The maximum altitude permitted on an airway

C. The altitude for receiving a navaid signal at a changeover point

D. The minimum altitude for a holding pattern entry

5. Why does an MCA exist at certain fixes?

A. To mark the boundary of two ARTCC sectors

B. Because rising terrain ahead requires the aircraft to begin climbing before the fix

C. To indicate the maximum usable navaid range

D. To designate a mandatory reporting point

6. The Minimum Reception Altitude (MRA) is the lowest altitude at which:

A. Obstacle clearance is first guaranteed on the segment

B. A holding pattern may be entered

C. A circling approach may be commenced

D. An intersection can be determined using the required navaids

7. The Maximum Authorized Altitude (MAA) is published because:

A. Terrain below requires a minimum height

B. Fuel efficiency degrades above that altitude

C. Above it, navaid signals from different stations may interfere with each other

D. ATC radar cannot reach above it

8. OROCA (Off-Route Obstruction Clearance Altitude) provides obstruction clearance:

A. Only along published airways

B. Only within the terminal area

C. In a defined off-airway quadrant, but with no navigation signal guarantee

D. For radar-vectored segments only

9. When navigating direct via GPS off the airway structure, which altitude provides terrain/obstacle awareness?

A. OROCA, the off-route obstruction clearance altitude

B. The MEA of the nearest airway

C. The MOCA at the nearest VOR

D. The MCA at the nearest fix

10. The MOCA provides obstacle clearance of how much in non-mountainous terrain?

A. 2,000 feet

B. 1,000 feet

C. 500 feet

D. 300 feet

11. A pilot crossing a fix marked with an MCA while climbing to a higher MEA must:

A. Cross the fix at the previous MEA and climb afterward

B. Maintain the MOCA until passing the fix

C. Begin the climb early enough to cross the fix at or above the MCA

D. Request a block altitude from ATC

12. The MEA in mountainous terrain provides obstacle clearance of:

A. 500 feet

B. 1,000 feet

C. 2,000 feet

D. 300 feet

13. An airway segment shows an MEA of 8,000 and a MOCA of 5,500. A pilot navigating solely by the VOR 40 NM from the station should fly at least:

A. 5,500, the MOCA

B. The midpoint of the two, 6,750

C. 4,500, below both values

D. 8,000, the MEA, because signal reception beyond 22 NM is only assured at the MEA

14. An intersection that requires a specific minimum altitude to receive the crossing radial defining it is marked with:

A. An MCA

B. An MEA

C. A MOCA

D. An MRA

15. The fundamental difference between MEA and MOCA is that MEA additionally guarantees:

A. Navigation signal reception for the entire segment

B. A higher obstacle clearance margin

C. Radar contact with ATC

D. Freedom from all turbulence

16. A pilot flying off-airways direct who wants the lowest safe altitude that ensures terrain clearance in that grid area uses:

A. The MOCA from the nearest airway

B. The MAA of the region

C. The MCA at the nearest published fix

D. The OROCA for the affected quadrant

17. A "MOCA" value on an enroute chart is depicted:

A. As the larger, primary altitude figure above the airway

B. With an asterisk, as the smaller figure

C. In a boxed format like a holding altitude

D. Only in the Chart Supplement, never on the chart

18. The MEA may, on some segments, be raised above the obstacle-clearance minimum specifically to ensure:

A. Better fuel economy

B. Compliance with the MAA

C. A mandatory reporting requirement

D. Adequate navigation signal reception or communications

19. A DPE asks: "Which altitude guarantees obstacle clearance but not necessarily navaid reception for the whole segment?" The correct answer is:

A. MEA

B. MRA

C. MCA

D. MOCA

20. OROCA differs from the MEA primarily in that OROCA:

A. Guarantees both obstacle clearance and signal reception

B. Is published only for mountainous regions

C. Provides no guarantee of navigation signal reception or communications

D. Applies only below 3,000 feet AGL

21. A pilot is cleared direct to a distant fix via GPS over remote terrain. To select a safe cruise altitude, the pilot should reference:

A. The MOCA at the departure VOR

B. The MEA of the nearest Victor airway

C. The OROCA for each quadrant the route crosses

D. The MCA at the destination

22. An MCA is typically associated with:

A. A holding pattern at an initial approach fix

B. A fix where the MEA increases in the direction of flight due to terrain

C. The maximum altitude on a jet route

D. A radar handoff point

23. The MEA obstacle clearance in non-mountainous terrain is:

A. 500 feet

B. 1,000 feet

C. 2,000 feet

D. 300 feet

24. A pilot who descends to the MOCA beyond 22 NM from the reference VOR risks:

A. Loss of reliable navigation signal reception

B. Violating the maximum authorized altitude

C. Entering Class A airspace prematurely

D. Exceeding the aircraft's service ceiling

25. When the MEA and MOCA are equal on a segment, this indicates:

A. The segment has no obstacle clearance margin

B. Signal reception is assured for the entire segment at the obstacle-clearance altitude

C. The airway is closed

D. The MAA has been reached

ANSWER KEY & EXPLANATIONS – SESSION 12

1. A. Obstacle + signal — The MEA guarantees both obstacle clearance and acceptable navigation signal reception for the entire airway segment.

2. A. Signal within 22 NM — The MOCA guarantees obstacle clearance for the full segment but assures signal reception only within 22 NM of the VOR.

3. C. Within 22 NM — A pilot may use the MOCA within 22 NM of the VOR, where signal reception is assured.

4. A. Lowest crossing altitude — The MCA is the lowest altitude at which a fix must be crossed when proceeding toward a higher MEA.

5. B. Rising terrain ahead — An MCA exists because rising terrain ahead requires the aircraft to begin climbing before reaching the fix.

6. D. Determine intersection — The MRA is the lowest altitude at which an intersection can be determined using the required navaids.

7. C. Signal interference — The MAA is published because above it, navaid signals from different stations may interfere with each other.

8. C. Off-airway quadrant, no signal — OROCA provides obstruction clearance in a defined off-airway quadrant with no navigation signal guarantee.

9. A. OROCA — When navigating direct via GPS off the airways, OROCA provides terrain/obstacle awareness.

10. B. 1,000 feet — The MOCA provides 1,000 feet of obstacle clearance in non-mountainous terrain.

11. C. Climb to cross at/above MCA — The pilot must begin the climb early enough to cross the MCA fix at or above the specified altitude.

12. C. 2,000 feet — The MEA provides 2,000 feet of obstacle clearance in designated mountainous terrain.

13. D. 8,000 MEA — At 40 NM (beyond 22 NM) signal reception is assured only at the MEA, so the pilot must fly 8,000.

14. D. MRA — An intersection requiring a minimum altitude to receive its defining radial is marked with an MRA.

15. A. Signal for whole segment — MEA additionally guarantees navigation signal reception for the entire segment.

16. D. OROCA — Off-airways direct, the lowest safe altitude ensuring terrain clearance in a grid area is the OROCA.

17. B. Asterisk, smaller figure — The MOCA is depicted with an asterisk as the smaller of the two altitude figures.

18. D. Signal/communications — The MEA may be raised above the obstacle minimum to ensure adequate navigation signal reception or communications.

19. D. MOCA — The MOCA guarantees obstacle clearance but not necessarily navaid reception for the whole segment.

20. C. No signal guarantee — OROCA differs from MEA in that it provides no guarantee of navigation signal reception or communications.

21. C. OROCA per quadrant — For direct GPS routing over remote terrain, the OROCA for each quadrant crossed provides the safe cruise reference.

22. B. MEA increases ahead — An MCA is associated with a fix where the MEA increases in the direction of flight due to terrain.

23. B. 1,000 feet — The MEA provides 1,000 feet of obstacle clearance in non-mountainous terrain.

24. A. Loss of signal — Descending to the MOCA beyond 22 NM from the reference VOR risks loss of reliable navigation signal reception.

25. B. Signal assured at obstacle altitude — Equal MEA and MOCA indicate signal reception is assured for the entire segment at the obstacle-clearance altitude.