RADIO NAVIGATION

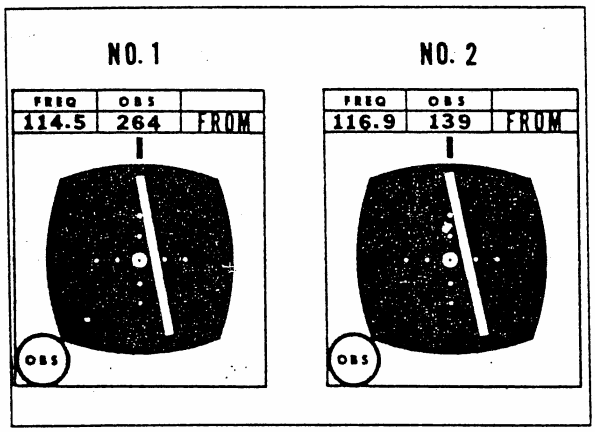
General

All radio aids are oriented to magnetic direction.

The only way to identify a VOR, TACAN or NDB is by reception of the Morse Code or voice identification. If you do not receive any identification, the station is unusable, even though you may be receiving a strong navigational signal. If you receive a single coded identification once every 30 seconds, the VOR is inoperative and the DME is operative.

VOR (Very High Frequency Omnirange)

VOR Components:



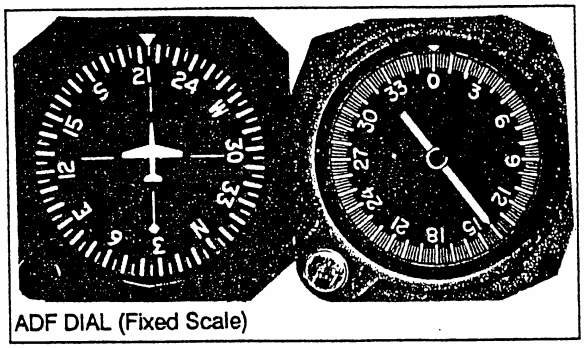
Omnibearing selector (OBS) enables you to select the course you wish to fly. This selector should always agree with your course or heading. If reading a VOR indicator, imagine the aircraft on the same heading as the OBS.

TO-FROM flag tells you if flying the course selected will take you closer TO or farther FROM the VOR station. Station passage occurs with the first positive, complete reversal of the TO-FROM indicator.

Left-Right needle tells you, if flying the course selected, to turn right or left to center the needle and put you on course. Full needle deflection indicates 10 to 12 degrees off course. Be able to compute the miles off course by knowing that one degree off course at 60 miles distance is one mile off course.

To interpret airplane position from a VOR indication, imagine the airplane to be on the same heading as OBS, either going closer TO or farther FROM the VOR (as indicated by TO-FROM flag), and having to turn towards the needle to get on course. On a back course approach imagine the airplane to be on the inbound front course heading.

ADF (Automatic Direction Finder)


ADF DIAL (Fixed Scale)

ADF (Automatic Direction Finder) (Cont)

ADF needle always points to the station, and shows relative bearing. This changes as the heading changes.

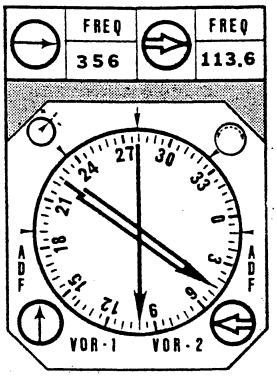
MH + RB = MBto

MH = Magnetic Heading is the angle between magnetic north and the nose of the airplane. RB = Relative Bearing is the angle (clockwise) from the nose of the airplane to the station.

MBto = Magnetic Bearing to the station is the direction you must fly to get to the station. It is the reciprocal of the radial on which you are located.

MBfrom = Magnetic Bearing from the station is the reciprocal of MBto, and is the radial on which you are located.

RMI (Radio Magnetic Indicator)



The RMI does just what the ADF indicator does:
it points to the station. The only difference is that the card which shows the bearing will rotate and is connected to the compass system. The nose of the airplane is shown with the magnetic heading.

Needle 1 is tuned to an NDB with frequency 356 KHz, Relative bearing to the station is 180 degrees.
Magnetic bearing to the station is 100 degrees.

Needle 2 is tuned to VOR with frequency 113.6 MHz. Relative bearing to the station is 125 degrees. Magnetic bearing to the station is 045 degrees, and the aircraft is on the 225 radial.

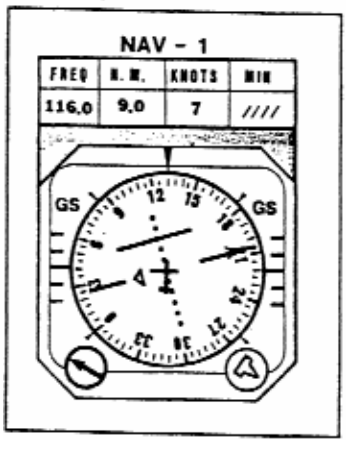
RMI can be used with VOR or ADF, and the needle points to your magnetic bearing to the station.

Your bearing from the station is the radial on which you are located, shown by the tail of the RMI needle. Find your bearing to the station, then take the reciprocal.

If on a right-hand DME arc with a right crosswind, the needle will be ahead of the right wingtip reference.

HSI (Horizontal Situation Indicator)

The HSI shows:



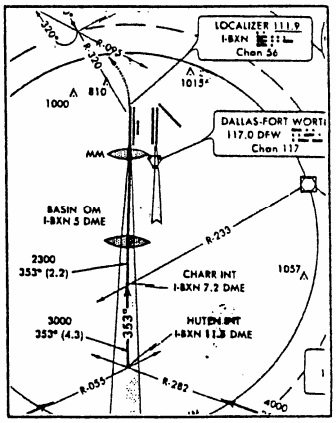
-Aircraft heading, at top of instrument, is 130 degrees.
-OBS setting, shown by arrowhead, is 205 degrees.
-TO-FROM indicator shows FROM since arrow points away from OBS arrowhead
-Left-Right indicator shows getting closer to the selected course.
-Glide slope information, if tuned to ILS localizer frequency.

DME (Distance Measuring Equipment)

DME measures the line of sight distance (slant range) in nautical miles from the airplane to the ground VORTAC. If you are over the VORTAC at 6,000 AGL, the DME would show one mile, because you are that far from the station. The greatest errors occur at high altitudes close to the station.

As a rule of thumb, you should be one or more miles from the station for each 1000 feet of altitude above the facility for the DME to be considered accurate.

ILS (Instrument Landing System)



ILS minimums are normally 200 feet DH and minimum visibility of one-half mile.

The ground components are:

Localizer - frequencies of 108. 1 - 111.9 MHz, odd tenths only.
-Morse code ident is preceded by the letter I (I-MSY).
-2 1/2 degrees off course fully deflects the needle.
-Drift corrections inside the FAF should be no greater than 2 degrees.

Glideslope - uses UHF frequencies automatically paired with the localizer frequency.
- normally intercepts MM at 200 AGL
- Your rate of descent on the glide slope increases with your groundspeed.

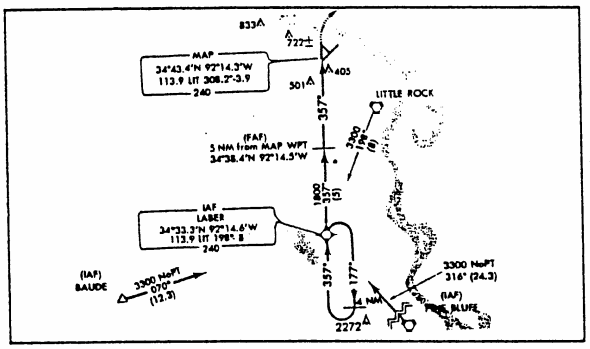
Outer Marker - located about 5 miles from the end of the runway.
- Identified by a series of continuous dashes and a blue light.

Middle Marker - 3500 feet from end of runway.
-Identified by a series of dot dash combinations and an amber light.

Other possible components:

Inner Marker - located at your decision height on the glide slope.
-Identified by a series of six dots per second and a white light.

Compass Locator - an NDB located at OM or MM.
-Identified by two letter Morse code.
A compass locator at the outer marker (LOM) is identified by the first two letters of the ILS, and a compass locator at the middle marker (LMM) is identified by the second two letters of the ILS. At New Orleans, where the ILS identifier is I-MSY, the LOM identifier would be MS and the LMM identifier would be SY.



RNAV (Area Navigation)

Requires any approved RNAV receiver.

Waypoint is a predetermined geographical position used on an RNAV route or RNAV instrument approach.

Microwave Landing System (MLS)

The MLS is similar to the ILS, but also provides precision distance measuring equipment. Identification consists of a three letter identifier preceded by the Morse Code letter M.

Signal coverage extends to 20,000 feet, 40 degrees either side of centerline, and 20 NM front course and 7 NM back course.

4069.
What is a waypoint when used for an IFR flight?

A) A predetermined geographical position used for an RNAV route or an RNAV instrument approach.
B) A reporting point defined by the intersection of two VOR radials.
C) A location on a victor airway which can only be identified by VOR and DME signals.

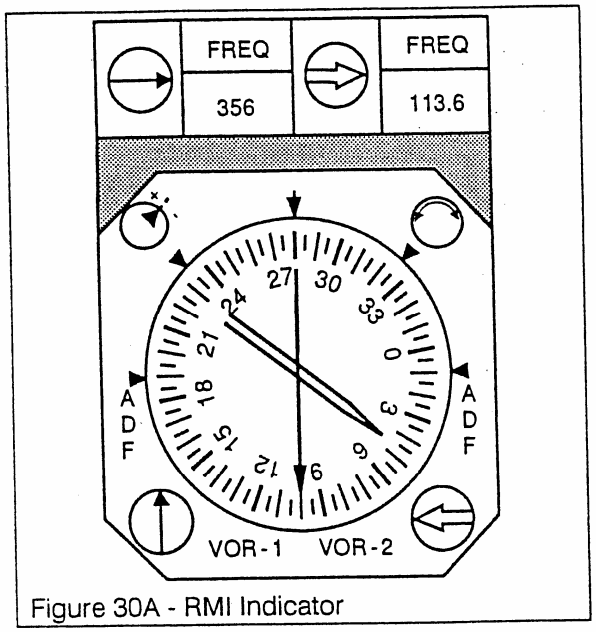


Figure 30A - RMI Indicator

4269. H832 IRA
(Refer to figure 30.) During the arc portion of the instrument departure procedure (GNATS 1. MOURN) a left crosswind is encountered. Where should the bearing pointer of the RMI be referenced relative to the wingtip to compensate for wind drift and maintain the I 5DME arc?

A) Behind the right wingtip reference point.
B) On the right wingtip reference point.
C) Behind the left wing tip reference point.

4272. J40 IRA
(Refer to figures 30 and 30A.) What is your position relative to GNATS intersection and the instrument departure routing?

A) On departure course and past GNATS.
B) Right of departure course and past GNATS.
C) Left of departure course and have not passed GNATS.

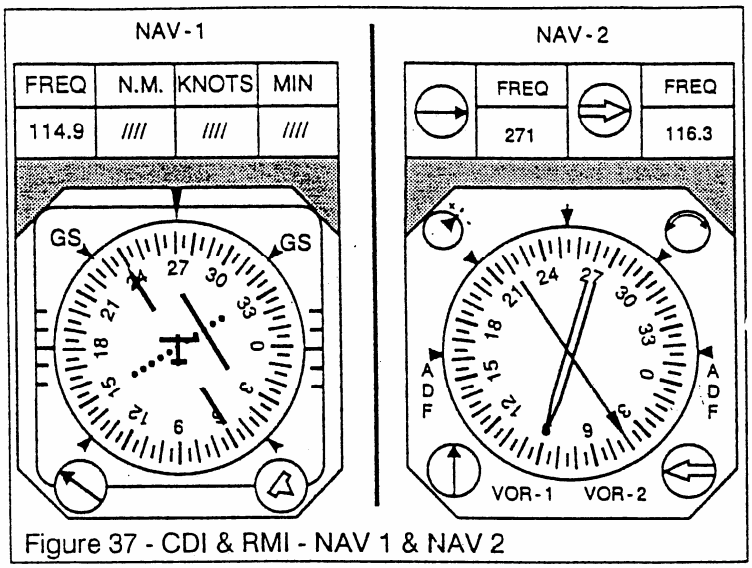


Figure 37 - CDI & RMI - NAV 1 & NAV 2

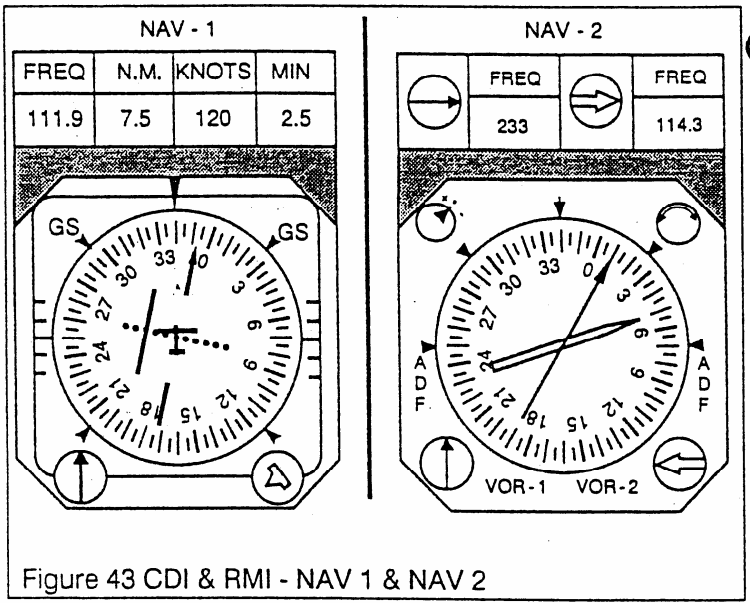


Figure 43 CDI & RMI - NAV 1 & NAV 2

4281. J40 IRA
(Refer to figures 35 and 37.) What is your position relative to the CONNY intersection on the BUJ.BUJ3 transition?

A) Left of the TXK R-272 and approaching the BUJ R-059°.
B) Left of the TXK R-266 and past the BUJ R-065.
C) Right of the TXK R-270 and approaching the BUJ R-245.

4284. K26 IRA
How can a pilot determine if a Global Positioning System (GPS) installed in an aircraft is approved for IFR enroute and IFR approaches?

A) Flight manual supplement.
B) GPS operator's manual.
C) Aircraft owner's handbook.

4285. J42 IRA
(Refer to figures 36A) What is the minimum number of waypoints required for the complete RNAV RWY 33 approach procedure including the IAFs and missed approach procedure?

A) One waypoint.
B) Two waypoints.
C) Three waypoints.

4296. J42 IRA
(Refer to figures 42A) Which navigational information and services would be available to the pilot when using the localizer frequency?

A) Localizer and glide slope, DME, TACAN with no voice capability.
B) Localizer information only, ATIS and DME are available.
C) Localizer and glide slope, DME, and no voice capability.

4299. J40 IRA
(Refer to figures 42A and 43.) What is your position relative to CHAAR intersection? The aircraft is level at 3,000 feet MSL.

A) Right of the localizer course approaching CHAAR intersection and approaching the glide slope.
B) Left of the localizer course approaching CHAAR intersection and below the glide slope.
C) Right of the localizer course, past CHAAR intersection and above the glide slope.

4304. J40 IRA
(Refer to figures 46 and 48.) What is your position relative to the 9 DME ARC and the 206° radial of the Instrument departure procedure?

A) On the 9 DME arc and approaching R-206.
B) Outside the 9 DME arc and past R-206.
C) Inside the 9 DME arc and approaching R-206.

NOTE: CORRECT ANSWER IN BOLD ITALICS

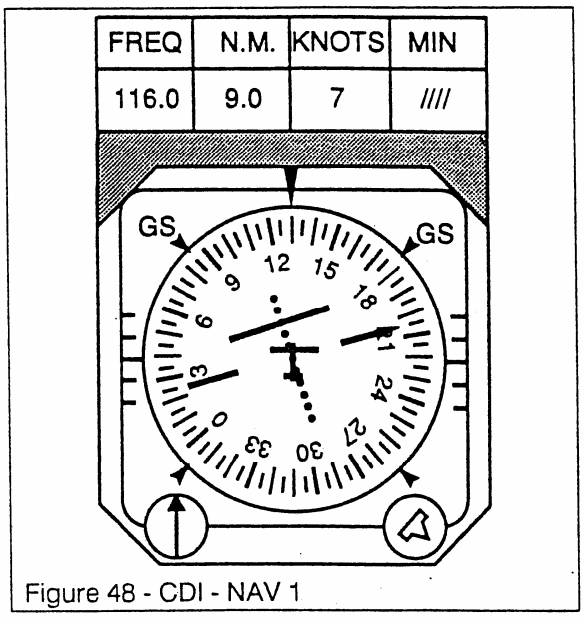


Figure 48 - CDI - NAV 1

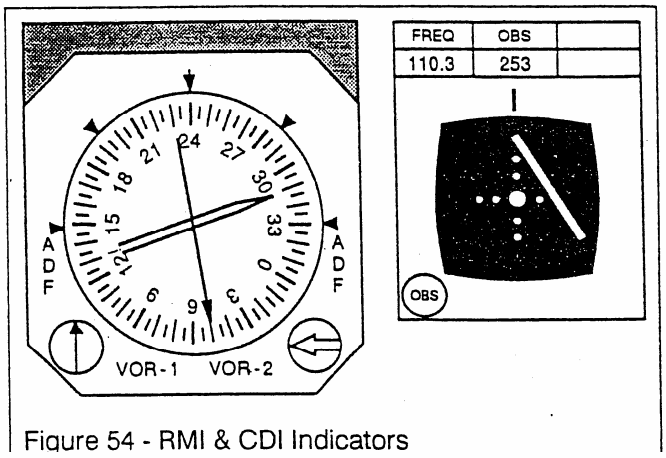


Figure 54 - RMI & CDI Indicators

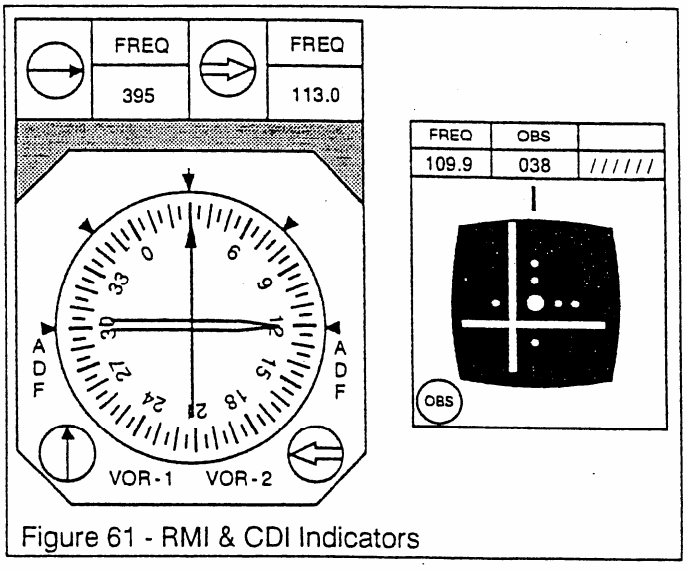


Figure 61 - RMI & CDI Indicators

4306.
(Refer to figure 49.) What determines the MAP on the LOC/DME RWY 21 approach at Portland international Airport?

A) I-GPO 1.2 DME.
B) 5.8 NM from ROBOT FAF.
C) 160 radial of BTG VORTAC.

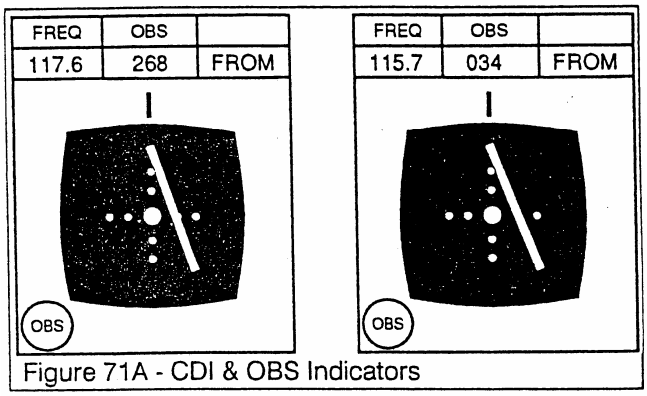


Figure 71A - CDI & OBS Indicators

4308.
(Refer to figure 49.) When conducting the LOC/DME RWY 21 approach at PDX, what is the Minimum Safe Altitude (MSA) while maneuvering between the BTG VORTAC and CREAK intersection?

A) 3,400 feet MSL.
B) 5,700 feet MSL
C) 6,100 feet MSL.

4310.
(Refer to figure 49.) With a groundspeed of 120 knots, approximately what maximum rate of descent will be required between I-GPO 7 DME fix (ROBOT) and the I-GPO 4 DME fix?

A) 200 fpm.
B) 500fpm.
C) 800 fpm.

4311. J42 IRA
(Refer to figure 49.) What is the usable runway length for landing on runway 21 at PDX?
A) 7,900 feet.
B) 7,000 feet.
C) 5,957 feet.

4315.
(Refer to figures 52 and 54.) What is the aircraft's position relative to the HABUT intersection? (The VOR-2 is tuned to 116.5)
A) South of the localizer and past the GVO R-163.
B) North of the localizer and approaching the GVO R-163.
C) South of the localizer and approaching the GVO R-163.

4326.
(Refer to figure 58.) Which indications on the VOR receivers and DME at the Easterwood Field VOR receiver checkpoint would meet the regulatory requirements for this flight?

	VOR 1	TO/FROM	VOR 2	TO/FROM	DME
A)	097°	FROM	101°	FROM	3.3
B)	097°	TO	096°	TO	3.2
C)	277°	FROM	280°	FROM	3.3

4331. J40 IRA
(Refer to figures 60A, and 61.) What is your position relative to the PLATS intersection, glide slope, and the localizer course?
A) Past PLATS, below the glide slope, and right of the localizer course.
B) Approaching PLATS, above the glide slope, and left of the localizer course.
C) Past PLATS, above the glide slope, and right of the localizer course.

4338. J40 IRA
(Refer to figures 65 and 66.) What is your position relative to GRICE intersection?

A) Right of V552 and approaching GRICE intersection.
B) Right of V552 and past GRICE intersection.
C) Left of V552 and approaching GRICE intersection.

4347.
(Refer to Figures 71 and 71A.) What is your position relative to the Flosi intersection Northbound on V213?

A) West of V213 and approaching the Flosi intersection.
B) East of V213 and approaching the Flosi intersection.
C) West of V213 and past the Flosi intersection.

4353. J01 IRA
(Refer to figure 73) Which sequence of marker beacon indicator lights, and their respective codes, will you receive on the ILS RWY 6 approach procedure to the MAP?

A) Blue - alternate dots and dashes; amber -dashes.
B) Amber - alternate dots and dashes; blue -dashes.
C) Blue - dashes; amber - alternate dots and dashes.

4367.
(Refer to Figures 78 and 79.) What is your position relative to the VOR COP southeast bound on V86 between the Bozeman and Livingston VORTACs? The No. 1 VOR is tuned to 116.1 and the No. 2 VOR is tuned to 112.2.

A) Past the LVM R-246 and west of the BZN R-110.
B) Approaching the LVM R-246 and west of the BZN R-110.
C) Past the LVM R-246 and east of the BZN R-110.

4397.
Which distance is displayed by the DME indicator?

A) Slant range distance in NM.
B) Slant range distance in SM.
C) Line-of-sight direct distance from aircraft to VORTAC in SM.

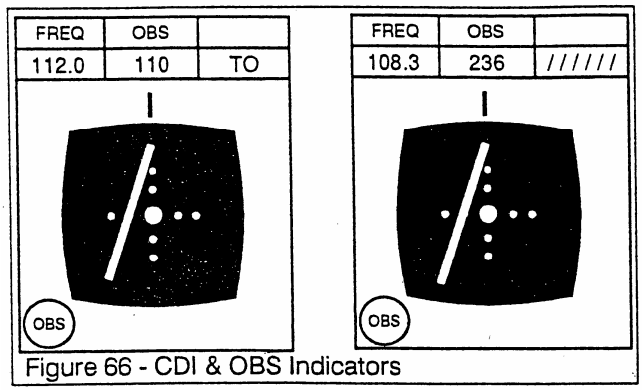


Figure 66 - CDI & OBS Indicators

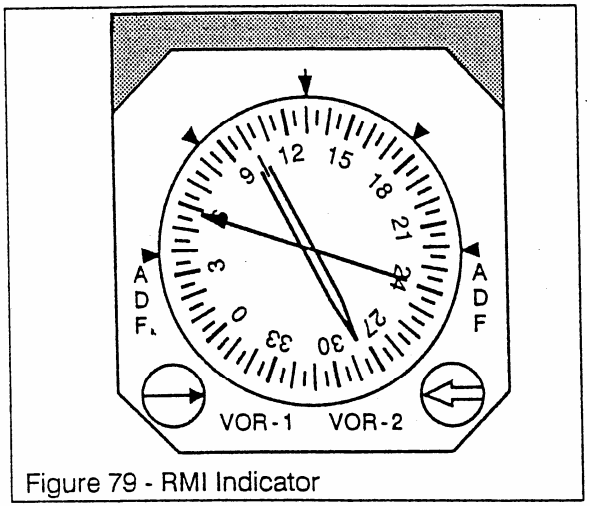


Figure 79 - RMI Indicator

NOTE: CORRECT ANSWER IN BOLD ITALICS

4399. J01 IRA
Where does the DME indicator have the greatest error between ground distance to the VORTAC and displayed distance?

A) High altitudes far from the VORTAC.
B) High altitudes close to the VORTAC.
C) Low altitudes far from the VORTAC.

4410. J01 IRA
What indication should a pilot receive when a VOR station is undergoing maintenance and may be considered unreliable?

A) No coded identification, but possible navigation indications.
B) Coded identification, but no navigation indications.
C) A voice recording on the VOR frequency announcing that the VOR is out of service for maintenance.

4411.
A particular VOR station is undergoing routine maintenance. This is evidenced by

A) removal of the navigational feature.
B) broadcasting a maintenance alert signal on the voice channel.
C) removal of the identification feature.

4412. J01 IRA
What is the meaning of a single coded identification received only once approximately every 30 seconds from a VORTAC?

A) The VOR and DME components are operative.
B) VOR and DME components are both operative, but voice identification is out of service.
C) The DME component is operative and the VOR component is inoperative.

4413. J01 IRA
Which DME indication should you receive when you are directly over a VORTAC site at approximately 6,000 feet AGL?
A) 0.
B) 1.
C)1.3.

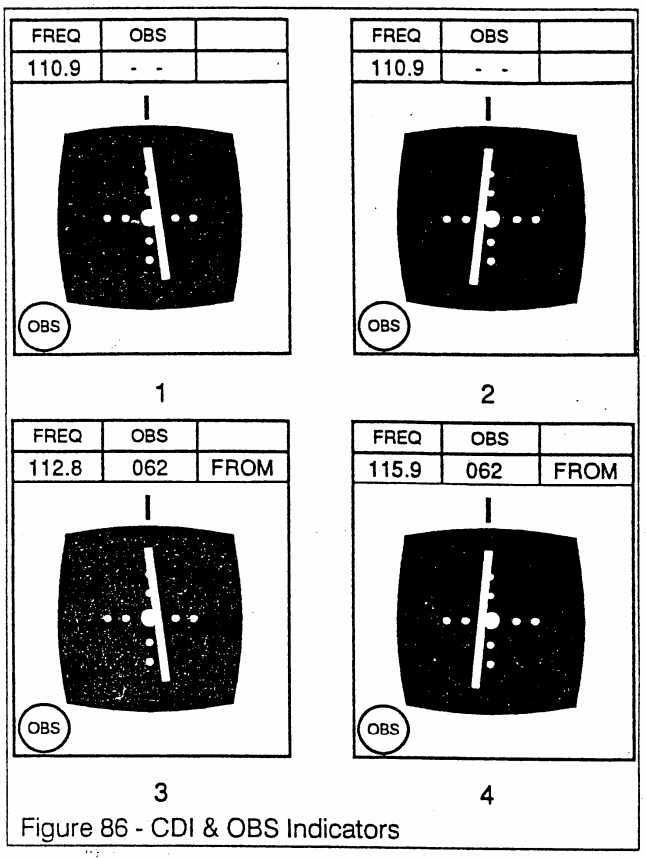


Figure 86 - CDI & OBS Indicators

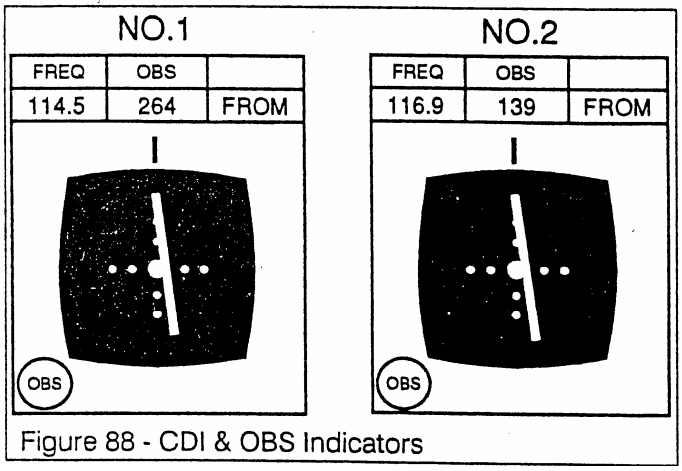


Figure 88 - CDI & OBS Indicators

4472. H832 IRA
As a rule of thumb, to minimize DME slant range error, how far from the facility should you be to consider the reading as accurate?

A) Two miles or more for each 1,000 feet of altitude above the facility.
B) One or more miles for each 1,000 feet of altitude above the facility.
C) No specific distance is specified since the reception is line-of-sight.

NOTE: CORRECT ANSWER IN BOLD ITALICS

4487. H832 IRA
As a rule of thumb, to minimize DME slant range error, how far from the facility should you be to consider the reading as accurate?

A) Two miles or more for each 1,000 feet of altitude above the facility.
B) One or more miles for each 1,000 feet of altitude above the facility.
C) No specific distance is specified since the reception is line-of-sight.

4488. J40 IRA
(Refer to figures 85 and 86.) Which combination of indications confirm that you are approaching WAGGE intersection slightly to the right of the LOC centerline on departure?

A) 1 and 3.
B) 1 and 4.
C) 2 and 3.

4495. J17 IRA
(Refer to figures 87 and 88.) What is your position with reference to FALSE intersection (V222) if your VOR receivers indicate as shown?

A) South of V222 and east of FALSE intersection.
B) North of V222 and east of FALSE intersection.
C) South of V222 and west of FALSE intersection.

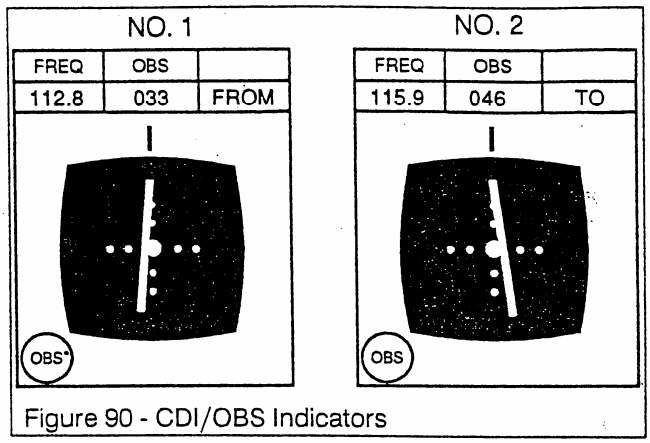


Figure 90 - CDI/OBS Indicators

4507. J35 IRA
(Refer to Figures 89 and 90.) What is your relationship to the airway while en route from BCE VORTAC to HVE VORTAC on V8?

A) Left of course on V8.
B) Left of course on V382.
C) Right of course on V8.

4548. H831 IRA
What angular deviation from a VOR course centerline is represented by a full-scale deflection of the CDI?

A) 4°.
B) 5°
C) 10°.

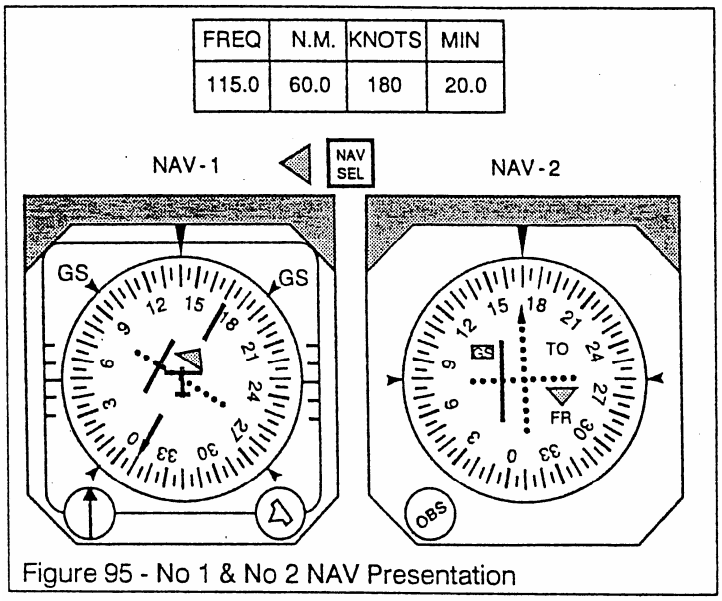


Figure 95 - No 1 & No 2 NAV Presentation

4549. H831 IRA
When using VOR for navigation, which of the following should be considered as station passage?

A) The first movement of the CDI as the airplane enters the zone of confusion.
B) The moment the TO-FROM indicator becomes blank.
C) The first positive, complete reversal of the TO-FROM indicator.

4550. H831 IRA
Which of the following should be considered as station passage when using VOR?

A) The first flickering of the TO-FROM indicator and CDI as the station is approached.
B) The first full-scale deflection of the CDI.
C) The first complete reversal of the TO-FROM indicator.

4551. H831 IRA
When checking the sensitivity of a VOR receiver, the number of degrees in course change as the OBS is rotated to move the CDI from center to the last dot on either side should be between

A) 5° and 6°. .
B) 8° and 10°.
C) 10° and 12°.

4552. H576 IRA
A VOR receiver with normal five-dot course sensitivity shows a three-dot deflection at 30 NM from the station. The aircraft would be displaced approximately how far from the course centerline?

A) 2 NM.
B) 3 NM.
C) 5NM.

4553. I08 IRA
An aircraft which is located 30 miles from a VOR station and shows a ½ scale deflection on theCDI would be how far from the selected course centerline?

A) 1½ miles.
B) 2 ½ miles.
C) 3 ½ miles.

4554. H831 IRA
What angular deviation from a VOR course centerline is represented by a ½ scale deflection of the CDI?

A) 2°.
B) 4°.
C) 5°.

4556.
After passing a VORTAC, the CDI shows ½ scale deflection to the right. What is indicated if the deflection remains constant for a period of time?

A) The airplane is getting closer to the radial.
B) The OBS is erroneously set on the reciprocal heading.
C) The airplane is flying away from the radial.

4557. H576 IRA
(Refer to figure 95.) What is the lateral displacement of the aircraft in NM from the radial selected on the No. 1 NAV?

A) 5.0 NM.
B) 7.5 NM.
C) 10.0 NM.

4558. H831 IRA
(Refer to figure 95.) On which radial is the aircraft as indicated by the No. 1 NAV?

A) R-175.
B) R-165.
C) R-345.

4559. H831 IRA
(Refer to figure 95.) Which OBS selection on the No. 1 NAV would center the CDI and change the ambiguity indication to a TO?

A) 175°.
B) 165°.
C) 345°.

4560. H831 IRA
(Refer to figure 95.) What is the lateral displacement in degrees from the desired radial on the No. 2 NAV?

A) 1°.
B) 2°.
C) 4°.

NOTE: CORRECT ANSWER IN BOLD ITALICS

4561. H831 IRA
(Refer to figure 95.) Which OBS selection on the No. 2 NAV would center the CDI?

A) 174°
B) 166°
C) 335°.

4562. H831 IRA
(Refer to figure 95.) Which OBS selection on the No. 2 NAV would center the CDI and change the ambiguity indication to a TO?

A) 166°
B) 346°
C) 354°.

4960.
Hand held GPS systems, and GPS systems certified for VFR operation, may be used during IFR operations as

A) the principal reference to determine en route waypoints.
B) an aid to situational awareness.
C) the primary source of navigation.

4961. J01 IRA
During IFR en route and terminal operations using an approved GPS system for navigation, ground based navigational facilities

A) are only required during the approach portion of the flight.
B) must be operational along the entire route.
C) must be operational only if RAIM predicts an outage.

4962. J01 IRA
During IFR operation using an approved GPS system for navigation

A) no other navigation system is required.
B) active monitoring of an alternate navigation system Is always required.
C) the aircraft must have an approved and operational alternate navigation system appropriate for the route.

NOTE: CORRECT ANSWER IN BOLD ITALICS

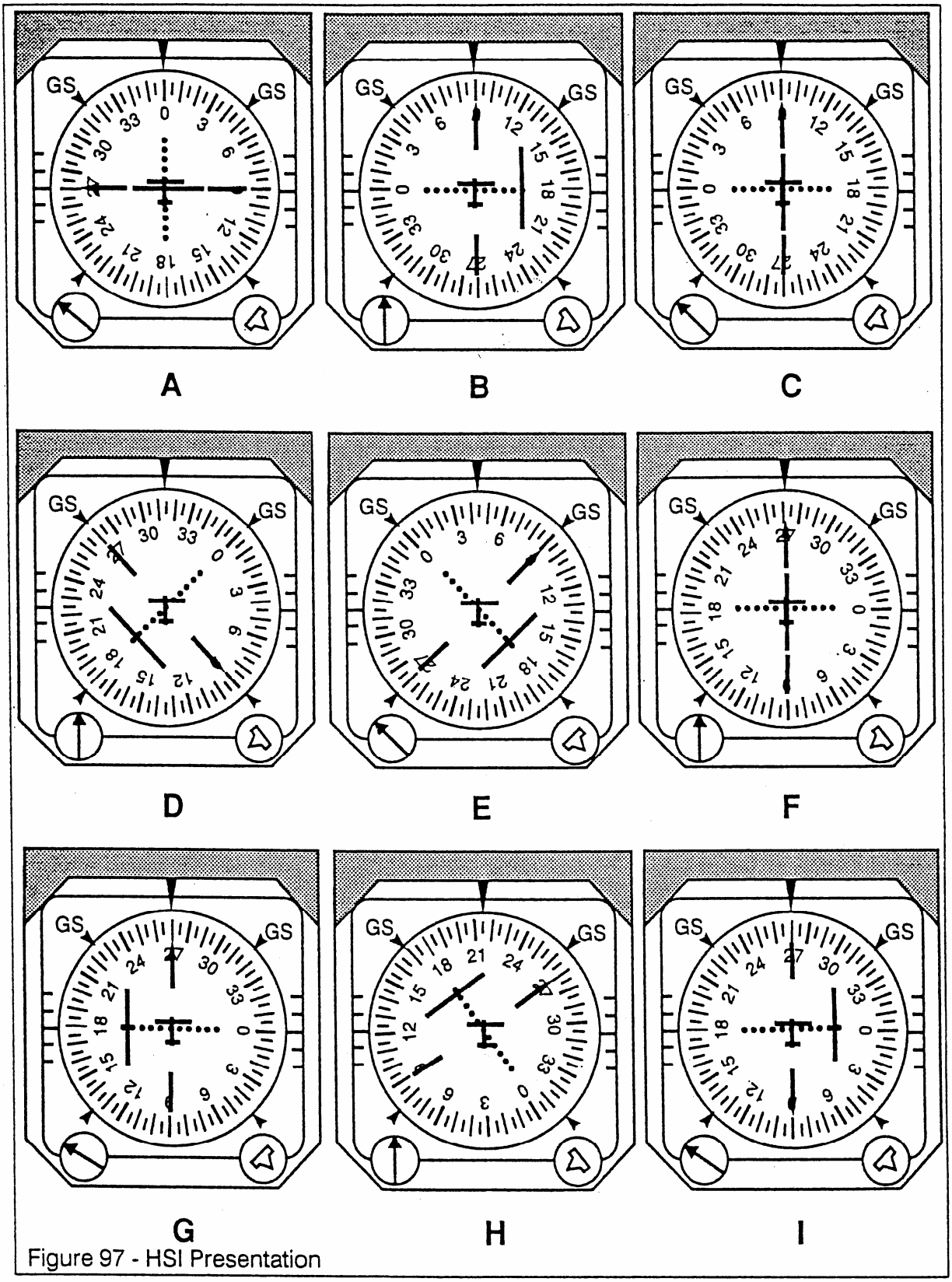


Figure 97 - HSI Presentation

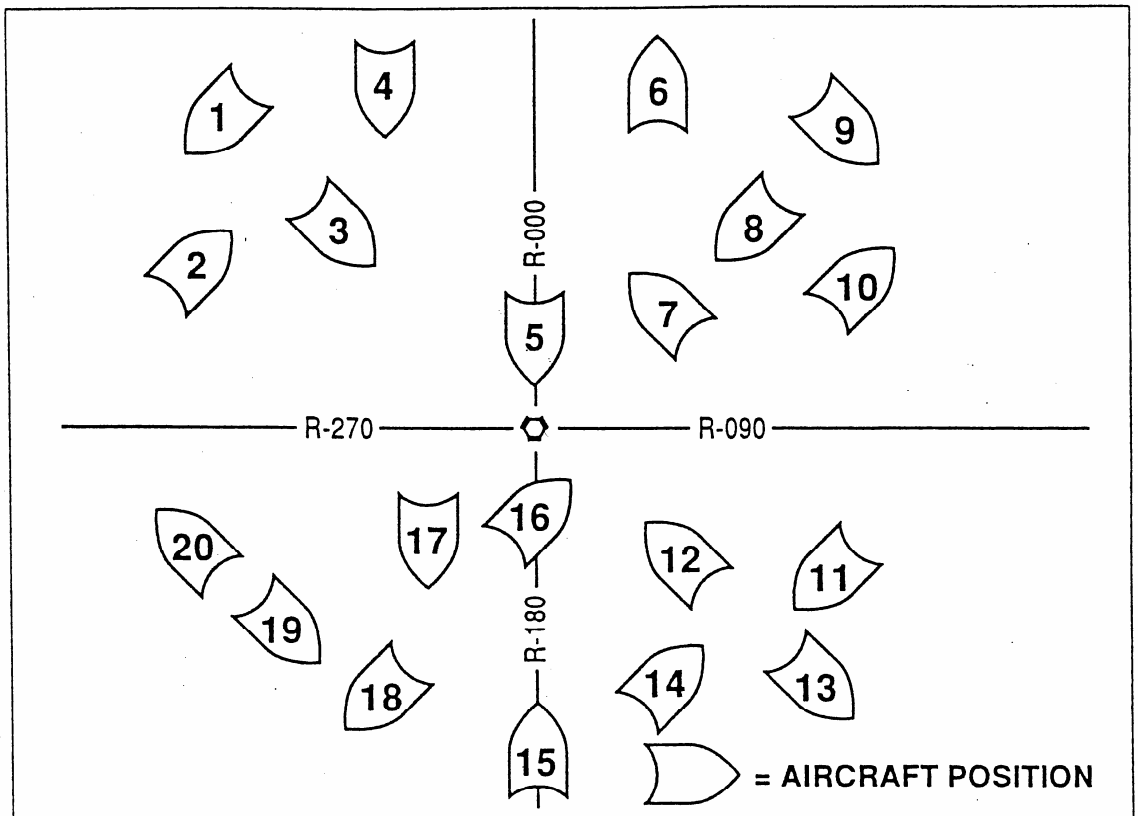


Figure 98 - Aircraft Position

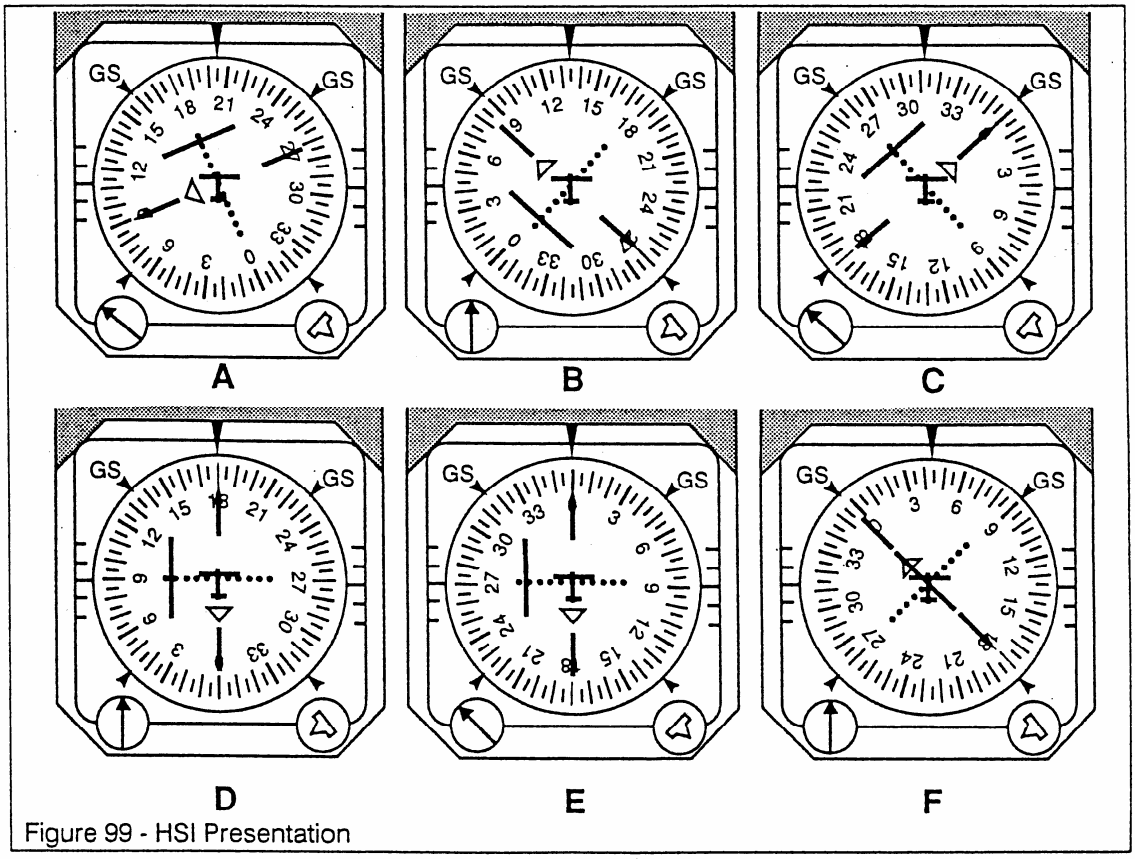


Figure 99 - HSI Presentation

4563. H831 IRA
(Refer to figures 96 and 97.) To which aircraft position(s) does HSI presentation “A” correspond?

A) 9 and 6.
B) 9 only.
C) 6 only.

4564. H831 IRA
(Refer to figures 96 and 97.) To which aircraft position(s) does HSI presentation “B” correspond?

A) 11.
B) 5 and 13.
C) 7 and 11.

4565. H831 IRA
(Refer to figures 96 and 97.) To which aircraft position does HSI presentation “C” correspond?

A) 9.
B) 4.
C) 12.

4566. H831 IRA
(Refer to figures 96 and 97.) To which aircraft position does HSI presentation “D” correspond?

A) 1.
B) 10.
C) 2.

4567. H831 IRA
(Refer to figures 96. and 97.) To which aircraft position(s) does HSI presentation “E” correspond?

A) 8 only.
B) 3 only.
C) 8 and 3.

4568. H831 IRA
(Refer to figures 96 and 97.) To which aircraft position does HSI presentation “F” correspond?

A) 4.
B) 11.
C) 5.

4569. H831 IRA
(Refer to figures 96 and 97.) To which aircraft position(s) does HSI presentation “G” correspond?

A) 7 only
B) 7and 11
C) 5 and 13.

4570. H831 IRA
(Refer to figures 96 and 97.) To which aircraft position does HSI presentation “H” correspond?

A) 8.
B) 1.
C) 2.

4571. H831 IRA
(Refer to figures 96 and 97.) To which aircraft position does HSI presentation “I” correspond?

A) 4.
B) 12.
C) 11.

4572. H831 IRA
(Refer to figures 98 and 99.) To which aircraft position does HSI presentation “D” correspond?

A) 4.
B) 15.
C) 17.

4573. H831 IRA
(Refer to figures 98 and 99.) To which aircraft position does HSI presentation “E” correspond?

A) 5.
B) 6.
C) 15.

4574. H831 IRA
(Refer to figures 98 and 99.) To which aircraft position does HSI presentation “F” correspond?

A) 10.
B) 14.
C) 16.

4575. H831 IRA
(Refer to figures 98 and 99.) To which aircraft position does HSI presentation “A” correspond?

A) 1.
B) 8.
C) 11.

4576. H831 IRA
(Refer to figures 98 and 99.) To which aircraft position does HSI presentation “B” correspond?

A) 9.
B) 13.
C) 19.

4577. H831 IRA
(Refer to figures 98 and 99.) To which aircraft position does HSI presentation “C” correspond?

A) 6.
B) 7.
C) 12.

4578. H831 IRA
(Refer to figure 101.) What is the magnetic bearing TO the station?

A) 060°.
B) 260°
C) 270°.

NOTE: CORRECT ANSWER IN BOLD ITALICS

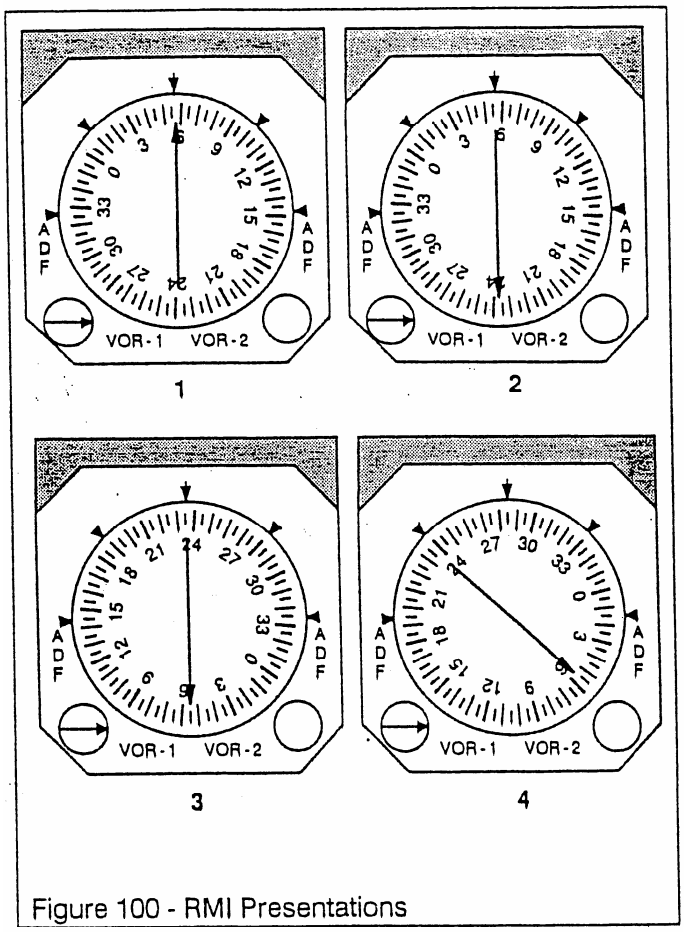


Figure 100 - RMI Presentations

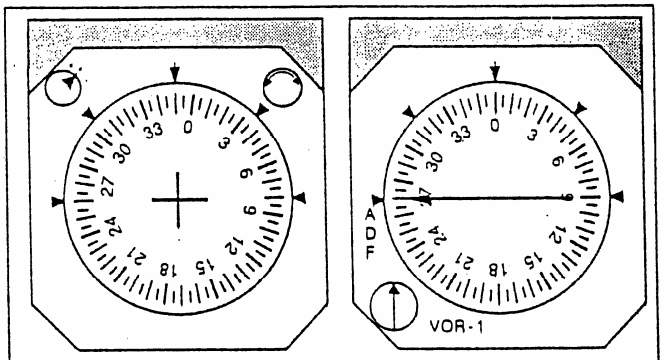


Figure 101 - Directional Gyro and ADF Indicator

4579. H831 IRA
(Refer to figure 100.) Which RMI illustration indicates the aircraft to be flying outbound on the magnetic bearing of 235° FROM the station? (Wind
050° at 20 knots.)

A) 2.
B) 3.
C) 4.

4580. H831 IRA
(Refer to figure 100.) What is the magnetic bearing TO the station as indicated by illustration 4?
A) 285°.
B) 055°.
C) 235°.

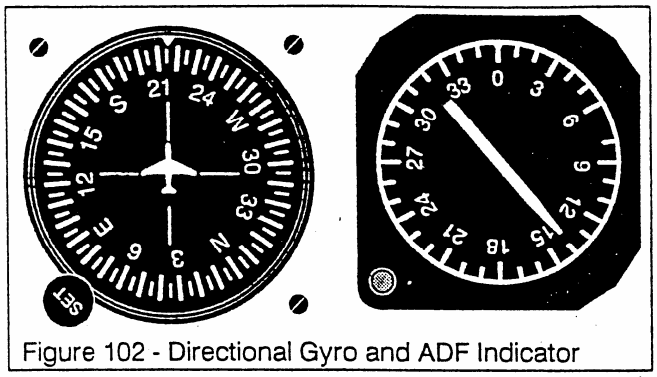


Figure 102 - Directional Gyro and ADF Indicator

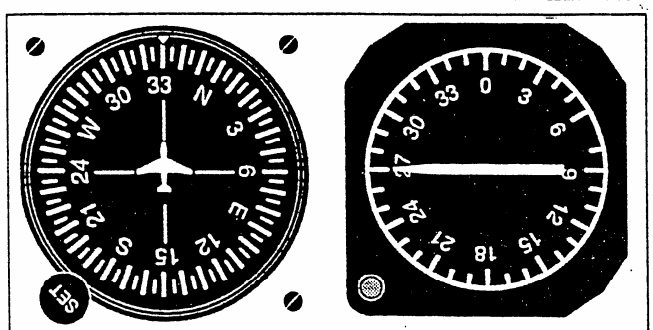


Figure 103 - Directional Gyro and ADF Indicator

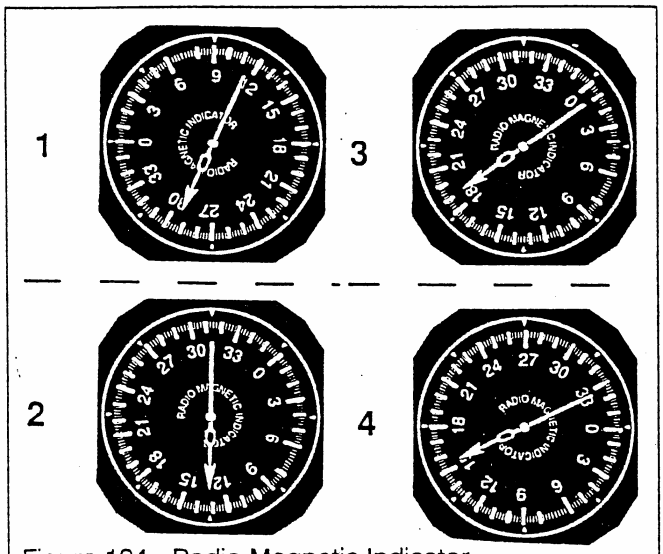


Figure 104 - Radio Magnetic Indicator

4581. H831 IRA
(Refer to figure 100.) Which RMI illustration indicates the aircraft is southwest of the station and moving closer TO the station?

A) 1.
B) 2.
C) 3.

NOTE: CORRECT ANSWER IN BOLD ITALICS

4582. H831 IRA
(Refer to figure 100. Previous Page) Which RMI illustration indicates the aircraft is located on the 055° radial of the station and heading away from the station?

A) 1.
B) 2.
C) 3.

4583. H830 IRA
(Refer to instruments in figure 102. Previous Page) On the basis of this information, the magnetic bearing TO the station would be
A) 175°.
B) 255°.
C) 355°.

4584. H830 IRA
(Refer to instruments in figure 102 Previous Page.) On the basis of this information, the magnetic bearing FROM the station would be
A) 175°.
B) 255°.
C) 355°.

4585. H830 IRA
(Refer to instruments in figure 103. Previous Page) On the basis of this information, the magnetic bearing FROM the station would be
A) 030°.
B) 060°.
C) 240°.

4586. H830 IRA
(Refer to instruments in figure 103. Previous Page) On the basis of this information, the magnetic bearing TO the station would be
A) 060°.
B) 240°.
C) 270°.

4587. H831 IRA
(Refer to figure 104. Previous Page) If the radio magnetic indicator is tuned to a VOR, which illustration indicates the aircraft is on the 115° radial?

A) 1
B) 2
C) 3

4588. H831 IRA
(Refer to figure 104. Previous Page) If the radio magnetic indicator is tuned to a VOR, which illustration indicates the aircraft is on the 335° radial?
A) 2.
B) 3.
C) 4.

4589. H831 IRA
(Refer to figure 104. Previous Page) If the radio magnetic indicator is tuned to a VOR, which illustration indicates the aircraft is on the 315° radial?

A) 2.
B) 3.
C) 4.

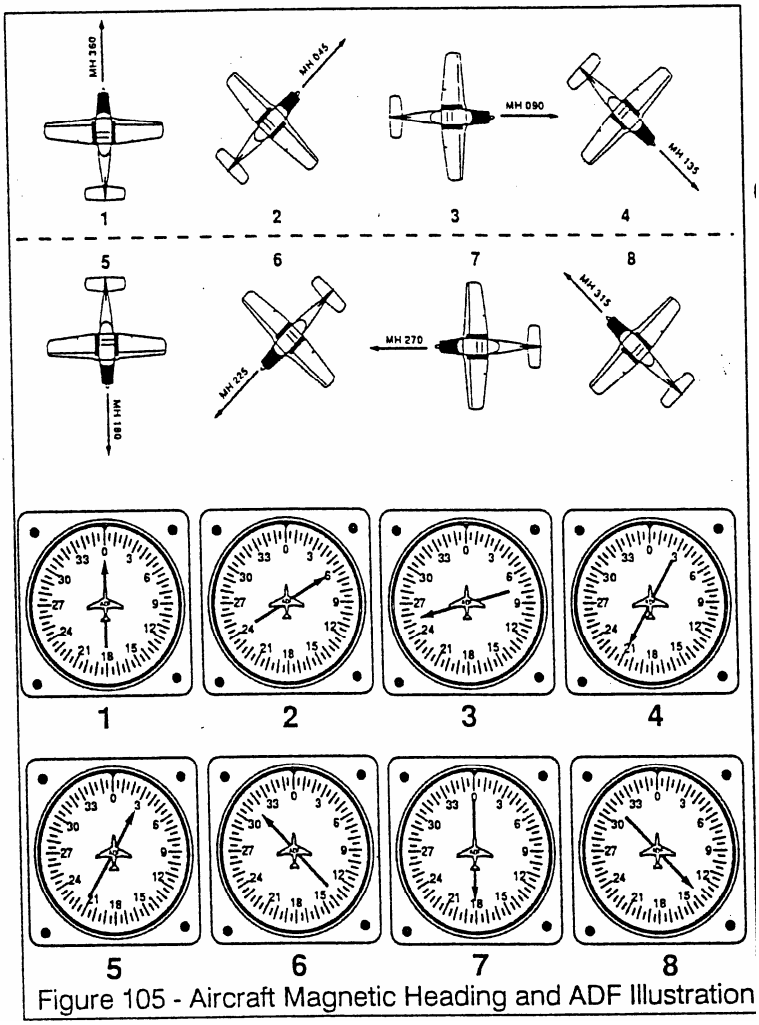


Figure 105 - Aircraft Magnetic Heading and ADF Illustration

4590. H831 IRA
(Refer to figure 104. Previous Page) If the radio magnetic indicator is tuned to a VOR, which illustration indicates the aircraft is on the 010° radial?

A) 1.
B) 2.
C) 3.

4591. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 7 is maintained, which ADF illustration would indicate the airplane is on the 120° magnetic bearing FROM the station?

A) 2.
B) 4.
C) 5.

4592. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 5 is maintained, which ADF illustration would indicate the airplane is on the 210° magnetic bearing FROM the station?

A) 2.
B) 3.
C) 4.

NOTE: CORRECT ANSWER IN BOLD ITALICS

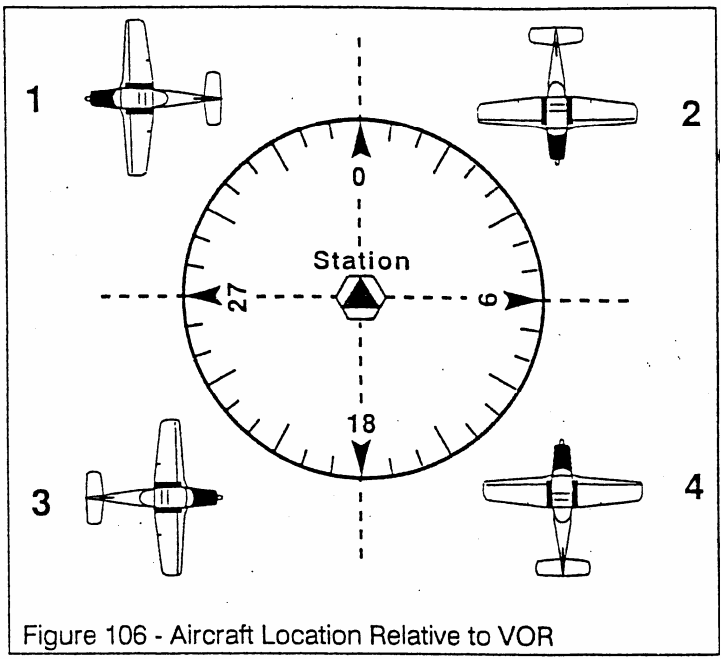


Figure 106 - Aircraft Location Relative to VOR

4593. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 3 is maintained, which ADF illustration would indicate the airplane is on the 120° magnetic bearing TO the station?

A) 4.
B) 5.
C) 8.

4594. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 1 is maintained, which ADF illustration would indicate the airplane is on the 060° magnetic bearing TO the station?

A) 2.
B) 4.
C) 5.

4595. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 2 is maintained, which ADF illustration would indicate the airplane is on the 255° magnetic bearing TO the station?

A) 2.
B) 4.
C) 5.

4596. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 4 is maintained, which ADF illustration would indicate the airplane is on the 135° magnetic bearing TO the station?

A) 1.
B) 4.
C) 8.

4597. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 6 is maintained, which ADF illustration would indicate the airplane is on the 255° magnetic bearing FROM the station?

A) 2.
B) 4.
C) 5.

4598. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 8 is maintained, which ADF illustration would indicate the airplane is on the 090° magnetic bearing FROM the station?

A) 3.
B) 4.
C) 6.

4599. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 5 is maintained, which ADF illustration would indicate the airplane is on the 240° magnetic bearing TO the station?

A) 2.
B) 3.
C) 4.

4600. H830 IRA
(Refer to figure 105.) If the magnetic heading shown for airplane 8 is maintained, which ADF illustration would indicate the airplane is on the 315° magnetic bearing TO the station?

A) 3.
B) 4.
C) 1.

4601. H831 IRA
(Refer to figure 106.) The course selector of each aircraft is set on 360°. Which aircraft would have a FROM indication on the ambiguity meter and the CDI pointing left of center?

A) 1.
B) 2.
C) 3.

4602. H831 IRA
(Refer to figure 107.) Where should the bearing pointer be located relative to the wingtip reference to maintain the 16 DME range in a right-hand arc with a right crosswind component?

A) Behind the right wingtip reference for VOR-2.
B) Ahead of the right wingtip reference for VOR-2.
C) Behind the right wingtip reference for VOR-l.

4603. H831 IRA
(Refer to figure 108.) Where should the bearing pointer be located relative to the wingtip reference to maintain the 16 DME range in a left-hand arc with a left crosswind component?

A) Ahead of the left wingtip reference for the VOR-2.
B) Ahead of the right wingtip reference for the VOR-1.
C) Behind the left wingtip reference for the VOR-2.

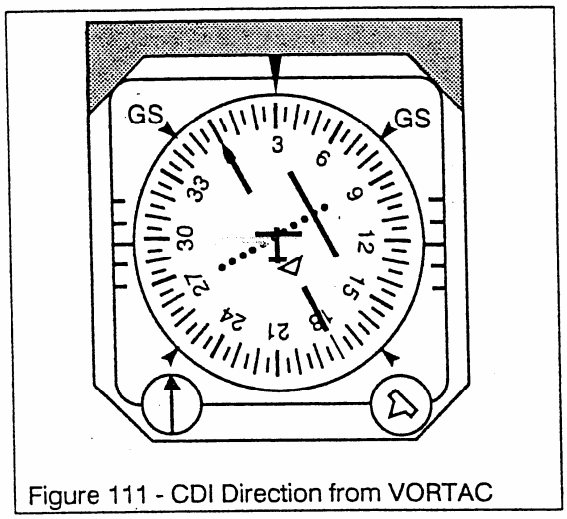


Figure 111 - CDI Direction from VORTAC

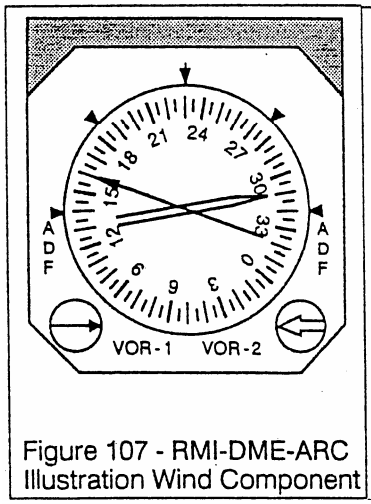


Figure 107 - RMI-DME-ARC Illustration Wind Component

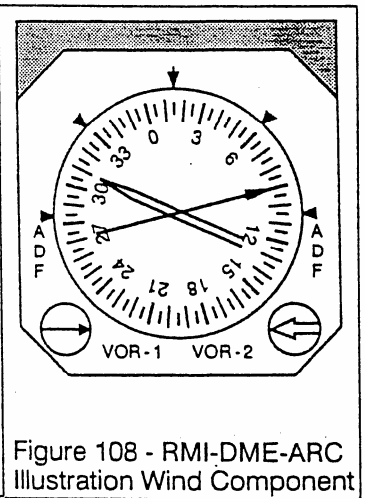


Figure 108 - RMI-DME-ARC Illustration Wind Component

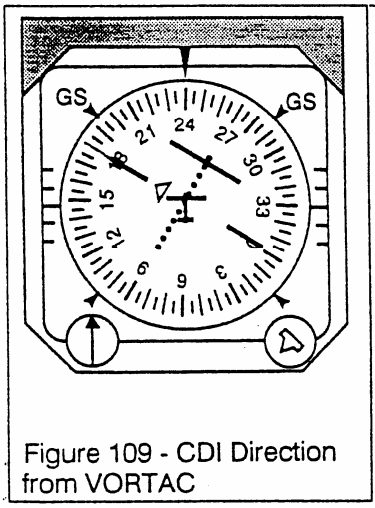


Figure 109 - CDI Direction from VORTAC

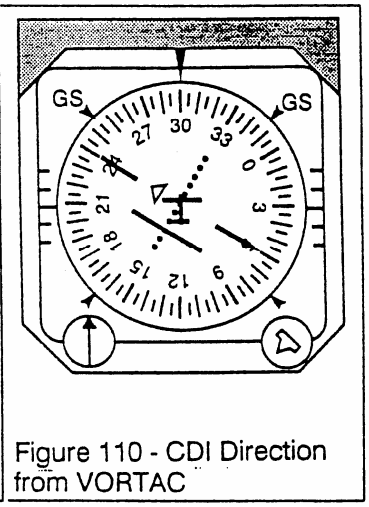


Figure 110 - CDI Direction from VORTAC

4606. H831 IRA
(Refer to figure 109.) In which general direction from the VORTAC is the aircraft located?

A) Northeast.
B) Southeast.
C) Southwest.

4607. H831 IRA
(Refer to figure 110.) In which general direction from the VORTAC is the aircraft located?

A) Southwest.
B) Northwest.
C) Northeast.

4608. H831 IRA
(Refer to figure 111.) In which general direction from the VORTAC is the aircraft located?

A) Northeast.
B) Southeast.
C) Northwest.

4646. J35 IRA
(Refer to figure 47.) When en route on V448 from YKM VORTAC to BTG VORTAC, what minimum navigation equipment is required to identify ANGOO intersection?
A) One VOR receiver.
B) One VOR receiver and DME.
C) Two VOR receivers.

4663. J01 IRA
When a VOR/DME is collocated under frequency pairings and the VOR portion is inoperative, the DME identifier will repeat at an interval of

A) 20 second intervals at 1020 Hz.
B) 30 second intervals at 1350 Hz.
C) 60 second intervals at 1350 Hz.

4664. J01 IRA
When installed with the ILS and specified in the approach procedures, DME may be used

A) in lieu of the OM.
B) in lieu of visibility requirements.
C) to determine distance from TDZ.

4665. J01 IRA
By which means may a pilot determine if a Loran C equipped aircraft is approved for IFR operations?

A) Not necessary; Loran C is not approved for IFR.
B) Check aircraft logbook.
C) Check the Airplane Flight Manual Supplement.

4666. H831 IRA
Full scale deflection of a CDI occurs when the course deviation bar or needle
A) deflects from left side of the scale to right side of the scale.
B) deflects from the center of the scale to either far side of the scale.
C) deflects from half scale left to half scale right.

4669. J42 IRA
How does a pilot determine if DME is available on an ILS/LOC?
A) IAP indicate DME\TACAN channel in LOC frequency box.
B) LOC\DME are indicated on en route low altitude frequency box.
C) LOC\DME frequencies available in the Airman's Information Manual.

4674. J01 IRA
(Refer to figure 128) How should a pilot determine when the DME at Price/Carbon County Airport is inoperative?

A) The airborne DME will always indicate "0" mileage.
B) The airborne DME will "search," but will not "lock on."
C) The airborne DME may appear normal, but there will be no code tone.

4680. J17 IRA
(Refer to figure 129) What indication should you get when it is time to turn inbound while in the procedure turn at LABER?

A) 4 DME miles from LABER.
B) 10 DME miles from the MAP.
C) 12 DME miles from LIT VORTAC.

4682. J42 IRA
(Refer to figure 129) How should the missed approach point be identified when executing the RNAV RWY 36 approach at Adams Field?

A) When the TO-FROM indicator changes.
B) Upon arrival at 760 feet on the glidepath.
C) When time has expired for 5 NM past the FAF.

4683. J42 IRA
(Refer to figure 129) What is the position of LABER relative to the reference facility?

A) 316°, 24.3 NM.
B) 177°, 10 NM.
C) 198°, 8 NM.

4684. J42 IRA
(Refer to figure 129) What minimum airborne equipment is required to be operative for RNAV RWY 36 approach at Adams Field?

A) An approved RNAV receiver that provides both horizontal and vertical guidance.
B) A transponder and an approved RNAV receiver that provides both horizontal and vertical guidance.
C) Any approved RNAV receiver.

4729. J01 IRA
Which range facility associated with the ILS is identified by the last two letters of the localizer identification group?

A) Inner marker.
B) Outer marker.
C) Middle compass locator.

4730. J01 IRA
Which range facility associated with the ILS can be identified by a two-letter coded signal?~

A) Middle marker.
B) Outer marker.
C) Compass locator.

4745. K04 IRA
The rate of descent required to stay on the ILS glide slope

A) must be increased if the groundspeed is decreased.
B) will remain constant if the indicated airspeed remains constant.
C) must be decreased if the groundspeed is decreased.

4747. J01 IRA
Which indications will a pilot receive where an IM is installed on a front course ILS approach?

A) One dot per second and a steady amber light.
B) Six dots per second and a flashing white light.
C) Alternate dashes and a blue light.

4748. K04 IRA
To remain on the ILS glidepath, the rate of descent must be

A) decreased if the airspeed is increased.
B) decreased if the groundspeed is increased.
C) increased if the groundspeed is increased.

4752. K04 IRA
The rate of descent on the glide slope is dependent upon

A) true airspeed.
B) calibrated airspeed.
C) groundspeed.

4772. K04 IRA
During a precision radar or ILS approach, the rate of descent required to remain on the glide slope will

A) remain the same regardless of groundspeed.
B) increase as the groundspeed increases.
C) decrease as the groundspeed increases.

4773.
When tracking inbound on the localizer, which of the following is the proper procedure regarding drift corrections?

A) Drift corrections should be accurately established before reaching the outer marker and completion of the approach should be accomplished with heading corrections no greater than 2°.
B) Drift corrections should be made in 5° increments after passing the outer marker.
C) Drift corrections should be made in 10° increments after passing the outer marker.

NOTE: CORRECT ANSWER IN BOLD ITALICS

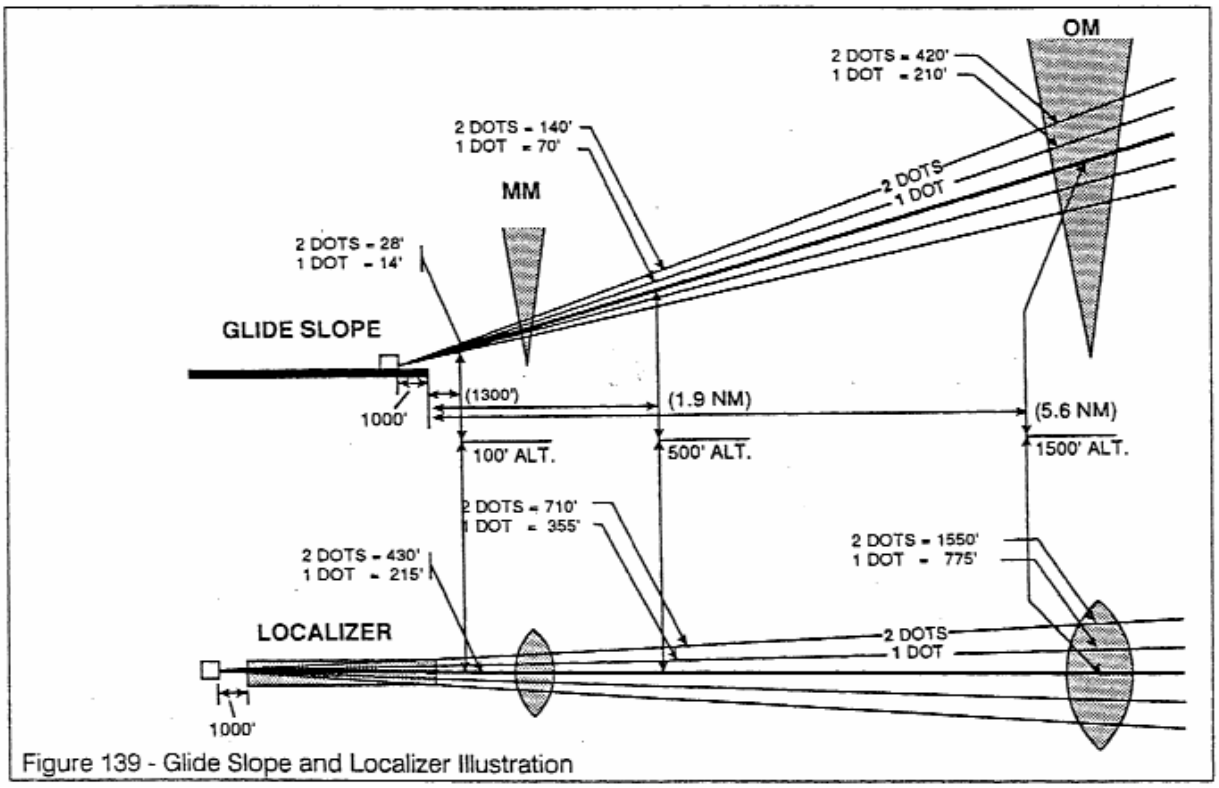


Figure 139 - Glide Slope and Localizer Illustration

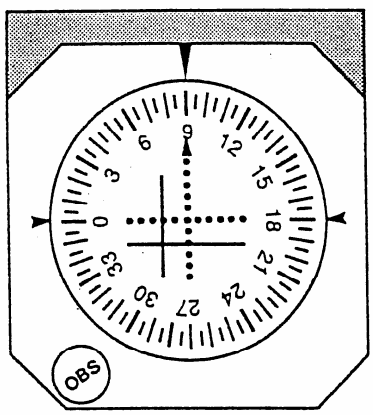


Figure 140 - OBS, ILS, and GS Displacement

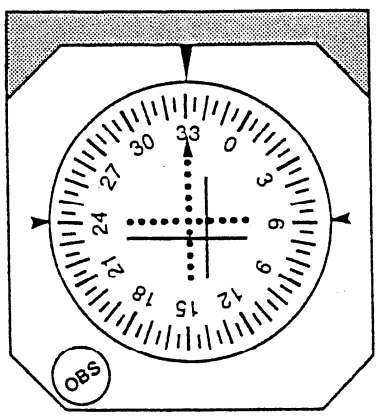


Figure 141 - OBS, ILS, and GS Displacement

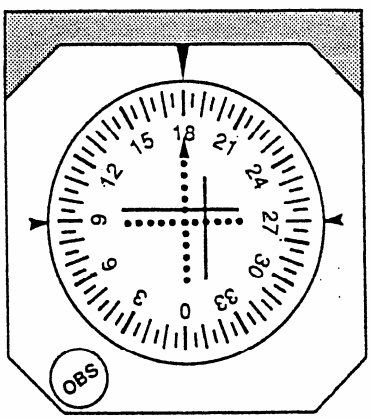


Figure 142 - OBS, ILS, and GS Displacement

4798. J01 IRA
What international Morse Code identifier is used to identify a specific interim standard microwave landing system?

A) A two letter Morse Code identifier preceded by the Morse Code for the letters “IM”.
B) A three letter Morse Code identifier preceded by the Morse Code for the letter “M”.
C) A three letter Morse Code identifier preceded by the Morse Code for the letters “ML”.

4799. J01 IRA
If Receiver Autonomous integrity Monitoring (RAIM) is not available when setting up a GPS approach, the pilot should

A) select another type of navigation and approach system.
B) continue to the MAP and hold until the satellites are recaptured.
C) continue the approach, expecting to recapture the satellites before reaching the FAF.

NOTE: CORRECT ANSWER IN BOLD ITALICS

4800.
What are the lateral approach azimuth angle limits, reference to either side of the landing runway, of an MLS?

A) At least 15°
B) 20°
C) At least 40°

4801. J01 IRA
When using GPS for navigation and instrument approaches, any required alternate airport must have

A) authorization to fly approaches under IFR using GPS avionics systems.
B) a GPS approach that is anticipated to be operational and available at the ETA.
C) an approved operational instrument approach procedure other than GPS.

4824.
(Refer to figures 139 and 140) Which displacement from the localizer and glide slope at the 1.9 NM point is indicated?

A) 710 feet to the left of the localizer centerline and 140 feet below the glide slope.
B) 710 feet to the right of the localizer centerline and 140 feet above the glide slope.
C) 430 feet to the right of the localizer centerline and 28 feet above the glide slope.

4825.
(Refer to figures 139 and 141.) Which displacement from the localizer centerline and glide slope at the 1,300-foot point from the runway is indicated?

A) 21 feet below the glide slope and approximately 320 feet to the right of the runway centerline.
B) 28 feet above the glide slope and approximately 250 feet to the left of the run way centerline.
C) 21 feet above the glide slope and approximately 320 feet to the left of the runway centerline.

4826.
(Refer to figures 139 and 142.) slocalizer and glide slope at the outer marker is indicated?

A) 1,550 feet to the left of the localizer centerline and 210 feet below the glide slope.
B) 1,550 feet to the right of the localizer centerline and 210 feet above the glide slope.
C) 775 feet to the left of the localizer centerline and 420 feet below the glide slope.

NOTE: CORRECT ANSWER IN BOLD ITALICS