SESSION 48: NAVIGATION — DME ARCS: PROCEDURES AND ERROR CORRECTION

1. A DME arc is a curved flight path flown at a constant:

A. Distance (DME) from the station

B. Radial from the station

C. Altitude only

D. Airspeed

2. To fly a DME arc, the aircraft maintains a constant DME reading by flying a series of:

A. Straight legs directly to the station

B. Constant-radius circles

C. Short straight segments, periodically turning to keep the station off the wingtip

D. Reciprocal headings

3. When established on a DME arc with no wind, the VOR station should be located approximately:

A. Directly ahead of the aircraft

B. Directly behind the aircraft

C. At the aircraft's tail

D. Off the wingtip (90 degrees to the aircraft's track)

4. The "turn ten, twist ten" technique for flying an arc means:

A. Turn 10 degrees of bank only

B. Turn the OBS 10 degrees first

C. After flying about 10 degrees of arc, turn the heading ~10 degrees and twist the OBS ~10 degrees to the next radial

D. Fly 10 miles then turn

5. During an arc, if the DME distance is increasing (aircraft drifting outside the arc), the pilot should:

A. Turn slightly toward the station to decrease the distance back to the arc

B. Turn away from the station

C. Increase airspeed

D. Maintain heading

6. During an arc, if the DME distance is decreasing (aircraft inside the arc), the pilot should:

A. Turn toward the station

B. Turn slightly away from the station to increase the distance back to the arc

C. Descend

D. Reverse course

7. To intercept a DME arc from a radial inbound to the station, the pilot leads the turn onto the arc by approximately:

A. 10 miles

B. 0.5 NM (a half-mile lead at typical speeds)

C. 2 NM

D. 5 NM

8. The lead distance for turning onto a DME arc depends on:

A. The OBS setting

B. The altitude only

C. The aircraft's groundspeed (faster requires a greater lead)

D. The radial number

9. A "lead radial" on a published arc procedure is provided to:

A. Set the altitude

B. Identify the station

C. Mark the missed approach

D. Tell the pilot when to begin the turn off the arc onto the final approach course

10. While flying an arc, the pilot keeps the station off the wingtip primarily by referencing the:

A. Glideslope

B. Bearing pointer (RMI/HSI) or the VOR radials, combined with the DME

C. Altimeter

D. Airspeed indicator

11. In a no-wind condition, to fly a clockwise arc (station to the left), the pilot keeps the bearing pointer pointing toward:

A. The nose

B. The tail

C. The left wingtip (90 degrees left)

D. The right wingtip

12. A wind blowing the aircraft toward the station while on the arc will cause the DME to:

A. Increase, requiring a turn toward the station

B. Stay constant automatically

C. Read zero

D. Decrease, requiring a turn away from the station and a wind correction

13. When turning off the arc onto the final approach course, the pilot uses the:

A. Wingtip reference only

B. Lead radial to begin the turn so as to roll out established on the final course

C. DME alone

D. Airspeed to time the turn

14. The "twist" portion of "turn ten, twist ten" updates the:

A. Heading bug

B. OBS to the next reference radial so the CDI shows arc position

C. Altimeter setting

D. DME range

15. Maintaining a precise arc requires frequent cross-reference between the:

A. DME distance and the radial/bearing to the station

B. Altimeter and VSI

C. Airspeed and heading only

D. Magnetic compass and clock

16. A pilot flying a 15 DME arc notices the DME reading 15.8 and increasing. The aircraft is:

A. Inside the arc

B. Outside the arc; turn toward the station to regain 15 DME

C. On the arc

D. Over the station

17. A DME arc is commonly used on an instrument approach as a:

A. Missed approach segment only

B. Holding pattern

C. Final approach segment

D. Transition (feeder) route connecting the en route structure to the final approach course

18. Flying the arc with small, frequent heading changes (rather than a continuous turn) is preferred because it:

A. Increases airspeed

B. Eliminates wind correction

C. Keeps the workload manageable and the arc accurate using standard instruments

D. Avoids using the DME

19. With a strong crosswind on the arc, the pilot must:

A. Adjust the wingtip reference and apply wind correction to hold the constant DME

B. Ignore the wind

C. Fly the reciprocal

D. Increase the bank to 30 degrees

20. The bearing pointer of an RMI/HSI is especially useful on an arc because it:

A. Continuously points to the station, making it easy to keep it on the wingtip

B. Shows the airspeed

C. Displays the glideslope

D. Indicates the altitude

21. If a pilot overshoots the arc to the outside during the intercept, the correction is to:

A. Reverse course

B. Continue outbound

C. Climb

D. Turn inbound toward the station to re-establish the arc distance

22. The DME used for an arc provides:

A. Bearing to the station

B. The glideslope angle

C. Lateral course guidance

D. Slant-range distance to the station, kept constant on the arc

23. A pilot transitioning from the arc to the final approach course should have already:

A. Identified the lead radial and briefed the final course and altitudes

B. Cancelled the approach

C. Descended to the MDA

D. Entered a hold

24. Flying a DME arc demands that the pilot integrate:

A. Only the heading indicator

B. DME distance, bearing/radial information, heading, and wind correction

C. Only the altimeter

D. The transponder and audio panel

25. The fundamental skill of flying a DME arc is to:

A. Fly directly to the station

B. Maintain the OBS at the aircraft heading

C. Maintain a constant distance from the station using small heading changes and continuous DME/bearing cross-reference, then transition onto the final course at the lead radial

D. Disregard the DME

ANSWER KEY & EXPLANATIONS – SESSION 48

1. A. Constant distance — A DME arc is a curved path flown at a constant distance (DME) from the station.

2. C. Short straight segments — A DME arc is flown as a series of short straight segments, periodically turning to keep the station off the wingtip.

3. D. Off the wingtip — Established on the arc with no wind, the station is approximately off the wingtip (90 degrees to track).

4. C. Turn ~10°, twist OBS ~10° — "Turn ten, twist ten" means after about 10 degrees of arc, turn the heading ~10 degrees and twist the OBS ~10 degrees to the next radial.

5. A. Turn toward station — If the DME is increasing (outside the arc), turn slightly toward the station to decrease the distance back to the arc.

6. B. Turn away from station — If the DME is decreasing (inside the arc), turn slightly away from the station to increase the distance back to the arc.

7. B. ~0.5 NM lead — Intercepting an arc, the turn is led by approximately 0.5 NM at typical speeds.

8. C. Groundspeed — The lead distance depends on the aircraft's groundspeed (faster requires a greater lead).

9. D. When to turn off — A lead radial tells the pilot when to begin the turn off the arc onto the final approach course.

10. B. Bearing pointer/radials + DME — The station is kept off the wingtip by referencing the bearing pointer or VOR radials, combined with the DME.

11. C. Left wingtip — For a clockwise arc with the station to the left, the bearing pointer points toward the left wingtip (90 degrees left).

12. D. Decrease, turn away — A wind blowing the aircraft toward the station decreases the DME, requiring a turn away from the station and a wind correction.

13. B. Lead radial — Turning off the arc onto final, the pilot uses the lead radial to begin the turn so as to roll out established on the final course.

14. B. OBS to next radial — The "twist" updates the OBS to the next reference radial so the CDI shows arc position.

15. A. DME and radial/bearing — A precise arc requires frequent cross-reference between the DME distance and the radial/bearing to the station.

16. B. Outside, turn toward — On a 15 DME arc reading 15.8 and increasing, the aircraft is outside the arc; turn toward the station to regain 15 DME.

17. D. Transition/feeder route — A DME arc is commonly used as a transition (feeder) route connecting the en route structure to the final approach course.

18. C. Manageable workload — Small, frequent heading changes keep the workload manageable and the arc accurate using standard instruments.

19. A. Adjust reference + WCA — With a strong crosswind, the pilot adjusts the wingtip reference and applies wind correction to hold the constant DME.

20. A. Points to station — The bearing pointer continuously points to the station, making it easy to keep it on the wingtip.

21. D. Turn inbound — Overshooting the arc to the outside is corrected by turning inbound toward the station to re-establish the arc distance.

22. D. Slant range — The DME provides slant-range distance to the station, kept constant on the arc.

23. A. Identify lead radial/brief — Transitioning from the arc to final, the pilot should have already identified the lead radial and briefed the final course and altitudes.

24. B. Integrate DME/bearing/heading/wind — Flying an arc integrates DME distance, bearing/radial information, heading, and wind correction.

25. C. Constant distance + transition — The fundamental skill is to maintain a constant distance using small heading changes and continuous DME/bearing cross-reference, then transition onto the final course at the lead radial.