Radio Navigation

Radio Aids

Ground direction finder DF (including classification of bearings)
ADF (including NDB's and use of RBI)
CVOR & DVOR (including use of RMI)
DME (Distance measuring equipment):
ILS (Instrument landing system):
MLS (Micro landing system):

Basic Radar Principle

Pulse technique and associated terms:
Ground radar
Airborne weather radar
SSR (Secondary surveillance radar):
Use of radar Observations and Application to In-flight Navigation:

Area navigation system

General philosophy:
Typical Flight deck Equipment and Operation:
Instrument Indications
Types of area Navigation systems Input:
VORDME Area Navigation (RNAV):
Flight director and autopilot coupling:

Self-contained and external referenced Navigation systems

Doppler:
Loran-C
Global Navigation satellite Systems GNSS GPS GLONASS:
Decca Navigation system:

Radio Aids

Ground direction finder DF (including classification of bearings)

An aircraft heading 040 (M) has an ADF reading of 060 Relative. The alteration of heading required to intercept the 120 track inbound to the NDB at 50° is:

A) 020° Right.
B) 030° Right.
C) 040° Right.
D) 050° Right.

The MF band extends from:

A) 300 to 3000 KHz.
B) 30 to 300 KHz.
C) 100 to 1000 KHz.
D) 3 to 30 KHz.

What is the maximum range at which a VDF station at 325 ft can provide a service to an aircraft at FL080?

A) 114 nm
B) 91 nm
C) 134 nm
D) 107 nm

Which of the following statements is correct in respect of a RF signal:

A) the electrical component of the signal is parallel to the aerial.
B) both the electrical and magnetic components are parralel to the aerial.
C) the magnetic component of the signal is parallel to the aerial.
D) the plane of polarisation is dictated by the oscillator unit in the transmitter.

A VDF bearing Class A should be accurate to within:

A) ± 10°
B) ± 2°
C) ± 20°
D) ± 5°

A pilot wishes to obtain the magnetic bearing of his aircraft from a VDF station. Which of the following terms would he use:

A) QTE
B) QDM
C) QGH
D) QDR

The maximum theoretical range at which a VHF signal will be received by an aircraft flying at FL 200, assuming that the transmitter is sited at 860 ft amsl, and that there is no intervening high ground:

A) 213 nm.
B) 180 nm.
C) 170 nm.
D) 144 nm.

Which of the following is an advantage of Ground/DF (VDF) let-down?

A) It only requires a VHF radio to be fitted to the aircraft.
B) It does not require any special equipment to be fitted to the aircraft.
C) It is pilot interpreted and does not require the assistance of ATC.
D) It does not require any special equipment, apart from a VHF radio, to be installed in the aircraft or on the ground.

Ground direction finding at aerodromes utilises which frequencies?

A) VHF at civil aerodromes and VHF at military aerodromes.
B) VHF at civil aerodromes and UHF at military aerodromes.
C) UHF at civil aerodromes and VHF at military aerodromes
D) UHF at civil aerodromes and UHF at military aerodromes.

What is the approximate maximum theoretical range at which an aircraft at FL130 could receive information from a VDF facility which is sited 1024 FT above MSL?

A) 220 NM
B) 120 NM
C) 180 NM
D) 150 NM

Of two sinusoidal waves of the same amplitude and frequency, Wave A is passing zero going negative when Wave B is at maximum positive. Which of the following statements accurately describes this situation

A) wave A leads wave B by 360° .
B) wave A leads wave B by 180° .
C) wave A leads wave B by 90° .
D) wave A leads wave B by 270° .

In an amplitude modulated signal, the amplitude of the carrier wave will:

A) vary according to the amplitude of the modulating signal.
B) vary according to the frequency of the modulating signal.
C) vary according to the phase of the modulating signal.
D) remain constant, and the frequency will vary according to the amplitude of the modulating signal.

To estabilish and maintain effective HF communications the frequency used at a given range:

A) should be decreased at night.
B) should remain constant.
C) should only be varied by season, decreased in summer and increased in winter.
D) should be increased at night.

For a given set of ionospheric conditions, as the frequency of an HF signal is increased:

A) the size of the dead space increases due solely to the decreasing minimum skip distance.
B) the size of the dead space decreases because the surface wave coverage decreases, and the minimum skip distance decreases.
C) the size of the dead space increases due solely to the increasing minimum skip distance.
D) the size of the dead space increases because the surface wave coverage decreases, and the minimum skip distance increases.

The phase difference between the reference and variable signals on QDM 050° (VAR 10° W) for a conventional VOR is:

A) 050°
B) 220°
C) 040°
D) 230°

The emission characteristics A3E describe:

A) VHF communications.
B) HF communications.
C) ILS.
D) VOR

In the MF frequency band:

A) skywaves are more common by night than by day.
B) ducting is a common phenomena.
C) reasonable reception is restricted to line of sight range.
D) skywaves are more common by day than by night.

The range at which you can obtain a VDF bearing can be influenced by:

A) time of day.
B) intensity of ionisation.
C) type of surface.
D) height of aircraft.

A VDF bearing can be obtain:

A) on the frequency notified for VDF services.
B) on the Approach frequency.
C) on the frequency agreed between the pilot and ATC but chosen from one of the available ATC frequencies.
D) only on a frequency of 121,5 Mhz.

What is QTE?

A) Magnetic track from the station.
B) True track from station.
C) Magnetic track to the station.
D) True track to the station.

21. Around a radiating transmitter aerial there is:

A) an electrical field.
B) a magnetic field.
C) an electrical and magnetic field.
D) a field of equal ionisation.

A radio wave increases speed when crossing the coast, leaving the land and passing over the sea. When this happens:

A) no change in either.
B) the wavelength changes.
C) the frequency increases..
D) the frequency changes.

If the (i) of a radio wave is (ii) then the skip distance will (iii) and the dead space will (iv):

A) (i) frequency; (ii) decrease; (iii) increase; (iv) decrease
B) (i) wavelength; (ii) increase; (iii) increase; (iv) increase
C) (i) wavelength; (ii) decrease; (iii) increase; (iv) decrease
D) (i) frequency; (ii) increase; (iii) increase; (iv) increase

Ground responders respond at a frequency:

A) the same as the interrogation signal.
B) 63 MHz lower than interrogation frequency.
C) 63 MHz different from interrogation frequency, either above or below.
D) 63 MHz grader than interrogation frequency.

The rate of attenuation of a radio wave which occurs when the wave travels close to the Earths surface.

A) increases as the frequency of the wave increases, and is greater over the sea than the land.
B) increases as the frequency of the wave increases, and is greater over the land than the sea.
C) decreases as the frequency of the wave increases, and is greater over the land than the sea.
D) decreases as the frequency of the wave increases, and is greater over the sea than the land.

What is the minimum level that an aircraft, at a range of 113 NM, must fly in order to contact the tower on R/T for a VDF bearing from an airport sited 169 FT above MSL

A) FL 60
B) FL 50
C) FL 100
D) FL 80

Which of the following statements is true?

A) A transmissions bandwidth is affected by the design of the aerial.
B) A narrow bandwidth improves beam width.
C) Bandwidth must be reduced in order to reduce noise.
D) A broad bandwidth gives a narrow beam width.

The frequency which corresponds to a wavelength of 12 mm is:

A) 25 MHz
B) 2.5 GHz
C) 2.5 MHz
D) 25 GHz

Abnormal long ranges may be experienced on VDF channels, caused by:
A) The VDF station using a relay station for communication to the aircraft.
B) Super refraction of signals in the atmosphere.
C) Efficient VDF antennas.
D) Intermodulation with signals on frequencies close to the one used by the VDF station.

A VDF bearing category B should be accurate to within:
A) ± 2°
B) ± 10°
C) ± 5°
D) ± 20°

With reference to VDF, the true bearing of an aircraft from a ground station is:
A) QDM
B) QUJ
C) QDR
D) QTE

For a given HF frequency skip distance will normally:
A) be greater by day than by night.
B) be greater by night than by day.
C) have no diurnal variation.
D) be less by night than by day.

When two separate frequencies are mixed together the resultants are the sum and also the difference between the frequencies. This process is called:
A) hydro-phasing.
B) heterodyning.
C) transponding.
D) frequency modulation.

The maximum theoretical range at which a UHF transmission can be received by an aircraft flying at FL 200, assuming the UHF station is at a height of 860 ft amsl is:
A) 180 nm
B) 213 nm
C) 144 nm
D) 170 nm

Diffraction of a RF signal is a displacement of its propagation path due to:
A) reflection from the surface.
B) passing through ionised regions of the upper atmosphere.
C) passing over or though mediums of different conductivity.
D) passing over obstacles with dimensions close to the wavelength.

Which of the following does NOT affect the accuracy of VDF bearings:
A) ground reflections.
B) synchronous transmissions.
C) duct propagation.
D) sky waves.

The rate of refraction of a radio wave which occurs within the ionosphere:
A) is greater at night.
B) decreases as the frequency of the radio wave increases.
C) is constant regardless of the frequency involved.
D) increases as the frequency of the radio wave increases.

You are at an altitude of 9.000 feet. At a range of 200nm from a VHF communications transmitter, and you are receiving a good signal.
A) You should expect this since the transmitter is at a height of 2.000 feet.
B) You should have been receiving the signal from a range of 240 nm.
C) You are probably receiving a duct propagation signal.
D) You are probably receiving a sky wave signal.

The frequency corresponding to a wavelength of 3.5 cm is:
A) 85.7 MHz.
B) 8.57 MHz.
C) 857 MHz.
D) 8.57 GHz.

In sky wave propagation the distance between the end of the surface wave and the first returning sky wave is called the:
A) skip distance.
B) maximum usable range.
C) minimum theoretical range.
D) dead space.

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41. What airborne equipment, if any, is required to be fitted in order that a VDF let-down may be flown?
A) none
B) VOR
C) VHF radio
D) VOR/DME

A half wave dipole aerial suitable for transmitting an RF signal at 18 MHz should have an effective length of:
A) 83,33 metres.
B) 166,67 metres.
C) 8,33 metres.
D) 16,67 metres.

At a height 5.000 feet you might expect to receive a VHF signal, from a transmitter at sea level, at a range of:

A) 200 km
B) 88,4 nm
C) 88,4 km
D) 70,7 nm

A Class A magnetic bearing from a VDF station will be a ... with an accuracy of ...

A) QDM; ± 2° .
B) QDR; ± 2° .
C) QDR; ± 5° .
D) QDM; ± 5° .

A radio aid has a wavelength of 2.4 m. The frequency is:

A) 720 MHz
B) 125 MHz
C) 12.5 MHz
D) 72 MHz

A frequency of 295 KHz would be described as:

A) HF.
B) LF.
C) MF.
D) short wave.

If, when you are requesting a QDM from an airfield, you are offered a QGH, it means:

A) the VDF service will be handled by a different VDF unit, operating on the same frequency.
B) the VDF unit is prepared to give you assistance during an approach to the airfield, based on VDF bearings.
C) the bearing will only be accurate when the aircraft is flying above the QGH level.
D) the service will be limited to bearings, no positions will be given by the DF station.

With reference to a VDF bearing, the true bearing of the aircraft from the ground station is a:

A) QDM.
B) QTE.
C) QDR.
D) QUJ.

With reference to a VDF bearing, the true bearing of the aircraft from the ground station is a:

A) QDM.
B) QTE.
C) QDR.
D) QUJ.

VDF for aeronautical use provides service in the frequency band:
A) 108 - 136 MHz
B) 130 - 300 MHz
C) 118 - 137 MHz
D) 108 - 118 MHz

The total length of a half-wave dipole designed to operate on 100 MHz would be:
A) 142.5 cm.
B) 1.5 m.
C) 0.95 m.
D) 285 cm.

A signal with a wavelength of 7360 m lies in the:
A) VLF band.
B) HF band.
C) LF band.
D) MF band.

A radio signal which is modulated in a manner described as A3E is likely to be used for:
A) LF/MF radio navigation (NDB).
B) a pulsed radar system.
C) VHF voice communication.
D) HF telegraphy.

In radio terms, frequency means:
A) the speed of radio waves in metres per second.
B) the number of complete waveforms passing a spot in one second.
C) the length of a complete waveform in metres.
D) the number of waveforms in one hour.

A frequency of 305 KHz would be described as:
A) LF.
B) HF.
C) MF.
D) Short Wave.

VLF surface waves achieve greater range than LF surface waves because:
A) VLF diffraction is less and attenuation is greater.
B) VLF diffraction is greater and attenuation is less.
C) VLF diffraction and attenuation are greater.
D) VLF diffraction and attenuation are less.

The maximum theoretical range that an aircraft flying at 14.400 ft can receive signals from a VHF station (400 ft amsl) is:
A) 175 nm.
B) 152 nm.
C) 203 nm.
D) 72.5 nm.

The indicator of the ground VDF equipment responds to:

A) The carrier wave received.
B) The voice modulated signal transmitted by the aircraft.
C) The signal being reflected from the aircraft.
D) The identification transmitted from the aircraft.

A radar set with a wavelength of 10 cm lies within which of the following frequency bands:

A) SHF
B) EHF
C) HF
D) VHF

As a radio signal increases in frequency, ionospheric refraction ... and atmospheric attenuation...

A) increases; decreases.
B) increases; increases.
C) decreases; decreases.
D) decreases; increases.

Which of the following is an advantage of VDF?

A) It is pilot interpreted, so ATC is not required.
B) Only a VHF radio is needed in the aircraft.
C) No equipment required in the aircraft.
D) No special equipment required in the aircraft or on the ground.

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61. An aircraft travelling at 330 metres a second transmits a signal at 10 GHz to a stationary receiver. If the aircraft is flying directly towards the receiver and they are approximately at the same height the received frequency will be:

A) 11 GHz
B) 9,999989 GHz
C) 11 MHz
D) 10,000011 GHz

When conducting a QGH approach responsibility for interpreting the procedure rests with ... and on a VDF approach responsibility rests with...

A) the controller; the controller.
B) the pilot; the pilot.
C) the controller; the pilot.
D) the pilot; the controller.

In which one of the following circumstances is ground direction finding (VDF) likely to be used to fix an aircrafts position?

A) When using the emergency VHF frequency 121.5 MHz.
B) On first contact with ATC on crossing an international FIR boundary.
C) When contacting ATC to join controlled airspace from the open FIR.
D) When declaring an emergency on any frequency.

Skywaves are not likely to occur by day or night in which of the following frequency bands:
A) HF
B) LF.
C) VHF.
D) MF.

A horizontally polarised signal would be best received by an aerial which is:
A) vertical.
B) horizontal.
C) the plane of the aerial does not matter.
D) horizontal or vertical.

The maximum theoretical range at which an aircraft at FL80 can obtain bearings from a ground VDF facility sited 325 FT above MSL is:
A) 134 NM.
B) 158 NM.
C) 107 NM.
D) 114 NM.

ADF (including NDB's and use of RBI):

An aircraft heading 130° (M) has an ADF reading of 190° Relative. The heading to steer to intercept the 170° track outbound from the NDB at 30º is:

A) 210° (M)
B) 200° (M)
C) 220° (M)
D) 190° (M)

An aircraft is maintaining track outbound from an NDB with a constant relative bearing of 184° .
To return to the NDB the relative bearing to maintain is:

A) 356° .
B) 184°
C) 000° .
D) 004°

Consider the following statements on the NDB transmitter:

A) It is operating in the MF/HF band.
B) To overcome the limitations caused by line of sight propagation, high-power transmitters must be used.
C) It is very simple, being required to transmit only a carrier wave and an identification.
D) In Europe, most NDBs operate in the frequency band 455 - 1750 kHz.

At 1000 Z an aircraft is overhead NB PE enroute to NDB CN, Track 075(M), Heading 082(M) At 1029 Z NDB PE bears 176 Relative and NDB CN bears 353 Relative. The heading to steer at 1029 Z to reach NDB CN is:

A) 079(M)
B) 078(M)
C) 081(M)
D) 0082(M)

The basic information given by the ADF is:

A) The magnetic direction of the loop aerial with reference to the sense aerial.
B) The true great circle track from the NDB to the aircraft.
C) The relative bearing from the aircraft to the NDB.
D) The magnetic bearing from the aircraft to the NDB.

The purpose of the BFO switch on the ADF receiver is to:

A) improve the strength of the received signal.
B) make the signal audible.
C) cut out the static noise.
D) attenuate the received signal.

When using NDBs night effect is most likely to be greatest at:

A) dawn or dusk.
B) night.
C) dusk.
D) awn.

With regard to the following types of NDB which statements is correct?

A) Locators have 15 W power, 10-25 nm range and are NON A2A.
B) Locators have 5000 W power, 50 nm range and are NON A1A.
C) Locators have 5000 W power, 50 nm range and are NON A2A.
D) Locators have 200 W power, 50 nm range and are NON A2A.

The inbound track to NDB GDV is 075° (T), Variation 10° W, drift 7° Right. The relative bearing to maintained on the radio compass to reach GDV is

A) 000 Relative.
B) 183 Relative,
C) 353 Relative.
D) 007 Relative.

An aircraft heading 040° (M) has an ADF reading of 060° ;Relative is to intercept the 120° (M) track inbound to an NDB at 50° . The relative bearing of the NDB that confirms track interception is:

A) 060 Relative.
B) 070 Relative.
C) 080 Relative.
D) 050 Relative.

Variations of signal strength in NDB receivers known as fading indicates the presence of:

A) reflection from thunderstorms.
B) night effect.
C) mountain or terrain effect.
D) coastal refraction.

An aircraft heading 100° (M) has an ADF reading of 210° Relative. The alteration of heading required to intercept the 340° track inbound to the NDB at 60° is:

A) 180 Left.
B) 180 Left or Right.
C) 170 Left.
D) 170 Right.

The D layer of the ionosphere affects the accuracy of NDB bearings:

A) by night only.
B) never.
C) by day and night.
D) by day only.

Both the VOR (single pointer) and the ADF in an aircraft are correctly tuned and identified. The indications from both are shown on the RMI shown below. Which of the following statements is correct:

A) the aircraft is heading 033° (M), is on the 310° radial, and bears 050° (M) from the NDB.
B) the aircraft is heading 330° (M), is on the 310° radial, and bears 050° (M) from the NDB.
C) the aircraft is heading 330° (M), is on the 130° radial, and bears 230° (M) from the NDB.
D) the aircraft is heading 330° (M), is on the 130° radial, and bears 050° (M) from the NDB.

An ADF uses a sense aerial to:

A) resolve ambiguous bearings.
B) detect the receiver test signal.
C) determine the null position.
D) transmit the beacon ident.

Factors liable to affect most NDB/ADF system performance and reliability include:

A) static interference - night effect - absence of failure warning system.
B) height error - station interference - mountain effect.
C) coastal refraction - lane slip - mountain effect.
D) static interference - station interference - latitude error.

The heading read on a standard RMI is:

A) The True heading.
B) The compass heading.
C) The magnetic heading.
D) The relative heading.

An aircraft heading 200° (M) has an ADF reading of 160° Relative is to intercept the 150° (M) track outbound from an NDB at 30° . The relative bearing of the NDB that confirms track interception is:

A) 230 Relative.
B) 220 Relative.
C) 240 Relative.
D) 210 Relative.

The signal to noise ratio for an NDB is...allowing a maximum error of...on 95% of occasions during...

A) 5/1, ± 3 degrees, daylight hours only.
B) 3/1, ± 5 degrees, 24 hours.
C) 5/1, ± 3 degrees, 24 hours.
D) 3/1, ± 5 degrees, daylight hours only.

What is the role of a ground direction finder?

A) To aid pilot navigation.
B) To all ground movements.
C) To assist planners in the construction of airfield approaches.
D) To map airfields.

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21. A long range NDB is likely to transmit on ... and be classified as … Select the answer to complete this statement.

A) 800 KHz; A2A.
B) 200 KHz; A2A.
C) 800 KHz; A1A.
D) 200 KHz; A1A.

Some ADFs have a bandwidth control. Consider the following statements:

A) Narrow bandwidth should be selected for listening to voice or music.
B) Broad or wide bandwidth should be selected when listening to any NDB for its identification.
C) Broad or wide bandwidth should be used when static from CBs is experienced.
D) Broad or wide bandwidth should be selected when listening to music or voice.

An aircraft over the sea is receiving a signal from an NDB 50nm from the coast and another from an NDB 20nm from the coast. Which of the following statements is most correct?

A) The bearing information from the beacon 20nm inland would be most correct.
B) The bearing information from the beacon 50nm inland would be most correct.
C) The bearing information from relative bearings of 90° and 270° would be most correct.
D) The bearing information from relative bearings of 360° and 180° would be most correct.

The maximum errors when using an ADF bearing will occur in the position of NDB ... and angle of cut at the coast...

A) on the coast; 90°
B) on the coast; 45°
C) inland; 45°
D) inland; 90°

Which of the following equipments does not have a system to warn the pilot that it is inoperative:

A) ADF
B) VOR
C) DME
D) ILS

The BFO:

A) is used to determine the signal strength of an NDB.
B) is used to make the ident from an A1A NDB audible.
C) is used to make the ident from an A2A NDB audible.
D) creates the audio ident for an NDB.

An aircraft heading 040 (M) has an ADF reading of 060 Relative. The heading to steer to intercept the 120° track inbound to the NDB at 50° is:

A) 080(M)
B) 070(M)
C) 060(M)
D) 050(M)

Using an NDB it is possible to experience which of the following errors or limitations?

A) Coastal refraction, timing error and lack of a failure warning system.
B) Night effect, station interference and latitude error.
C) Coastal refraction, timing error and night effect.
D) Night effect, station interference and lack of a failure warning system.

An NDB signal crossing from land to sea will ... speed and bend ... the normal.

A) decrease, towards.
B) increase, towards.
C) decrease, away from.
D) increase, away from.

An aeroplanes RMI shows an NDB bearing 070° , w/v calm. The aeroplane is to join a right hand holding pattern at the NDB, the inbound leg of which is 330° . The aeroplane should:

A) fly to the NDB then fly outbound on 150° for 1 minute, then turn left to point directly at the NDB joining the pattern overhead.
B) fly to the NDB then fly a teardrop with an outbound heading of 120° for 1 minute and a rate one turn to join in bound.
C) fly to the NDB and join the pattern.
D) fly to the NDB then fly choose either B) or C) above as preferred.

An NDB transmits a signal pattern in the horizontal plane which is:

A) a beam rotating at 30 Hz.
B) omnidirectional.
C) a cardioid balanced at 30 Hz.
D) bi-lobal circular.

The D layer in the ionosphere causes … errors by day for an NDB system and … errors by night for a VOR system:

A) maximum; maximum
B) no; no
C) maximum; no
D) no; maximum

Which of the following is the ICAO allocated frequency band for ADF receivers?
A) 300 - 3000 kHz.
B) 200 - 1750 kHz.
C) 200 - 2000 kHz.
D) 255 - 455 kHz.

The accuracy of ADF within the DOC by day is:
A) +/-10 deg.
B) +/-1 deg.
C) +/-2 deg.
D) +/-5 deg.

Aircraft heading 225(M), ADF RMI reading 090 the quadrantal error of this bearing:
A) proportional to sine heading times the signal strength.
B) not much.
C) zero.
D) maximum.

An NDB aerial is (i) so as to ensure the range is (ii) by minimising (iii) due to (iv):
A) (i) vertical; (ii) maximum; (iii) attenuation; (iv) atmospheric refraction
B) (i) horizontal; (ii) maximum; (iii) diffraction; (iv) the ground wave
C) (i) vertical; (ii) maximum; (iii) attenuation; (iv) energy losses to the surface
D) (i) horizontal; (ii) maximum; (iii) refraction; (iv) the D layer

Long range NDBs normally employ:
A) NON/A2A
B) A3W
C) NON/A1A
D) A9E

To double the range of an NDB the power must be increased by a factor of:
A) 8
B) 4
C) 2
D) 6

When using ADF, the sky-wave (night) effect:
A) Occurs when two sky-wave signals from two different NDBs interfere with each other.
B) Occurs when the signal from the desired NDB is interfered with by a long distant sky- wave signal from another NDB operating at the same or a close frequency.
C) Is most dominant around dusk and dawn.
D) Is most dominant at the darkest time of the day.

F bearings by an aeroplane by day within the published protection range should be accurate to within a maximum error of:

A) +/-2°
B) +/-2.5°
C) +/-5°
D) +/-10°

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41. A relative bearing indicator shows 030° . The heading of the aeroplane is 090° M. The intercept angle for a course to the NDB of 180° M is:

A) 150°
B) 030°
C) 120°
D) 60°

An aircraft heading 135° (M) with 13° Right drift intercepts the 082° (M) track outbound from an NDB. The relative bearing of the NDB that confirms track interception is:

A) 132° Relative.
B) 137° Relative.
C) 122° Relative.
D) 127° Relative.

Errors caused by the effect of coastal refraction on bearings at lower altitudes are maximum when the NDB is:

A) near the coast and the bearing crosses the coast at an acute angle.
B) inland and the bearing crosses the coast at right angles.
C) near the coast and the bearing crosses the coast at right angles.
D) inland and the bearing crosses the coast at an acute angle.

An aircraft heading 200° (M) has an ADF reading of 160° Relative. The heading to steer to intercept the 150° track outbound from the NDB at 30° is:

A) 110° (M)
B) 140° (M)
C) 130° (M)
D) 120° (M)

An RMI shows the bearing of an NDB as 020° . The heading of the aeroplane is 020° M. In order to intercept an outbound course of 330° (from the NDB) at an angle of 40° , the aeroplanes heading should be altered to:

A) 010°
B) 300°
C) 040°
D) 330°

When the induced signals from the loop and sense antenna are combined in an ADF receiver, the resultant polar diagram is:

A) a limacon.
B) None of the above
C) a cardioid.
D) a bi-lobal circular.

Coastal refraction on an ADF bearing will be increased if the:
A) aircraft is further away from the coast.
B) aircraft is nearer the coast.
C) beacon is further inland..
D) beacon is nearer the coast.

Fading of an ADF signal, together with a hunting needle, is an indication of:
A) night effect.
B) thunderstorm effect.
C) mountain effect.
D) quadrantal error.

The ADF reception loop is always used so that the electromotive force (EMF):
A) induced is zero.
B) induced is maximum.
C) is zero.
D) is maximum.

Homing on an NDB:
A) Calls for an assessment of the drift.
B) Is most effective in strong winds.
C) Will in most situations result in frequent heading changes when approaching the NDB.
D) Will result in passing the NDB along the planned track.

Which of the following is likely to have the greatest effect on ADF accuracy?
A) Mutual interference between aircraft aerials.
B) Interference from other NDBs, particularly at night.
C) Frequency drift at the ground station.
D) Interference from other NDBs, particularly during the day.

When using a N0N A2A NDB the BFO should be:
A) off for tuning and off for identification.
B) off for tuning and on for identification.
C) on for tuning and on for identification.
D) on for tuning and off for identification.

What is the approved frequency band assigned to aeronautical NDBs?
A) 190-1750 MHz
B) 190-1750 GHz
C) 190-1750 kHz
D) 190-1750 Hz

An aircraft heading 130° (M) has an ADF reading of 190° Relative is to intercept the 170° (M) track outbound from an NDB at 30° . The relative bearing of the NDB that confirms track interception is:
A) 150° Relative.
B) 140° Relative.
C) 170° Relative.
D) 160° Relative.

The nominal maximum range of an NDB with a transmitter power is 200 watts is:
A) 200 to 220 nm.
B) 50 to 60 nm.
C) 100 to 120 nm.
D) 150 to 170 nm.

Given: Compass heading 270° Deviation 2° W Variation 30° E Relative bearing 316° What is the QDR?
A) 224°
B) 226°
C) 046°
D) 044°

Which of the following factors could cause an error of an ADF bearing of an NDB?
A) Phase interference
B) Night effect.
C) Scalloping.
D) Atmospheric scatter.

Of the bearing indicators available for use on ADFs, the most sophisticated one is:
A) The Radio Magnetic Indicator.
B) The Manually Rotateable Card.
C) The Relative Bearing Indicator.
D) The Deviation Indicator.

If an NDB with a transmitter power of 25 KW which has a range of 50 nm is adjusted to give a power output of 100 KW the new range of the NDB will be approximately:
A) 200 nm
B) 100 nm
C) 300 nm
D) 400 nm

Which of the following is true about the ADF?
A) Sky waves do not affect the bearing accuracy provided they come from the correct NDB.
B) It does not have a signal failure warning.
C) Its accuracy is the same by day and by night.
D) It should not be used at night because of sky waves.

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61. An aircraft heading 130° (M) has an ADF reading of 190° Relative. The alteration of heading required to intercept the 170° track outbound from the NDB at 30° is:
A) 70° right.
B) 80° right.
C) 60° right.
D) 50° right.

The approximate range of a 10 KW NDB over the sea is:

A) 100 nm
B) 500 nm
C) 50 nm
D) 1000 nm

When is coastal error its worst for an aircraft at low level?

A) Beacon close to the coast at 90° to the coast.
B) Beacon close to the coast at an acute angle to the coast.
C) Beacon inland at 90° to the coast.
D) Beacon inland at an acute angle to the coast.

With a transmission from an NDB aerial, the ... component travels in the ... plane and the signal is ... polarised.

A) magnetic; horizontal; vertically.
B) magnetic; vertical; horizontally.
C) electrical; horizontal; vertically.
D) electrical; vertical; horizontally.

An aircraft is flying a constant heading with 8° right drift and is making good a track parallel to the centre line of an airway but 5 nm off to the left of the centreline. The ADF reading of a NDB on the airway centreline 42 nm ahead of the aircraft is:

A) 015° Relative.
B) 011° Relative.
C) 001° Relative.
D) 002° Relative.

When ADF equipment which incorporates a sense aerial and a loop aerial is tuned to a NDB and the loop aerial is rotated so that a sharp null is found the aerial is:

A) either at right angles or in line with the incoming signals.
B) at right angles to the incoming signals.
C) aligned with the aircraft nose.
D) in line with the incoming signals.

The promulgated range for an NDB is applicable:

A) during daytime only.
B) during night time only.
C) at all times.
D) throughout 24 hours, but is most prone to error around dusk and dawn.

Night Effect which causes loss of signal and fading, resulting in bearing errors from NDB transmissions, is due to:

A) interference from other transmissions and is maximum at dusk when east of the NDB.
B) the effect of the Aurora Borealis.
C) static activity increasing at night particularly in the lower frequency band.
D) skywave distortion of the null position and is maximum at dawn and dusk.

When ADF equipment which incorporates a sense aerial and a loop aerial is tuned to an NDB and the loop is rotated so that a sharp null is found, the aerial is:

A) in line with the incoming signals.
B) at right angles with the incoming signals.
C) parallel to the incoming signals.
D) aligned with the aircraft nose

The result of flying towards a NDB maintaining a 000 relative bearing with a crosswind is:

A) the aircrafts track remains unchanged.
B) the aircraft's track curves to the upwind side of the NDB.
C) the heading remains constant.
D) the aircrafts track curves to the downwind of the NDB.

An aircraft heading 325° (M) has an ADF reading of 330° Relative. The heading to steer to intercept the 280° track inbound to the NDB at 50° is:

A) 330(M)
B) 340(M)
C) 320(M)
D) 310(M)

A radio beacon has an operational range of 10 NM. By what factor should the transmitter power be increased in order to achieve an operational range of 20 NM?

A) Two.
B) Four.
C) Eight.
D) Six.

An aeroplane is flying parallel to a coast. Which of the following NDBs will give the greatest coastal refraction LOP error?

A) NDB sited 30 nm inland-RBI 330° .
B) NDB sited on the coast-RBI 330° .
C) NDB sited on the coast-RBI 300° .
D) NDB sited 30 nm inland-RBI 300° .

Flying in the vicinity of CB clouds and using ADF:

A) Strong static emitted from the CB may cause the ADF needle to deflect towards the CB.
B) All 3 answers are correct.
C) The ANT position of the function switch should be used when listening for NDB ID.
D) The static emitted from the CB will fade soon after you have passed it.

In order to obtain an ADF bearing the:

A) BFO switch must be selected to ON.
B) signal must be received by both the sense and loop aerials.
C) mode selector should be switched to LOOP.
D) sense aerial must be tuned separately.

The BFO selector on an ADF receiver is used to:

A) hear the IDENT and must always be switched ON.
B) find the loop NULL position.
C) stop loop rotation.
D) hear the IDENT of some NDB stations radiating a continuous wave signal.

The inbound track to NDB GDV is 075° (T), Variation 10° W, drift 7° Right. The RMI ADF bearing to maintain to reach GDV is

A) 092°
B) 080°
C) 085°
D) 075°

When considering the propagation of ADF transmissions night effect is most pronounced:

A) when flying at low altitude.
B) at or near the coast.
C) at dusk and dawn.
D) during the long winter nights.

An aircraft is HOMING to a radio beacon whilst maintaining a relative bearing of zero. If the magnetic heading decreases, the aircraft is experiencing:

A) left drift.
B) right drift.
C) a wind from the west.
D) zero drift.

What is the wavelength of an NDB transmitting on 375 kHz?

A) 80 m
B) 8000 m
C) 800 m
D) 8 m

---

81. An aircraft heading 315° M shows an NDB bearing 180° on the RMI. Any quadrantal error affecting the accuracy of this bearing is likely to be:

A) zero, as quadrantal errors are not found on the RMI.
B) zero, as quadrantal errors affect only the VOR.
C) at a minimum.
D) at a maximum.

While correctly tuned to an NDB transmitting a N0N A1A signal the BFO is switched on. What would you hear:

A) no signal noise.
B) both the identification and the tone.
C) the tone but not the identification.
D) the identification but not the tone.

Which one of the following disturbances is most likely to cause the greatest inaccuracy in ADF bearings?

A) Precipitation interference.
B) Coastal effect.
C) Quadrantal error.
D) Local thunderstorm activity.

In an ADF system, night effect is most pronounced:

A) when the aircraft is at low altitude.
B) at dusk and dawn.
C) during long winter nights.
D) when the aircraft is at high altitude.

The accuracy of ADF bearings is affected by precipitation static because:

A) the antenna leaks.
B) electro-magnetic fields produced when rain strikes an aircraft reduce the signal to noise ratio giving a broad null.
C) static produced by thunderstorms giving heavy rain attracts the ADF needle.
D) the NDB transmission refracts as it passes through rain.

Which of the following factors could cause an error on an ADF bearing of an NDB:

A) night effect.
B) land/sea bias.
C) tropospheric scatter.
D) scalloping.

Quadrantal errors associated with aircraft Automatic Direction Finding (ADF) equipment are caused by:

A) signal bending caused by electrical interference from aircraft wiring.
B) signal bending by the aircraft metallic surfaces.
C) misalignment of the loop aerial.
D) skywave/groundwave contamination.

CVOR & DVOR (including use of RMI):

In order to plot a bearing from a VOR station, a pilot needs to know the magnetic variation:
A) at both the VOR and aircraft.
B) at the half-way point between the aircraft and the station.
C) at the aircraft location.
D) at the VOR.

The basic principle of operation of the VOR is by:
A) phase comparison between a 63 Hz reference signal and a 63 Hz variable signal.
B) phase comparison between a 30 Hz reference signal and a 30 Hz variable signal.
C) phase comparison between a 30 Hz reference signal and a 63 Hz variable signal.
D) pulse difference between a 30 Hz reference signal and a 30 Hz variable signal.

The basic principle of operation of a standard VOR is by:
A) phase difference between a frequency modulated reference signal and an amplitude modulated variable signal.
B) phase comparison between a 30 Hz reference signal and a 108 Mhz variable signal.
C) phase comparison between an amplitude modulated reference signal and a frequency modulated variable signal.
D) phase comparison between a 108 Mhz reference signal and a 30 Hz variable signal.

An aircraft is flying on a heading of 270° (M). The VOR OBS is also set to 270° with the full left deflection and FROM flag displayed. In which sector is the aircraft from the VOR ground station:
A) SE
B) SW
C) NE
D) NW

Given: Course Deviation Indicator (CDI) for a VOR is selected to 090° . From/To indicator indicates TO. CDI needle is deflected halfway to the right. On what radial is the aircraft?
A) 095
B) 085
C) 275
D) 265

For a conventional VOR a phase difference of 090 deg would be achieved by flying ... from the beacon.
A) west
B) north
C) east
D) south

The TO/FROM indicator of a VOR:

A) Tells whether the deviation indicator shows that you should manoeuvre the aircraft towards or from the CDI needle.
B) Tells whether you are now flying towards or from the VOR.
C) Tells whether you should turn the aircraft towards or away from the CDI indication.
D) Tells whether a track equal to the selected bearing will bring you to or away from the VOR.

If you correctly tuned in a VOT situated to your east, your RMI should read ... and your OBS would read...

A) 000; 000 with needle central and FROM indicated.
B) 090; 090 with needle central and TO indicated.
C) 000; 000 with needle central an TO indicated.
D) 090; 090 with needle central and FROM indicated.

Using a VOR outside the DOC may result in interference from:

A) other aircraft.
B) ground waves.
C) other beacons.
D) skywaves.

A VOR frequency is selected and VOR and DME indications are received on the appropriate indicators. The VOR ident is CPL and the DME CPZ. This indicates that VOR and DME transmitters are:

A) co-located, and the bearing and range can be plotted from the VOR position.
B) this indicates a TACAN installation.
C) at two independent positions and are not related.
D) serving the same location and may be plotted after checking the two positions.

An aircraft is required to approach a VOR via the 104° radial. Which of the following settings should be made on the VOR/ILS deviation indicator?

A) 284° with the FROM flag showing.
B) 284° with the TO flag showing.
C) 104° with the FROM flag showing.
D) 104° with the TO flag showing.

Which of the following statements concerning the variable, or directional, signal of a conventional VOR is correct?

A) The transmitter changes the frequency of the variable signal by 30 Hz either side of the allocated frequency each time it rotates.
B) The rotation of the variable signal at a rate of 30 times per second gives it the characteristics of a 30 Hz amplitude modulation.
C) The transmitter varies the amplitude of the variable signal by 30 Hz each time it rotates.
D) The receiver adds 30 Hz to the variable signal before combining it with the reference signal.

If the signal from a VOR is lost, how is this shown on the B737-400 EHSI display?

A) A flashing red FAIL message appears in the frequency location.
B) By showing a fail flag alongside the deviation bar.
C) An amber FAIL message appears in the frequency location.
D) By removal of the deviation bar and pointer.

An aircraft heading 140° (M) bears 320° (T) from a VOR (VAR 10° E). The bearing, selected on the OBS which would make the VOR/ILS deviation indicator show TO would be:

A) 320°
B) 130°
C) 330°
D) 120°

The principle used in VOR bearing measurement is:

A) beat frequency discrimination.
B) envelope matching.
C) phase comparison.
D) difference in depth of modulation.

The antenna polar diagram of a conventional VOR:

A) Is a pencil beam.
B) Is like a figure of 8.
C) Rotates at 30 revolutions per second.
D) Is always directed towards the aircraft.

An aircraft is on a bearing of 263° (M) from a VOR station. If the OBI is set to 091, the deviation indicator will show:

A) FROM and fly left 4 dots.
B) TO and fly right 4 dots.
C) TO and fly left 4 dots.
D) FROM and fly right 4 dots.

An aircraft at FL 100 should be able to receive a VOR ground station at 100 FT above MSL at an approximate maximum range of:

A) 130 NM
B) 135 NM
C) 142 NM
D) 123 NM

An aircraft is tracking inbound to a VOR beacon on the 105 radial. The setting the pilot should put on the OBS and the CDI indications are:

A) 285, FROM.
B) 285, TO.
C) 105, TO.
D) 105, FROM.

An aircraft at FL 100 should be able to receive a VOR ground station at 100 FT above MSL at an approximate maximum range of:

A) 142 NM
B) 135 NM
C) 130 NM
D) 123 NM

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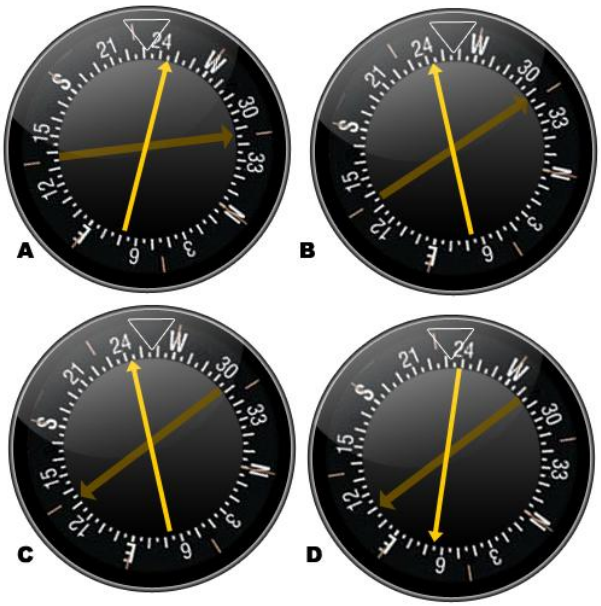
21. You are in an aircraft on a heading of 280° (M) and on a bearing of 090° (M) from a VOR. The bearing you should select on the omni-bearing selector in order to centralise the deviation needle with TO showing is:

A) 100°
B) 90°
C) 280°
D) 270°

An aircraft is tracking the 065° radial inbound to VOR X. With 12° port drift which of the Radio Magnetic Indicator (RMI) indications will be correct when crossing the 133° radial from VOR Y?

A) B
B) A
C) D
D) C



The captain of an aircraft flying at FL100 wishes to obtain weather information at the destination airfield from the airfields VOR. At what maximum theoretical range will it be possible to obtain this information?

A) 12.3 NM
B) 123 km
C) 1230 km
D) 123 NM

If an aircraft flies along a VOR radial it will follow a:

A) rhumbline track.
B) line of constant bearing.
C) constant magnetic track.
D) great circle track.

Transmissions from VOR facilities may be adversely affected by:

A) night effect.
B) static interference.
C) quadrantal error.
D) uneven propagation over irregular ground surfaces.

An RMI slaved to a remote indicating compass has gone unserviceable and is locked on to a reading of 090Â° .
The tail of the VOR pointer shows 135Â° . The available information from the VOR is:

A) Radial 315° , relative bearing unknown.
B) Radial unknown, relative bearing 225° .
C) Radial 135° , relative bearing unknown.
D) Radial unknown, relative bearing 045° .

An aircraft at 6.000 amsl is attempting to receive a VOR signal from a station at 240 amsl. Assuming no other factors are involved the maximum range at which the signal could be detected is:

A) 151 nm
B) 151 km
C) 116 km
D) 116 nm

Using a VOR beyond the limits of the DOC may result in:

A) loss of signal due to line of sight limitations.
B) scalloping errors.
C) interference from other VOR’ s operating on the same frequency.
D) skywave contamination of the VOR signal.

The frequency range of a VOR receiver is:

A) 108 to 135.95 MHz.
B) 108 to 117.95 MHz.
C) 108 to 111.95 MHz.
D) 118 to 135.95 MHz.

An aircraft heading 140° (M) bears 320° (T) from a VOR (VAR 10° E). The bearing, selected on the OBS which would make the VOR/ILS deviation indicator show TO would be:

A) 320°
B) 315°
C) 120°
D) 130°

The ICAO designation for VOR is:

A) J3E
B) A8W
C) A9W
D) A3W

The principle advantage of Doppler VOR is that:

A) the effective range is increased.
B) site errors are considerably reduced.
C) transmitter frequency instability is minimised.
D) a readout of range as well as bearing is obtained.

An aircraft is 100 NM from a VOR facility. Assuming no error when using a deviation indicator where 1 dot = 2° deviation, how many dots deviation from the centre line of the instrument will represent the limits of the airway boundary? (Assume that the airway is 10 NM wide)

A) 1.5
B) 3.0
C) 4.5
D) 6.0

When a maximum range and altitude is published for a VOR?

A) The terrain will cause bends and/or scalloping on the VOR signal and make it inaccurate outside standards in the airspace outside the published airspace.
B) The reception from this VOR is guaranteed free from harmful interference from other VORs when you are within this airspace.
C) The signal from the VOR will be too weak to provide information when you are outside this airspace.
D) You are guaranteed to receive no interference to the VOR signal from other radio transmissions as long as you are within the air space published.

What is the maximum theoretical range that an aircraft at FL150 can receive signals from a VOR situated 609 feet above MSL?

A) 184 NM
B) 156 NM
C) 147 NM
D) 220 NM

An aircraft is required to approach a VOR station via the 244° radial. In order to obtain correct sense indications the deviation indicator should be set to:

A) 244° with the FROM flag showing.
B) 244° with the TO flag showing.
C) 064° with the TO flag showing.
D) 064° with the FROM flag showing.

An aircraft is on a bearing of 263° (M) from a VOR station, the OBI is set to 091° , the deviation indicator will show:

A) FROM and fly left 4 dots.
B) TO and fly right 4 dots.
C) TO and fly left 4 dots.
D) FROM and fly right 4 dots.

An aircraft is over flying a VOR at 30.000 ft, at a groundspeed of 300 kt. The maximum time during which no usable signals will be received (in minutes and seconds) is:

A) 0.50
B) 1:40
C) 4.40
D) 2.25

Which of the following can affect the accuracy of VOR?

A) Sky waves.
B) Thunderstorms nearby.
C) Night effect.
D) Coastal refraction.

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41. With reference to a VOR, the cone of confusion is:

A) the change over from TO to FROM when the OBS is set 90° to the radial.
B) the area outside the DOC.
C) the area directly overhead a VOR.
D) the change over from TO to FROM when the OBS is set 90° to the radial.

In order to establish what radial you are on, you could:

A) Read the OBS when the CDI is centred and the TO/FROM is showing TO.
B) Turn the aircraft until the CDI is centred. The aircraft magnetic heading is now the reciprocal of the radial you are on.
C) Turn the OBS to make the TO/FROM change from TO to FROM. The OBS is now indicating the radial you are on.
D) Rotate the OBS until the CDI gets centred and the TO/FROM indicator is showing FROM. Then read the radial on the OBS.

An aircraft is flying on the true track 090° towards a VOR station located near the equator where the magnetic variation is 15° E. The variation at the aircraft position is 8° E. The aircraft is on VOR radial:

A) 262° .
B) 278° .
C) 285° .
D) 255° .

An aircraft on a heading of 270° (M) has 093 set on the OBS and TO indicated on the VOR L/R deviation indicator. The needle shows two dots fly left. The aircraft is on the:

A) 089° radial
B) 269° radial
C) 277° radial.
D) 097° radial

Given: VOR station position N61° E025° , variation 13° E; Estimated position of an aircraft N59° E025° , variation 20° E. What VOR radial is the aircraft on?

A) 347° .
B) 167° .
C) 193° .
D) 160° .

In which frequency band do VOR transmitters operate?

A) SHF
B) UHF
C) EHF
D) VHF

An aircraft is on a VOR radial of 235° , heading 003° (M), and with the OBS set to 060. The correct indications are:

A) FROM; 1/2 Scale deflection to the left.
B) TO; 1/2 Scale deflection to the left.
C) TO; 1/2 Scale deflection to the right.
D) FROM; 1/2 Scale deflection to the right.

A VOR frequency is selected and VOR and DME indications are received on the appropriate indicators. The VOR ident is GDV and the DME MFT. This indicates that VOR and DME transmitters are:

A) this indicates that GDV is a TACAN installation.
B) serving the same location and may be plotted after checking the two positions.
C) co-located, and the bearing and range can be plotted from the VOR position.
D) at two independent positions and are not related.

During maintenance, malfunction or testing the identification signal of a VOR transmitter is (i) by (ii) or (iii).

A) (i) removed; (ii) an antiphase signal; (iii) suppression
B) (i) suppressed; (ii) a continuous tone; (iii) removed
C) (i) suppressed; (ii) a modulated tone; (iii) suppression
D) (i) replaced; (ii) a continuous tone; (iii) morse letter S

The RMI indicates aircraft magnetic heading. To convert the RMI bearings of NDBs and VOR' s to true bearings the correct positions to read magnetic variation are: (VOR), (NDB)

A) beacon position, beacon position.
B) beacon position, aircraft position.
C) aircraft position, beacon position.
D) aircraft position, aircraft position.

A VOR is sited at position A (45° 00N, 010° 00E). An aircraft is located at position B (44° 00N, 010° 00E).
Assuming that the magnetic variation at A is 10° W and at B is 15° W, the aircraft is on VOR radial:

A) 180°
B) 185°
C) 190°
D) 195°

An airway 10 NM wide is to be defined by two VOR' s each having a resultant bearing accuracy of plus or minus 5.5° . In order to ensure accurate track guidance within the airway limits the maximum distance apart for the transmitter is approximately:

A) 105 NM.
B) 165 NM.
C) 50 NM.
D) 210 NM.

What is the approved frequency band assigned to VOR?

A) 108-117,975 MHz which is LF
B) 108-117,975 MHz which is VHF
C) 108-117,975 MHz which is MF
D) 108-117,975 MHz which is HF

For an aircraft at 30.000 ft what is the maximum radius above a VOR where unreliable or no signals at all may be received:

A) 2 nm.
B) 5 nm
C) 3 nm
D) 4 nm

The maximum theoretical range at which an aircraft at FL210 may receive signals from a VOR facility sited 340 feet above mean sea level is approximately:

A) 204 NM.
B) 183 NM.
C) 245 NM.
D) 163 NM.

When using an RMI as an indicator for the VOR receiver?

A) You will read the drift as the angle between the OBS bug and the tip of the VOR needle.
B) You will read the number of the received radial under the tail of the VOR needle.
C) You will read the number of the received radial under the tip of the VOR needle.
D) The TO/FROM indication on the RMI will indicate which way to turn the aircraft in order to fly towards the VOR station being received

The VOR in an aircraft is correctly tuned and set to define the centre line of a standard airway. The signal received on the VOR/ILS deviation indicator is shown. At the same time the DME gives a range of 45 nm from the facility. The aircraft is displaced from the centre line by:

A) 4 nm
B) 9 nm
C) 10 nm
D) 8 nm

When tracking a VOR radial inbound the aircraft would fly?

A) a rhumb line track.
B) a constant track.
C) a constant heading.
D) a great circle track.

The VOR in an aircraft is correctly tuned and set to define the centre line of a standard airway. The signal received on the VOR/ILS deviation indicator is shown. At the same time the DME gives a range of 45 nm from the facility. Assuming still air conditions, on regaining the centre line, it will be necessary to make the following:

A) right onto 085°
B) left onto 085°
C) left onto 275°
D) right onto 275°

A VOT is:

A) a trial VOR.
B) a tracking VOR
C) a terminal VOR.
D) a test VOR.

The approximate width of the cone of confusion at 15.000 ft overhead a VOR beacon should not be greater than?

A) 4 nm
B) 2 nm
C) 3 nm
D) 6 nm

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61. When using a DVOR, the pilot should be aware that the reference and variable signals are reversed. This:

A) reverses the indications.
B) improves the accuracy.
C) improves the range.
D) does not affect the VOR indications in any way.

An aircraft at 6400 FT will be able to receive a VOR ground station at 100 FT above MSL at an approximate maximum range of:

A) 110 NM
B) 120 NM
C) 90 NM
D) 100 NM

An aircraft on a heading of 270° (M) has 093 set on the OBS and TO indicated on the VOR L/R deviation indicator. With the needle showing 2 dots fly left the aircraft is situated on:

A) 089° radial.
B) 269° radial.
C) 277° radial.
D) 097° radial.

With reference to the VOR:

A) A typical VOR frequency is 118.15 Mhz.
B) Failure of the monitor will cause the beacon to cease its ident.
C) Wide coverage is obtained from only a few beacons.
D) The TO/FROM indicator shows whether the aircraft is heading towards or away from the beacon.

An aeroplane is on radial 070° of a VOR, HDG is 270° . If the OBS is set to 260° , the CDI will show:

A) fly right FROM
B) fly left FROM
C) fly right TO.
D) fly left TO.

If the reference phase differs 30° with the variable phase the radial from the VOR station will be:

A) 030°
B) 210°
C) 330°
D) 150°

The two signals transmitted by a conventional VOR ground station are 90° out of phase on magnetic:

A) west.
B) east.
C) north.
D) south.

Which of the following lists information required to input a waypoint or Phantom Station into a basic VOR/DME- based Area Navigation System?

A) Magnetic track and distance from the aircraft to the waypoint or Phantom Station.
B) Radial and distance from a VOR/DME to the waypoint or Phantom Station.
C) Magnetic track and distance to a VOR/DME from the Waypoint or Phantom Station.
D) Radials from a minimum of two VOR' s to the waypoint or Phantom Station.

An aircraft is on radial 120 with a magnetic heading of 300° , the track selector (OBS) reads: 330. The indications on the Course Deviation Indicator (CDI) are fly:

A) left with TO showing.
B) left with FROM showing.
C) right with FROM showing.
D) right with TO showing.

A VOR is sited at position 58° 00 N 073° 00 W where the magnetic variation equals 32° W. An aircraft is located at position 56° 00 N 073° 00 W where the magnetic variation equals 28° W. The aircraft is on VOR radial:

A) 212.
B) 360.
C) 180.
D) 208.

An aircraft is on a heading of 100 degrees (m) from a VOR. To make the VOR/ILS deviation indicator needle centralise with the TO flag showing, the following bearing should be selected on the OBS:

A) 280 degrees.
B) 100 degrees.
C) 110 degrees.
D) 290 degrees.

Given: Magnetic heading 280° VOR radial 090° What bearing should be selected on the omni-bearing selector in order to centralise the VOR deviation needle with a TO indication?

A) 100°
B) 270°
C) 090°
D) 280°

An aircraft is attempting to track 186° M on an airway defined by a VOR 80nm away. The VOR indicator indicates the aircraft position. With these indications the aircraft is on the... radial and ... the airway.

A) 001° , inside.
B) 001° , outside.
C) 181° , outside.
D) 181° , inside.

When the warning flag on a VOR indicator appears, it may indicate?

A) That no signal is received.
B) That the received signal is too week to be processed in the receiver.
C) All 3 answers are correct.
D) That the quality of the received signal is so poor that a stable establishment of phase difference between the reference and the variable signal is not possible.

If VOR bearing information is used beyond the published protection range, errors could be caused by:

A) interference from other transmitters.
B) sky wave interference from the same transmitter.
C) sky wave interference from distant transmitters on the same frequency.
D) noise from precipitation static exceeding the signal strength of the transmitter.

Which frequency band is used by VOR transmissions?

A) UHF
B) VHF
C) HF
D) SHF

The average total system error using VOR is:

A) +/- 2,5°
B) +/- 3,5°
C) +/- 7,5°
D) +/- 5°

An Omni-bearing selector (OBS) shows full deflection to the left when within range of a serviceable VOR. What angular deviation are you from the selected radial?

A) less than 10° .
B) 10° or more.
C) 2.5 or more
D) 1.5° or more.

If the compass providing information to the RMI suddenly gets a 20° deviation:

A) all 3 answers are correct.
B) the number of the received radial may still be read on the compass card under the tail of the VOR needle.
C) the magnetic track to the VOR station may be read on the compass card under the tip of the VOR needle.
D) the relative bearing to the VOR, as observed on the RMI, will jump 20° .

The letters QTX and adjacent symbol indicate a:

A) VOR/DME
B) VOR
C) Airport
D) TACAN

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81. An aircraft on a heading of 280° (M) is on a bearing of 090° (M) from a VOR. The bearing you should select on the OMNI bearing selector to centralise the VOR/ILS left/right deviation needle with a TO indication is:

A) 100°
B) 090°
C) 280°
D) 270°

The basic principle of VOR is:

A) bearing by phase comparison.
B) bearing by frequency and amplitude modulation.
C) range by phase comparison.
D) range by frequency and amplitude modulation.

Using a 5 dot CDI, how many dots would show for an aircraft on the edge of an airway at 100 nm from the VOR beacon?

A) 5
B) 3
C) 2.5
D) 1.5

Refer to the diagram of a VOR/ILS deviation indicator. Assume that the indicator is set to define the centreline of an airway, that the aircraft is 90nm from the VOR and inbound to the facility. At the time of observation the aircraft was located on radial:

A) 063°
B) 253°
C) 245°
D) 243°

The VOR system is limited to about 1° of accuracy. One degree at 200 NM represents a width of:

A) 3.5 NM.
B) 3.0 NM.
C) 2.0 NM.
D) 2.5 NM.

Given:
Aircraft heading 160° (M).
Aircraft is on radial 240° from a VOR.
Selected course on HSI is 250° .
The HSI indications are deviation bar:

A) ahead of the aeroplane symbol with the FROM flag showing.
B) behind the aeroplane symbol with the FROM flag showing.
C) behind the aeroplane symbol with the TO flag showing.
D) ahead of the aeroplane symbol with the TO flag showing.

DME (Distance measuring equipment):

In the DME system:

A) The channels are referred to as " X" channels paired with VORs and " Y" channels paired with ILS localizers.
B) The receive and the transmit frequency is always split by 63 MHz.
C) The operation is similar to a primary radar system.
D) The aircraft equipment is called a transponder.

During a flight at FL 210, a pilot does not receive any DME distance indication from a DME station located approximately 220 NM away. The reason for this is that the:

A) range of a DME system is always less than 200 NM.
B) altitude is too high.
C) aeroplane is below the line of sight altitude.
D) aeroplane is circling around the station.

An X channel DME transponder will not reply to a Y channel interrogation, because:

A) the spacing between the X and Y interrogation pulses is different.
B) the interrogation and reply frequencies are 126 Mhz apart.
C) the Y channel accepts three pulse interrogations only.
D) the x channel accepts three pulse interrogations only,

An aircraft will not accept replies from its own transmissions that are reflected from the ground because the:

A) random PRF which is unique to each transmitter.
B) interrogation and reply frequencies are 63 Mhz apart.
C) pulses are transmitted in pairs.
D) the aircrafts registration is embedded onto the signal.

If an ident signal is received once in 30 seconds on a frequency paired VOR/DME, then:

A) the TACAN signal is degraded.
B) the DME only is operational.
C) the VOR only is operational.
D) both facilities are operational.

When can an ILS back beam be received in the:

A) never.
B) when flying in the area forward the localiser aerial
C) only at installations where this facility exists.
D) when flying in the area behind the localiser aerial.

DME uses:

A) secondary radar.
B) primary radar.
C) primary radar from the aircraft and secondary radar from the ground.
D) primary radar from the ground and secondary radar from the aircraft.

What is the maximum distance apart, in metres, that an associated en-route VOR/DME can be sited?

A) 30 m.
B) 2000 m.
C) 300 m.
D) 600 m.

DME distinguishes between its signals returning from the ground equipment and signals reflected from the ground because:

A) they are differently modulated.
B) the time delay between transmitted and received signals is incorrect.
C) they are at different frequencies.
D) they carry a unique coding sequence.

The DME frequency band is:

A) VHF
B) UHF
C) HF
D) FM

An aircrafts DME receiver will accept replies to its own interrogations from a DME transponder and ignore replies to interrogations from other aircraft because the:

A) interrogation and reply frequencies are 126 Mhz apart.
B) random PRF which is unique to each transmitter.
C) pulses are transmitted in pairs.
D) interrogation and reply frequencies are 63 Mhz apart.

Which of the following statements is TRUE in respect to microwave landing system?

A) Azimuth and elevation signals are transmitted at the same UHF frequency.
B) Range information is provided by precision DME operating in the UHF.
C) Azimuth and elevation signals use the same aerial on a time share basic.
D) A special precision DME, operating in the SHF band, provides range information.

A DME that has difficulty obtaining a lock-on: (NOTE: PRF = pulse recurrence frequency, PPS = pulses per second)

A) alternates search mode with periods of memory mode lasting 10 seconds.
B) stays in search mode without a reduction in PRF.
C) stays in search mode but reduces PRF to max. 60 PPS after 100 seconds.
D) stays in search mode but reduces PRF to max. 60 PPS after 15000 pulse pairs have been transmitted.

An aircraft DME receiver rejects pulses meant for other aircraft because:

A) the pulses are transmitted in pairs.
B) the transmission and reply frequencies are 63 MHz apart.
C) the random PRF is unique to each aircraft.
D) the pulses are unique to each aircraft.

The DME automatic standby will activate the DME interrogator when:

A) there are too many aircraft in the area for it to service.
B) random filler pulses from the transponder are received.
C) a VOR frequency that has a frequency paired DME is selected.
D) the DME ident signal is received.

Airborne DME equipment is able to discriminate between pulses intended for itself and pulses intended for other aircraft because:

A) each aircraft has its own frequency allocation.
B) aircraft will only accept unique twin pulses.
C) aircraft reject pulses not synchronised with its own random pulse recurrence rate.
D) aircraft transmit and receive on different frequencies.

An aircraft flying at flight level 250 wishes to interrogate a DME beacon situated 400 ft above mean sea level.
What is the maximum range likely to be achieved?

A) 222 nm.
B) 175 nm.
C) 198 nm.
D) 210 nm.

Consider the following statements on horizontal/slant distance when using DME:

A) The horizontal distance is always slightly longer than the slant distance.
B) The operator in the aircraft should always make a mental increase to the indicated range, in order to compensate for the difference between horizontal and slant distance.
C) The difference between the two distances will be negligible for en-route navigation when the indicated distance in NM is more than the height of the aircraft above the DME site, stated in thousands of feet.
D) The difference between the two is automatically compensated for in all DME equipment.

What is the slant range error for an aircraft flying at 9000 feet absolute altitude above a DME located at elevation 2000 ft, when the slant range is 12 NM?

A) 0,57 NM.
B) 1,42 NM.
C) 0,31 NM.
D) 0,09 NM.

A DME receiver is able to distinguish between replies to its own interrogations and replies to other aircraft because:

A) Each aircraft transmits pulses at a random rate and will only accept synchronised replies.
B) DME is secondary radar and each aircraft transmits and receives on a different frequency.
C) DME transponders reply to interrogations with twin pulses and the airborne equipment ejects all other pulses.
D) When DME is in the search mode it will only accept pulses giving the correct range.

21. Referring to DME, during the search pattern before lock-on.

A) the airborne receiver checks 150 pulse pairs per second.
B) the ground receiver maintains the ground transmitter pulse pair transmission rate at no more than 150 per second.
C) the aircraft transmits 24 pulse pairs per second and the receiver checks a maximum of 150 pulse pairs per second.
D) the airborne transmitter transmits 150 pulse pairs per second.

Of what use, if any, is a military TACAN station to civil aviation?

A) It is of no use to civil aviation.
B) It can provide a magnetic bearing.
C) It can provide a DME distance and magnetic bearing.
D) It can provide DME distance.

A typical frequency employed in Distance Measuring Equipment (DME) is:

A) 1000 MHz
B) 10 MHz
C) 100 GHz
D) 100 MHZ

The range indicated by DME is considered to be accurate to within:

A) 3% of range.
B) 0.2 nm.
C) 0.5 nm.
D) 1.25 % of range.

When VOR and DME stations are associated?

A) Their aerials will be mounted on top of each other.
B) Their IDs will in all respects be identical.
C) They may be separated by as much as 600 metres if they are meant for en-route navigation.
D) Their signals must be tuned in by VOR and DME sets in the aircraft having common frequency control.

On a DME, display counters rotating throughout their range indicates:

A) the airborne equipment is conducting a frequency search.
B) ground equipment failure.
C) the airborne receiver is conducting a range search.
D) airborne equipment failure.

An aircraft receives a reply pulse from a DME 1200 micro s after transmission of the interrogation pulse. The DME has a fixed delay of 50 micro s. The range of the aircraft from the DME station is:

A) 63 nm
B) 45 nm
C) 93 nm
D) 75 nm

DME and VOR are frequency paired because:

A) cockpit workload is reduced.
B) the same receiver can be used for both aids.
C) both ground transmitter aerials can be placed on the same site if required.
D) the VOR transmitter is easily converted to the required DME frequency.

Distance Measuring Equipment is an example of ... radar operating on a frequency of ... in the ... band.

A) secondary; 1214 MHz; UHF
B) primary; 8800 MHz; SHF
C) primary; 9375MHz; SHF
D) secondary; 962 MHz; UHF

A DME transponder becomes saturated if interrogated by a excessive number of aircraft. It will reply to the nearest:

A) 200 aircraft.
B) 50 aircraft.
C) 100 aircraft.
D) 150 aircraft.

The maximum theoretical range of a DME at 460 ft amsl interrogated by an aircraft at FL 260 is:

A) 183 nm.
B) 228 nm.
C) 137 nm.
D) 190 nm.

The aircraft DME receiver is able to accept replies to its own transmissions and reject replies to other aircraft interrogations because:

A) aircraft interrogation signals and transponder responses are 63 MHz removed from each other.
B) transmission frequencies are 63 MHz different for each aircraft.
C) pulse pairs are amplitude modulated with the aircraft registration.
D) pulse pairs are discreet to a particular aircraft.

A DME receiver is able to distinguish between replies to its own interrogation pulses and those intended for other aircraft using the same transponder because:

A) DME transponders reply to interrogations by means of twin pulses and the airborne equipment rejects all single pulses.
B) DME is a secondary radar and each aircraft transmits and receives on a different frequency.
C) each aircraft transmits pulses at a random rate (jittering) and will only accept replies that match this randomisation.
D) when DME is in the range search mode it will accept only pulses separated by + or - 63 Mhz from the interrogation frequency.

A DME and VOR have the same ident, are associated and are:

A) within 2.000 feet of each other.
B) within 600 feet of each other.
C) always co-located.
D) within 100 feet of each other.

An aircraft DME interrogator transmits pair of pulses for limited periods at switch on. The transmission pattern is:

A) 150 pps for 100 seconds, thereafter 60 pps until lock on, then 27 pps.
B) 270 pps for 100 seconds, thereafter 150 pps until lock on, then 25-30 pps.
C) 27000 pps for 100 seconds, thereafter 60 pps until lock on, then 30 pps.
D) 15000 pps for 100 seconds, thereafter 60 pps until lock on, then 27 pps.

The time interval between the transmission of a given DME interrogation pulse and the reception of the appropriate response pulse at the aircraft is 2 milli seconds. The slant range is:

A) 92 nm
B) 162 nm
C) 323 nm
D) 73 nm

An aircraft DME receiver does not lock on to its own transmissions reflected from the ground because:

A) DME transmits twin pulses.
B) they are not on the receiver frequency.
C) the pulse recurrence rates are varied.
D) DME uses the UHF band.

System, or beacon, saturation of the DME system:

A) All 3 answers are correct.
B) Occurs when the aircraft DME set has been in operation for an extended period of time, without being put into the STANDBY mode.
C) Occurs when many aircraft, being at a long distance from the DME, are demanding a reply.
D) May occur when more than 100 aircraft are demanding replies from a single ground station.

Referring to DME during the initial stage of the search pattern before lock-on:

A) the airborne transmitter transmits 150 pulses each second.
B) the ground receiver maintains the ground transmitter pulse transmission rate at no more than 150 per second.
C) the airborne receiver checks 150 pulses each second.
D) the aircraft transmits 24 pulses per second and the receiver checks a maximum of 150 pulses per second.

For a VOR and a DME beacon to be said to be associated the aerial separation must not exceed ... in a terminal area and ... outside a terminal area.

A) 50 m; 200 m.
B) 100 m; 2000 m
C) 30m; 600m
D) 50 feet; 200 feet

41. When using multiple DMEs in the RNAV configuration, errors in navigation can occur because:

A) the aircraft is outside their Promulgated Ranges.
B) it is difficult, if not impossible, to make a positive identification of the beacon being used and thus confirm its DOC.
C) the ground beacon may be saturated by the number of aircraft interrogating it.
D) the aircraft is below their line of sight reception ranges.

DME is a (i) radar operating in the (ii) band and transmits (iii).

A) (i) primary; (ii) SHF; (iii) CW pulses
B) (i) secondary; (ii) SHF; (iii) 2400 pulse pairs per second
C) (i) secondary; (ii) UHF; (iii) pulse pairs
D) (i) primary; (ii) UHF; (iii) pulse pairs

Height error has the greatest effect on accuracy when an aeroplane is:

A) at the base line bisector at high altitude.
B) over the base line extension at high altitude.
C) over the base line extensions at low altitude.
D) at the base line bisector at low altitudes.

Distance Measuring Equipment (DME) operates in the:

A) UHF band and is a primary radar system.
B) UHF band and is a secondary radar system.
C) SHF band and uses frequency modulation techniques.
D) VHF band and uses the principle of phase comparison.

For a conventional DME facility Beacon Saturation will occur whenever the number of simultaneous interrogations exceeds:

A) 80
B) 60
C) 200
D) 100

The accuracy of a DME:

A) is approximately ± 2 nm.
B) decreases with increase of range.
C) increases with increase of altitude.
D) is approximately ± 0.5 nm.

The time taken for the transmission of an interrogation pulse by a Distance Measuring Equipment (DME) to travel to the ground transponder and return to the airborne receiver was 2000 micro-second. The slant range from the ground transponder was:

A) 330 NM.
B) 165 NM.
C) 186 NM.
D) 296 NM.

The DME in an aircraft, cruising at FL210, fails to achieve lock on a DME at msl at a range of 210 nm. The reason for this is:

A) the aircraft is beyond the maximum usable range for DME.
B) the aircraft signal is too weak at that range to trigger a response.
C) the aircraft is beyond line of sight range.
D) the beacon is saturated.

A DME station is located 1.000 feet above MSL. An aircraft flying at FL 370, 15 NM away from the DME station, will have a DME reading of:

A) 15 NM
B) 14 NM
C) 16 NM
D) 17 NM

A DME is located at MSL. An aircraft passing vertically above the station at flight level FL 360 will obtain a DME range of approximately:

A) 8 NM.
B) 6 NM.
C) 11 NM.
D) 7 NM.

A VOR and DME are co-located. You want to identify the DME by listening to the callsign. Having heard the same callsign 4 times in 30 seconds the:

A) VOR and DME callsigns were the same and broadcast with the same pitch.
B) DME callsign is the one with the lower pitch that was broadcast several times.
C) DME callsign is the one with the higher pitch that was broadcast only once.
D) DME callsign was not transmitted, the distance information is sufficient proof of correct operation.

The transmission frequency of a DME beacon is 63 MHz removed from the aircraft interrogator frequency to prevent:

A) interference from other radars.
B) static interference.
C) the airborne receiver locking on to primary returns from its own transmissions.
D) receiver accepting replies intended for other interrogators.

Given height of aircraft 32.000 feet DME indicated range 16 nm. The actual range is:

A) 15,1 nm
B) 22,8 nm
C) 16,58 nm
D) 6,58 nm

The frequency difference between the signal transmitted by the DME in an aircraft and the reply signal which is transmitted by the ground station is … , and this difference ensures that the aircraft receiver does not lock-on to…

A) 63 MHz; interrogation pulses from other aircraft.
B) 6.3 MHz; interrogation pulses from other aircraft.
C) 63 GHz; ground reflected signals.
D) 63 MHz; ground reflected signals.

The OFF flag on aircraft DME mileage displays indicate:

A) any of the above.
B) the DME is searching.
C) the DME is off.
D) DME is tuned to the wrong frequency.

In which of the following frequency bands does DME operate?

A) UHF
B) VHF
C) SHF
D) EHF

DME operates on … frequencies and uses … propagation:

A) VHF; space wave
B) VHF; sky wave
C) UHF; space wave
D) UHF; sky wave

An aircraft at FL 450 is 15 nm from a DME. The ground distance is:

A) 13.96 nm.
B) 15.02 nm.
C) 15.04 nm.
D) 13.04 nm

ICAO specifications are that range errors indicated by Distance Measuring Equipment (DME) should not exceed:

A) + or - 0.25 NM plus 1.25% of the distance measured.
B) + or - 1.2 5 NM plus 0.25% of the distance measured.
C) + or - 0.25 NM plus 3% of the distance measured up to a maximum of 5 NM.
D) + or - 0.5 NM or 3% of the. distance measured whichever is the greater.

The distance displayed by the DME indicator is:

A) slant range in statute miles.
B) correct ground range.
C) slant range in nautical miles.
D) slant range in kilometres.

61. Groundspeed measurement using DME equipment is most accurate flying:

A) past the station at long range.
B) from the station at long range.
C) towards the station at short range.
D) past the station at short range.

In which situation will speed indications on an airborne Distance Measuring Equipment (DME) most closely represent the groundspeed of an aircraft flying at FL400?

A) When tracking directly away from the station at a range of 10 NM.
B) When overhead the station, with no change of heading at transit.
C) When passing abeam the station and within 5 NM of it.
D) When tracking directly towards the station at a range of 100 NM or more.

The greatest error between ground distance to the DME station and the indicated distance is:

A) high altitudes at maximum range.
B) low altitudes at maximum range.
C) high altitudes close to the DME station.
D) low altitudes close to the DME station.

The most accurate measurement of speed by DME for an aircraft at 30.000 ft will be when the aircraft is:

A) tracking away from the beacon at 100 nm.
B) passing abeam the beacon at 50 nm.
C) tracking towards the beacon at 10 nm.
D) overhead the beacon.

An aircraft at FL 410 has a DME range of 14 nm. The ground range from the DME is:

A) 12.27 nm
B) 10.33 nm
C) 11.18 nm
D) 12 96 nm

If an NDB has a published range of 30 nm, its accuracy is:

A) is not protected in any way.
B) only guaranteed by day to that range.
C) guaranteed to that range.
D) only guaranteed at night to that range.

For a DME and a VOR to be said to be associated it is necessary for:

A) the aerial separation not to exceed 100 metres in a TMA or 2.000m outside a TMA.
B) the DME to transmit on the same VHF frequency as the VOR.
C) the aerial separation not to exceed 100 feet in a TMA or 2.000 feet outside a TMA.
D) both beacons to have the same first two letters for their ident but the last letter of the DME to be a Z.

The accuracy associated with DME is:

A) + or - 3% of range.
B) + or - 1.25% of range.
C) + or - 0.2 nm.
D) + or - 3% of range, or 0.5 nm, whichever is greater.

How many aircraft can a DME respond to simultaneously:

A) 50
B) 200
C) 100
D) 150

A DME transponder does not respond to pulses received from radars other than DME because:

A) each aircraft transmits pulses at a random rate.
B) DME transmits and receives on different frequencies.
C) DME only responds to the strongest 100 interrogators.
D) it will only accept the unique twin DME pulses.

A VOR/DME share the same first two letters of their respective identifiers; the last identifying letter of the DME is a Z. This means that:

A) they are a maximum distance of 30m apart.
B) they are widely separated and do not serve the same location.
C) they are co-located.
D) they are more than 600m apart but serve the same location.

When a VOR is selected, the morse identifier codes PSV. The DME morse identifier codes PSZ. This means that:

A) the two aerials are not associated with each other but do meet the co-location criteria.
B) the two aids are associated and the aerials are less than 2.000 ft apart.
C) the two transmitter aerials do not meet the co-location criteria.
D) the two aids are co-located and can be used for an airfield approach.

What is the approved frequency band assigned to DME?

A) 960-1215 MHz which is SHF
B) 960-1215 MHz which is UHF
C) 960-1215 MHz which is EHF
D) 960-1215 MHz which is VHF

The DME (Distance Measuring Equipment) operates within the following frequencies:

A) 329 to 335 MHz
B) 962 to 1213 MHz
C) 108 to 118 MHz
D) 962 to 1213 kHz

When a DME is used instead of marker beacons to provide range to the threshold on an ILS approach and where the DME frequency is paired with the ILS, the DME indications should not be used at altitudes greater than:

A) 6.000 ft.
B) 3.000 ft.
C) 25.000 ft
D) 10.000 ft

An aircraft at FL360 is 10 nm plan range from a DME. The DME reading in the aircraft will be:

A) 8 nm.
B) 13.6 nm.
C) 10 nm.
D) 11.7 nm.

DME channels utilise frequencies of approximately:

A) 300 MHz
B) 600 MHz
C) 110 MHz
D) 1000 MHz

A DME beacon having a transmit frequency of 962 MHz would have a receive frequency of:

A) 1030 Mhz.
B) 902 Mhz.
C) 1025 Mhz.
D) 962 Mhz.

A DME in tracking mode subsequently experiences a reduction in signal strength will switch the equipment in the first instance to:

A) signal controlled search.
B) memory mode.
C) search mode.
D) standby mode.

If a VOR station and a DME station, having different locations, are selected to provide a fix:

A) two positions, being ambiguous, will be presented.
B) two different IDs will have to be checked.
C) two sets, with separate frequency control, are required in the aircraft.
D) all 3 answers above are correct.

---

81. The airborne DME equipment will transmit pulse pairs at a comparatively high PRF:

A) At all times, except when the panel control LO is operated.
B) Whenever a stable signal is being received from the selected ground station.
C) When the distance presented is above 50 NM.
D) When first switched on and after a channel selection.

The aircraft DME receiver cannot lock on to interrogation signals reflected from the ground because:
A) reflections are subject to doppler frequency shift.
B) DME transmits twin pulses.
C) DME pulse recurrence rates are varied.
D) aircraft transmitter and DME ground station are transmitting on different frequencies.

The DME indication when an aircraft is overhead a VOR/DME station at 6000 ft:
A) 0,5 nm
B) 0,2 nm
C) 1 nm
D) 1,3 nm

An aircraft DME receiver does not lock on to signals that are reflected from the ground because:
A) the pulse recurrence rate is varied.
B) DME uses the UHF band.
C) reflections will not be at the correct frequency for the receiver.
D) DME transmits twin pulses.

What is the maximum distance between VOR and DME/TACAN ground installations if they are to have the same morse code identifier?
A) 60 m
B) 600 m
C) 300 m
D) 2000 m

The accuracy of DME at 100 nm slant range is within:
A) 4 nm
B) 1 nm
C) 3 nm
D) 2 nm

When identifying a co-located VOR/DME the following signals are heard in the Morse code every 30 seconds?
A) 4 identifications with the DME at a lower tone.
B) 4 identifications with the DME at a higher tone.
C) no DME identification, but if the VOR identification is present and a range is indicated then this shows that both are serviceable.
D) 4 identifications in the same tone.

Which of the following will give the most accurate calculation of aircraft ground speed?
A) A DME station sited on the flight route.
B) An ADF sited on the flight route.
C) A VOR station sited on the flight route.
D) A DME station sited across the flight route.

The reason for using different frequencies for transmitting and receiving in the DME system:
A) Is to avoid the reception in the aircraft of signals referring to other aircraft.
B) Is to prevent overload of the system.
C) Is to prevent self-triggering of the receiving equipment by the transmitter
D) Is to permit more channels in the system.

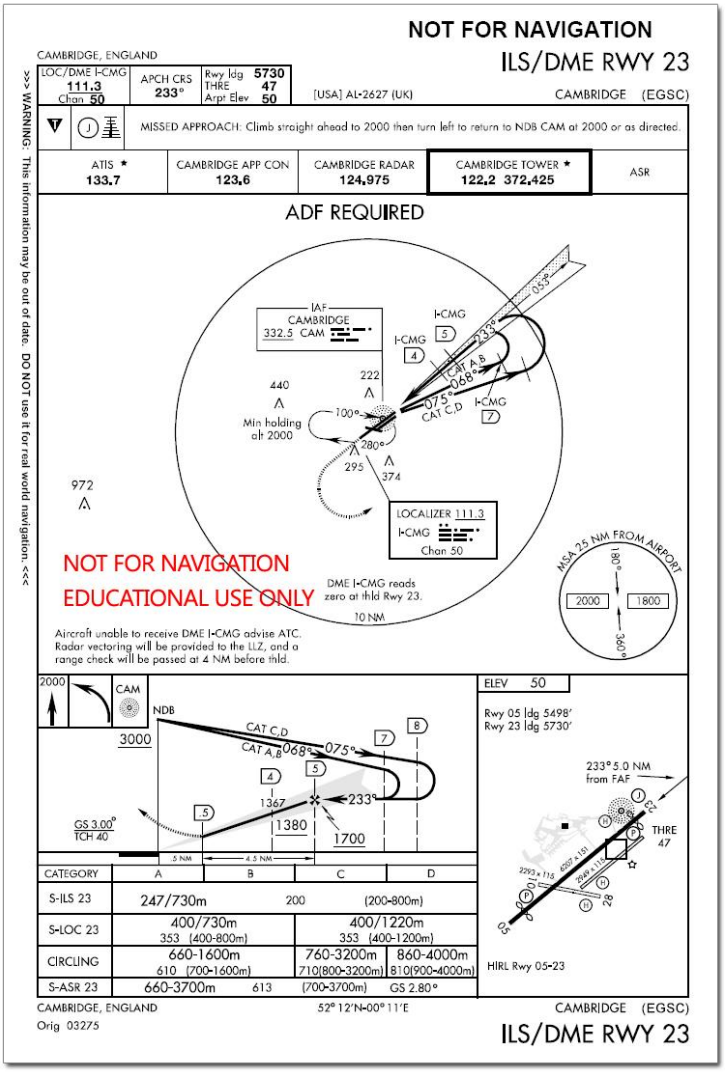
ILS (Instrument landing system):

What is the ILS Localizer frequency on the sample approach plate provided?

A) 332.5 MHz
B) 111.3 KHz
C) 111.3 MHz
D) 332.5 KHz

From the approach plate provided, what is decision height for a Category B aircraft on the straight-in ILS 26 approach?

A) 200 feet
B) 247 metres
C) 247 feet
D) 200 metres



An aircraft is following the ILS glidepath of 3° at an airfield where the outer marker is 4.2 nm from the ILS touchdown point. The aircraft approach speed is 130 kt. The height of the aircraft at the outer marker should be:

A) 1310 ft
B) 960 ft
C) 1200 ft
D) 1150 ft

For reliable navigational information the approximate coverage of a 3° glideslope is:

A) 1.35° to 5.25° from the horizontal and 8° either side of the localiser.
B) 0.45° from the horizontal to 1.75° above the glidepath and 8° either side of the localiser.
C) 0.7° above and below the glidepath and 8° either side of the localiser.
D) 3° above and below the glidepath and 10° either side of the localiser.

The ILS glidepath is 2,8° . At what altitude above the threshold level is the upper limit of the glide path coverage at a distance of 1,5 NM from the touchdown point?

A) 425 feet.
B) 865 feet.
C) 610 feet.
D) 745 feet.

What approximate rate of descent is required in order to maintain a 3° glide path at a groundspeed of 120 kt?

A) 950 FT/MIN.
B) 800 FT/MIN.
C) 550 FT/MIN.
D) 600 FT/MIN.

Assuming a five dot display, what does each of the dots on either side of the ILS localizer cockpit display represent:

A) 0.5 degrees.
B) 2.0 degrees.
C) 2.5 degrees.
D) 1.5 degrees.

On a localizer the modulations are at 150 Hz and 90 Hz. Which of the following statements is correct?

A) The 90 Hz modulation predominates to the right of the centre line.
B) If the 150 Hz modulations predominates, the needle on the CDI moves to the right of centre.
C) When both modulations are received, the aeroplane will be on the centre line.
D) The 150 Hz modulation predominates to the right of the centre line.

An aircraft tracking to intercept the Instrument Landing System (ILS) localiser inbound on the approach side, outside the published ILS coverage angle:

A) will not normally receive signals.
B) may receive false course indications.
C) will receive signals without identification coding.
D) can expect signals to give correct indications.

On an ILS approach you receive more of the 90 Hz modulation than the 150 Hz modulation. The action you should take is:

A) fly right and down.
B) fly left and up.
C) fly left and down.
D) fly right and up.

At 5.25 nm from the threshold an aircraft on an ILS approach has a display showing it to be 4 dots low on a 3 degree glidepath. Using an angle of 0.15° per dot of glideslope deviation and the 1 in 60 rule calculate the height of the aircraft from touchdown.

A) 1375 ft.
B) 1450 ft.
C) 1280 ft.
D) 1325 ft.

An ILS category II ground installation is one that is capable of providing guidance to a height of:

A) 15 m on QNH.
B) 60 m on QNH.
C) 60 m above the horizontal plane containing the threshold.
D) 15 m above the horizontal plane containing the threshold.

The middle marker of an ILS installation identifies itself with:

A) continuous dots with a white light.
B) continuous dashes with an amber light.
C) alternating dots and dashes with a white light.
D) dots and dashes with alternating an amber light.

An aircraft carrying out a 3° glidepath ILS approach experiences a reduction in groundspeed from 150 kt at the outer marker to 120 kt over the threshold. The effect of this change in groundspeed on the aircrafts rate of descent will be a decrease of approximately:

A) 100 FT/MIN.
B) 50 FT/MIN.
C) 250 FT/MIN.
D) 150 FT/MIN.

The horizontal deviation on the expanded ILS display represented by one dot is approximately:

A) 2°
B) 5°
C) 1°
D) 0,5°

In an ILS system, the identification:

A) Is transmitted in morse by the localizer transmitter with a tone of 1020 Hz.
B) Is transmitted alternatively by the localizer and the glidepath transmitters using morse code (In some countries voice identification is also used).
C) Is transmitted with a tone of 1450 Hz.
D) Is transmitted by the localizer and the glidepath transmitters.

The ILS localiser gives coverage in the UK out to a range of 17 nm on either side of the centre line through an angle of:

A) 25°
B) 28°
C) 35°
D) 31°

Outer marker transmits on 75 MHz and has an aural frequency of:

A) 400 Hz.
B) 3000 Hz.
C) 1300 Hz.
D) 2000 Hz.

For a category one ILS glide path of 3.3 degrees the coverage is:

A) 1.49 to 5.94 degrees
B) 1.49 to 5.77 degrees
C) 1.65 to 5.94 degrees
D) 1.65 to 5.77 degrees

Flying a 3° glidepath ILS approach, at a ground speed of 100 Kt., the rule of thumb gives a required rate of descent of:

A) 500 ft/min.
B) 450 ft/min.
C) 400 ft/min.
D) 600 ft/min.

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21. The glide-path signals must be received to a range of 10 nm over a sector:

A) 8° wide centred on the localizer centre line.
B) 10° wide centred on the localizer centre line.
C) 8° each side of the localizer centre line.
D) 10° each side of the localizer centre line.

Which of the following statements concerning the ILS localiser is correct:

A) the localiser signals can be used for a back beam on any approach.
B) the beam is reliable up to 35° from the centreline at a range of 25 nm.
C) reverse course signals may be obtained within 35° of the centreline on the approach side of the ILS.
D) ATC is responsible for keeping large aircraft at a safe distance from a Category III installation in use in minimum conditions.

There are four types of marker beacons, all transmitting on the same carrier frequency:

A) Airway marker (fan marker), Outer marker, Middle marker, Intersection marker.
B) Boundary marker, Outer marker, Middle marker, Inner marker.
C) Airway marker (fan marker) Outer marker, Middle marker, Inner marker.
D) Intersection marker, Outer marker, Middle marker, Inner marker.

In order to maintain a 3° glide-path at an approach speed of 150 kts, the rate of descent required is approximately:

A) 600 feet per minute.
B) 300 feet per minute.
C) 750 feet per minute.
D) 450 feet per minute.

The glide path transmitter operates on:

A) 36 VHF frequencies, paired with localizer frequencies.
B) The frequencies 90 and 150 MHz.
C) On frequencies found by multiplying the localizer frequency by 3.
D) 40 frequencies from 329,15 MHz to 335,00 MHz.

The outer marker of an ILS with a 3° glide slope is located 4.6 NM from the threshold. Assuming a glide slope height of 50 FT above the threshold, the approximate height of an aircraft passing the outer marker is:

A) 1.350 FT
B) 1.450 FT
C) 1.400 FT
D) 1.300 FT

A typical ILS glidepath frequency, in MHz, is:

A) 75.00
B) 110.30
C) 329.30
D) 110.45

What is the Rate of Descent required to maintain a 3° glidepath at a groundspeed of 135 knots.

A) 675 fpm.
B) 800 fpm.
C) 725 fpm.
D) 750 fpm.

ILS glidepath coverage, in extends to a range of 10 nm and:

A) 13° either side of the centre line
B) 18° either side of the centre line
C) 28° either side of the centre line
D) 8° either side of the centre line.

What approximate rate of descent is required in order to maintain a 3° glidepath at a groundspeed of 90 kt?

A) 600 FT/MIN
B) 450 FT/MIN
C) 500 FT/MIN
D) 400 FT/MIN

The modulation technique used in ILS is ... and a typical localiser frequency is...

A) A9W; 110.70 MHz.
B) A8W; 118.30 MHz.
C) A9W; 329.30 MHz.
D) A8W; 110.30 MHz.

Consider the following statements on ILS:

A) An ILS-approach may be flown if the localizer, glide path and marker beacons/DME are operational.
B) If the localizer is out of service, an ILS approach with increased decision height (DH) may be carried out.
C) When the pilot is reaching the decision height (DH) he may only continue the approach if both localizer and glidepath indications are within one dot from the centre positions.
D) ILS is the primary precision approach facility for civil aviation.

The wavelength corresponding to a frequency of 108.95 MHz is
A) 275 m.
B) 27.5 m.
C) 2.75 m.
D) 0.275 m.

Which of the following is an ILS localiser frequency?
A) 109.15 MHz.
B) 108.25 MHz.
C) 112.10 MHz.
D) 110.20 MHz.

Category I aircraft ILS equipment is certificated to:
A) 200 ft barometric height.
B) 100 ft radio height.
C) 200 ft radio height.
D) 100 ft barometric height.

The MIDDLE MARKER of an Instrument Landing System (ILS) facility is identified audibly and visually by a series of:
A) dots and a white light flashing.
B) two dashes per second and a blue light flashing.
C) alternate dots and dashes and an amber light flashing.
D) dashes and an amber light flashing.

Which of the following correctly describes the ILS glidepath radiation pattern:
A) two overlapping lobes on different radio carrier frequencies but with the same modulation.
B) a pencil beam comprising a series of smaller beams each carrying a different modulation.
C) two overlapping lobes on the same VHF carrier frequency.
D) two overlapping lobes on the same UHF carrier.

Using the 1 in 60 rule, calculate the rate of descent (in ft/min) for a 3.3 degree glidepath at a groundspeed of 115 kts.
A) 172 ft/min.
B) 641 ft/min.
C) 325 ft/min.
D) 522 ft/min.

The modulation technique used in ILS … , and a typical localiser frequency is…
A) A9W; 329.30 MHz
B) A9W; 110.70 MHz
C) A8W; 110.30 MHz
D) A8W; 118.30 MHz

Scalloping of an ILS beam means:

A) That the beam slowly leaves the intended approach line.
B) That the beam is intermittent, and is received only now and then during an approach.
C) That false beams (sidelobes) appear from time to time during the approach.
D) That the guidance beam direction varies from side to side of the intended approach path.

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41. A Cat III ILS glidepath transmitter provides reliable guidance information down to:

A) a maximum height of 200 ft above the runway.
B) the surface of the runway.
C) a maximum height of 50 ft above the runway.
D) a maximum height of 100 ft above the runway.

For reliable navigation information the approximate coverage of a 3° ILS glideslope is:

A) 11/2° to 5° from the horizontal and 8° either side of the localiser.
B) 3° above and below the glidepath and 10° either side of the localiser centreline.
C) 0.45° from the horizontal to 1.75° above the glidepath and 8° either side of the localiser centreline.
D) 0.7° above and below the glidepath and 8° either side of the localiser centreline.

In an ILS installation the accurate coverage of the glidepath signals in azimuth is:

A) 8° either side of the centre line out to a distance of 10 nm.
B) 10° either side of the centre line out to a distance of 8 nm.
C) 35 ° either side of the centre line out to a distance of 17 nm.
D) 17° either side of the centre line out to a distance of 35 nm.

A HSI compass rose is stuck on 200 deg. When the aircraft is lined up on the centreline of the ILS localiser for runway 25, the localiser needle will be:

A) right of the centre.
B) centred with the fail flag showing.
C) centred.
D) left of the centre.

An aircraft on a 3° ILS approach at 150kt groundspeed is required to reduce its speed to 120kts at the outer marker, 41/2nm from the threshold. The rate of descent should reduce by approximately:

A) 120 ft/min.
B) 150 ft/min.
C) 190 ft/min.
D) 170 ft/min.

The rate of descent in feet per minute, appropriate to a 3.2° ILS glidepath at an approach groundspeed of 110 kts is:

A) 586 fpm
B) 692 fpm
C) 563 fpm
D) 666 fpm

What frequency is assigned to all ILS marker beacons?

A) 150 Hz
B) One chosen from between 108-112 MHz at odd tenths.
C) 90 Hz
D) 75 MHz

For a 2.7 degree glidepath on a Category 1 ILS the vertical coverage is:

A) 1.85º - 4.75º .
B) 2.05º - 5.55º .
C) 1.35º - 5.25º .
D) 1.22º - 4.73º .

The reason why pre take-off holding areas are sometimes further from the active runway when ILS Category 2 and 3 landing procedures are in progress than during good weather operations is:

A) aircraft manoeuvring near the runway may disturb guidance signals.
B) heavy precipitation may disturb guidance signals.
C) to increase aircraft separation in very reduced visibility conditions.
D) to increase distance from the runway during offset approach operations.

When using the ILS, a false glidepath is:

A) not found.
B) always found above the real glidepath.
C) always found below the real glidepath.
D) found both above and below the real glidepath.

ILS is subject to false glide paths resulting from:

A) back-scattering of antennas.
B) spurious signals reflected by nearby obstacles.
C) ground returns ahead of the antennas.
D) multiple lobes of radiation patterns in the vertical plane.

ILS localiser signals use VHF frequencies between 108 MHz and 118.85 MHz with frequencies allocated every:

A) odd 100 KHz and odd 100 KHz + 50 KHz
B) even 100 KHz and even 100 KHz + 50 KHz
C) odd 100 KHz
D) even 100 KHz

For a 3° ILS glidepath the approximate angles of lower and upper vertical coverage are:
A) 1.05° - 4.25° .
B) 1.35° - 5.25° .
C) 1.5° - 5.25° .
D) 0.45° - 1.75° .

Which of the following statements is true, in respect of an ILS?
A) If the glide path is not operating, the ILS will be switched off.
B) The glide path transmits on UHF.
C) The glide path frequency is paired with the marker frequency.
D) An ILS cannot be used if either of the outer or middle markers is switched off.

The principle of operation of an ILS localiser transmitter is based on two overlapping lobes that are transmitted on (i) frequencies and carry different (ii).
A) (i) different; (ii) phases
B) (i) the same; (ii) phases
C) (i) different; (ii) modulation frequencies
D) (i) the same; (ii) modulation frequencies

At a distance of 20 NM from the localizer transmitter, the horizontal extent of the localizer coverage is:
A) +/- 2,5° .
B) +/- 10° from the runway extended centre line.
C) 10 NM wide.
D) +/- 10 NM wide.

The visual and aural indications of the ILS outer marker are:
A) A white light and 6 dots per second of a 30 Hz modulated tone.
B) A blue light and 2 dashes per second of 400 Hz modulated tone.
C) A blue light and 2 dashes per second of a 1300 Hz modulated tone.
D) An amber light and alternate dots and dashes of a 1300 Hz modulated tone.

The ILS glidepath transmitter is located:
A) About 150 meters upwind from the threshold and about 300 meters from the centre line of the runway.
B) About 300 meters upwind from the threshold and about 150 meters from the centre line of the runway.
C) As close to the runway threshold as possible without causing an obstruction to aircraft.
D) No more than 600 meters from the localizer transmitter.

The ILS glidepath operates between:
A) 329.3 to 335 MHz in the UHF band.
B) 108 to 112 MHz in the VHF band.
C) 329.3 to 335 MHz in the VHF band.
D) 108 to 112 MHz in the UHF band.

A category III ILS system provides accurate guidance down to:
A) the surface of the runway.
B) less than 50 ft.
C) less than 100 ft.
D) less than 200 ft.

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61. An aircraft carrying out an ILS approach is receiving more 90 Hz than 150 Hz modulation notes from both the localiser and glidepath transmitters. The ILS indication will show:
A) Fly left and fly down.
B) Fly right and fly down.
C) Fly right and fly up.
D) Fly left and fly up.

The upper limit of the vertical coverage of the localizer must be:
A) not less than 35° above the horizontal.
B) not less than 600 m above the horizontal.
C) not less than 7° above the horizontal (drawn from the localizer).
D) not less than 300 m above the highest point on the approach.

ILS Cat II will permit instrument approaches down to:
A) DH 100 ft, RVR 200 m.
B) DH 100 ft, RVR 350 m.
C) DH 150 ft RVR 400 m.
D) DH 50 ft, RVR 200 m.

Category II ILS provides accurate guidance to:
A) 125 ft above the horizontal plane containing the threshold.
B) 75 ft above the horizontal plane containing the threshold.
C) 150 ft above the horizontal plane containing the threshold.
D) 100 ft above the horizontal plane containing the threshold.

The coverage of the ILS glideslope with respect to the localiser centreline is:
A) +/-10 deg to 8 nm.
B) +/-35 deg to 17 nm.
C) +/-10 deg to 25 nm.
D) +/-8 deg to 10 nm.

Every 10 kt decrease in groundspeed, on a 3° ILS glidepath, will require an approximate:
A) increase in the aircrafts rate of descent of 50 FT/MIN.
B) increase in the aircrafts rate of descent of 100 FT/MIN.
C) decrease in the aircrafts rate of descent of 50 FT/MIN.
D) decrease in the aircrafts rate of descent of 100 FT/MIN.

The OUTER MARKER of an Instrument Landing System (ILS) facility transmits on a frequency of:
A) 200 MHz and is modulated by alternate dot/dash in morse.
B) 75 MHz and is modulated by alternate dot/dash in morse.
C) 75 MHz and is modulated by morse at two dashes per second.
D) 300 MHz and is modulated by morse at two dashes per second.

Using the 1 in 60 rule calculate the height on a 3 degree glide path of an aircraft 4.5 NM from touchdown.
A) 1420 ft
B) 1480 ft
C) 1370 ft
D) 1230 ft

Which of the following frequencies are used by ILS?
A) 108,45 MHz.
B) 111,10 MHz.
C) A and B above.
D) 109,35 MHz.

The ILS localiser uses frequencies in the … band and the glideslope uses frequencies in the … band:
A) UHF; SHF
B) VHF; HF
C) VHF; UHF
D) UHF; VHF

In which frequency band does an ILS glide slope transmit?
A) VHF
B) SHF
C) EHF
D) UHF

The visual indication of passing the outer marker is a ... light with a series of ... at 400 Hz:
A) white; dashes
B) white; dots & dashes
C) blue; dashes
D) blue; dots

What is the colour sequence when passing over an Outer, Middle and Inner Marker beacon?
A) white - amber - blue.
B) blue - amber - white.
C) amber - white - green.
D) blue - green - white.

The sensitive area of an ILS is the area aircraft may not enter when:
A) ILS operations are in progress.
B) category 1 ILS operations are in progress.
C) category II/III ILS operations are in progress.
D) the ILS is undergoing calibration.

What is the approximate angular coverage of reliable navigation information for a 3° ILS glide path out to a distance of 10 NM?

A) 3° above and below the glide path and 10° each side of the localiser centreline.
B) 0.45° above the horizontal to 1.75° above the glide path and 8° each side of the localiser centreline.
C) 0.7° above and below the glide path and 2.5° each side of the localiser centreline.
D) 1.35° above the horizontal to 5.25° above the horizontal and 8° each side of the localiser centreline.

The amplitude modulation and the colour of an outer marker (OM) is:

A) 1300 Hz, blue.
B) 400 Hz, amber.
C) 3000 Hz, blue.
D) 400 Hz, blue.

The rate of descent required to maintain a 3.25° glide slope at a groundspeed of 140 kt is approximately:

A) 800 FT/MIN.
B) 850 FT/MIN.
C) 700 FT/MIN.
D) 670 FT/MIN.

The heading rose of an HSI is frozen on 200° . Lined up on the ILS of runway 25, the localizer needle will be:

A) right of centre.
B) centred.
C) centred with the fail flag showing.
D) left of centre.

An aircraft flying an ILS is receiving an excess of 90 Hz modulation, what will be the fly indications on the CDI:

A) fly up, fly left.
B) fly up, fly right.
C) fly down, fly left.
D) fly down, fly right.

Where, in relation to the runway, is the ILS localiser transmitting aerial normally situated?

A) At the approach end of the runway about 300 m from touchdown on the centreline.
B) On the non-approach end of the runway about 300 m from the runway on the extended centreline.
C) At the non-approach end about 150 m to one side of the runway and 300 m along the extended centreline.
D) At the approach end about 150 m to one side of the runway and 300 m from touchdown.

81. The correct ROD for an aircraft on a 2.5° glideslope with a groundspeed of 142 Kt at a distance of 4 nm from the threshold is:

A) 600 fpm
B) 1010 fpm
C) 710 fpm
D) 450 fpm

The coverage of the ILS localiser at 17 nm is guaranteed up to an angle either side of the extended centreline of:

A) 35 degrees.
B) 25 degrees.
C) 30 degrees.
D) 10 degrees.

If the ILS monitoring equipment senses a shift or change outside set limits in the basic transmission:

A) The transmissions on a Cat I ILS will be stopped within 6 seconds.
B) The Tower control will inform any inbound aircraft about the inaccuracy.
C) The pilot on ILS approach will be notified by the ident disappearing.
D) The technicians on duty will switch on the stand-by ILS equipment.

Which of the following is TRUE in respect of using ILS?

A) When using a CDI in the overshoot sector you must disobey the needles.
B) When using an HSI the glide path must be set before approach.
C) When using a CDI you must set the OBS to the localizer course.
D) When using an HSI you must set the course arrow to the localizer course.

A localizer must provide horizontal coverage to a distance of:

A) 17 nm all around.
B) 17 nm over a sector of 35° each side of center line.
C) 25 nm over a sector of 15° each side of center line
D) 10 nm all around.

Instrument Landing Systems (ILS) Glide Paths provide azimuth coverage (i) each side of the localiser centre-line to a distance of (ii) NM from the threshold.

A) (i) 25° (ii) 17
B) (i) 5° (ii) 8
C) (i) 8° (ii) 10
D) (i) 35° (ii) 25

Category I ILS is certificated down to:

A) 300 ft barometric height.
B) 200 ft barometric height.
C) 100 ft barometric height.
D) 400 ft barometric height.

Accurate glidepath signals cannot be guaranteed above a certain angle relative to the horizontal . That angle is:

A) 5.25
B) 1.75
C) 1.35
D) 0.45

Consider the following statements on ILS back beam approach:

A) Using an HSI the course selector should be set to the inbound track of the localizer front beam, in order to get normal sensing.
B) Only when a published procedure is at hand, a back beam approach must be flown.
C) All 3 statements are correct.
D) Using a standard ILS indicator, a back beam approach must be flown with heading adjustments from the localizer needle.

Which of the following statements is TRUE?

A) Localiser back beams are never checked for accuracy.
B) All localisers have back beams. They provide guidance in the event of a missed approach.
C) A localizer back beam should only be used for approaches if there is a published procedure.
D) A localizer back beam will always provide reversed steering signals.

An aircraft on an ILS approach is receiving more 90Hz modulation than 150Hz modulation in both localiser and glidepath. The correct action to regain the centreline and glidepath would be to:

A) increase rate of descent and fly right.
B) increase rate of descent and fly left.
C) reduce rate of descent and fly left.
D) reduce rate of descent and fly right.

MLS (Micro landing system):

Compared to the ILS, MLS has the following advantages:

A) Many different approaches to the same runway may be defined by 1 set of ground equipment.
B) All approaches to all airfields will use the same channel, which means that the aircraft equipment will be a single-channel receiver.
C) No special receivers are required in the aircraft.
D) Aircraft separation will automatically be arranged by the ground equipment.

In an MLS the azimuth information is available in the approach sector:

A) To a distance of 20 NM in a 40 degree wide sector.
B) To a distance of 20 NM in an 80 degree wide sector.
C) To a distance of 10 NM in a 110 degree wide sector.
D) To a distance of 10 NM in an 80 degree wide sector.

Which of the following is an advantage of MLS?

A) Uses the same aircraft equipment as ILS.
B) Has a selective access ability.
C) Is not affected by heavy precipitation.
D) Can be used in inhospitable terrain.

Which answer correctly completes the following statement? The characteristics of an MLS installation are that it uses:

A) an azimuth transmitter at the approach end of the runway, an elevation transmitter at the upwind end of the runway and two frequencies.
B) one transmitter for both elevation and azimuth and a single frequency.
C) an elevation transmitter at the approach end of the runway, an azimuth transmitter at the upwind end of the runway and a single frequency.
D) one transmitter for both elevation and azimuth and two frequencies.

In which frequency band does the Microwave Landing System (MLS) operate?

A) VHF
B) EHF
C) SHF
D) UHF

The coverage of MLS is ... either side of the centreline to a distance of...

A) 20 deg; 20 nm.
B) 20 deg; 40 nm.
C) 40 deg; 40 nm.
D) 40 deg; 20 nm.

The principle of operation of MLS is:
A) frequency comparison of reference beams.
B) phase comparison directional beams.
C) lobe comparison of scanning beams
D) time referenced scanning beams.

MLS installations notified for operation, unless otherwise stated, provide azimuth coverage of:
A) + or - 40° about the nominal courseline out to a range of 30 NM.
B) + or - 20° about the nominal courseline out to a range of 10 NM.
C) + or - 20° about the nominal courseline out to a range of 20 NM.
D) + or - 40° about the nominal courseline out to a range of 20 NM.

In an MLS system, the azimuth coverage is:
A) +/- 40°
B) +/- 10°
C) +/- 8°
D) +/- 35°

A microwave landing system operates:
A) on one of 400 channels in the band 5030 GHz to 5090 GHz.
B) on one of 200 channels in the band 5030 to 5090 GHz.
C) on one of 200 channels in the band 5.03 GHz to 5.09 GHz.
D) on one of 400 channels in the band 5.03 GHz to 5.09 GHz.

The MLS utilises a:
A) phase referenced scanning beam system.
B) magnetic referenced scanning beam system.
C) time referenced scanning beam system.
D) clock referenced scanning beam system.

Which one of the following is an advantage of a Microwave Landing System (MLS) compared with an Instrument Landing System (ILS)?
A) The installation does not require to have a separate method (marker beacons or DME) to determine range.
B) It does not require a separate azimuth (localiser) and elevation (azimuth) transmitter.
C) It is insensitive to geographical site and can be installed at sites where it is not possible to use an ILS.
D) There is no restriction on the number of ground installations that can be operated because there is an unlimited number of frequency channels available.

The MLS use a technique based on:
A) Pulse interrogation.
B) Time Reference Scanning Beam.
C) Frequency Modulated Duplex.
D) Analogue Scanning Beam.

The azimuth transmitter of a Microwave Landing System (MLS) provides a fan-shaped horizontal approach zone which is usually:
A) + or - 30° of the runway centre-line.
B) + or - 50° of the runway centre-line.
C) + or - 60° of the runway centre-line.
D) + or - 40° of the runway centre-line.

In a MLS, the time that elapses between the passage of the TO scan and the FRO scan at the aircraft position is:
A) not related to the angular position of the aircraft.
B) directly proportional to the angular position of the aircraft.
C) indirectly proportional to the angular position of the aircraft.
D) none of the above are correct.

Which one of the following correctly lists the major ground based components of a Microwave Landing System (MLS)?
A) Combined azimuth and elevation transmitter, outer and inner marker beacons.
B) Separate azimuth and elevation transmitters, DME facility.
C) Separate azimuth and elevation transmitters, outer and middle marker beacons.
D) Combined azimuth and elevation transmitter, DME facility.

Making an MLS approach, the aircraft:
A) Receives elevation information 2 times a second.
B) Receives elevation information three times as frequent as azimuth information.
C) Receives elevation and azimuth information 39 times a second.
D) Receives elevation information 13 times a second.

Which one of the following methods is used by a Microwave Landing System (MLS) to indicate distance from the runway threshold?
A) Timing the interval between the reception of sequential secondary radar pulses from the MLS station to the aircraft.
B) Timing the interval between the transmission and reception of primary radar pulses from the aircraft to MLS station.
C) Measurement of the frequency shift between the MLS azimuth and elevation transmissions.
D) A DME co-located with the MLS transmitters.

The scanning beam of the MLS system is called:
A) frequency reference scanning beam (FRSB).
B) angle reference scanning beam (ARSB).
C) time reference scanning beam (TRSB).
D) phase reference scanning beam (PRSB).

Microwave landing systems use guidance signals formed from:
A) time referenced scanning beams.
B) phase differences between an amplitude modulated reference signal and a frequency modulated variable signal.
C) intersecting modulated signals transmitted on very narrow beams.
D) radar beams.

Basic Radar Principle
Pulse technique and associated terms:

The speed of a radio wave in nm/sec is:
A) 186,000
B) 300,000
C) 163,842
D) 161,842

In a Cathode Ray Tube the grid is used to:
A) control the brilliance.
B) deflect the electron stream to form a time-base.
C) control the focus.
D) drain electrons from the tube.

For a parabolic reflector to make a narrow beam:
A) the power from the transmitter must be evenly distributed on the antenna.
B) the antenna must rotate at a high speed.
C) the size of the antenna has only minor importance.
D) the size must be large compared to the wavelength.

Using a primary radar:
A) All 3 answers are correct.
B) precipitation may reduce the useful range.
C) target size will influence the maximum range.
D) detection of targets in the area close to the radar will be difficult.

The main factor which determines the minimum range that can be measured by a pulsed radar is pulse:
A) amplitude.
B) repetition rate.
C) length.
D) frequency.

A Primary radar operates on the principle of:
A) continuous wave transmission.
B) phase comparison.
C) transponder interrogation.
D) pulse technique.

Using primary radar, super refraction may play a role, because:
A) super refraction may cause shadows, in which no target will be observed.
B) super refraction will cause a sort of night effect also on radar frequencies.
C) super refraction may cause the direct wave range to be considerably increased.
D) other radar signals may be received due to super refraction of signals.

In a primary radar the maximum range requires:
A) Short PRI and high PRF.
B) High pulse effect and long PRI.
C) High pulse effect and short PRI.
D) Long PRI and high PRF.

The prime factor in determining the maximum unambiguous range of a primary radar is the:
A) size of parabolic receiver aerial.
B) height of the transmitter above the ground.
C) pulse recurrence rate.
D) power output.

A primary radar has a PRF of 500 pps. The maximum theoretical unambiguous range, ignoring all other factors, is
A) 350 nm
B) 100 nm
C) 250 nm
D) 162 nm

Pulse width can be defined as:
A) the number of pulses per second.
B) the time difference from the start of one radar pulse to the start of the next pulse.
C) the time that the radar is active.
D) the duration of the pulse generally measured in microseconds.

What is the maximum theoretical range for a primary radar with a PRF of 324 pps?
A) 500 nm
B) 463 nm
C) 250 nm
D) 463 sm

The main advantage of a slotted scanner is:
A) sidelobe suppression.
B) removes the need for azimuth slaving.
C) can produce simultaneous map and weather information.
D) reduces sidelobes and directs more energy into the main beam.

Minimum useful range of a primary radar requires:
A) Long pulses and high PRI.
B) High PRF.
C) Short pulses and long PRI.
D) Short pulses.

The minimum range of a radar with a pulse width of 1.5 micro/secs is:
A) 450 ft.
B) 450 metres.
C) 225 metres.
D) 225 ft.

If the PRF of a transmitter is stated as 500, the corresponding PRI is:
A) 2 milliseconds.
B) 2 picoseconds.
C) 2 microseconds.
D) 2 nanoseconds.

The advantages of CW radar systems over pulse radar systems are:
A) they are more reliable.
B) they offer better long range performance.
C) there is no minimum range.
D) the transmitter/receiver aerial system is smaller and less complex.

In a primary radar using pulse technique, pulse length determines:
A) minimum measurable range.
B) target discrimination.
C) beam width.
D) maximum measurable range.

The interval in time between the commencement of two consecutive pulses is:
A) pulse recurrence frequency.
B) pulse width.
C) pulse recurrence period.
D) pulse rate.

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21. The maximum theoretical range of a radar whose PRF is 750 is:
A) 132 nm.
B) 218 nm.
C) 108 nm.
D) 200 nm.

On a standard radar display (PPI):
A) the time base is a cosine curve.
B) the time base is a sine curve.
C) the time base is made to rotate synchronously with the antenna in order to display bearing as well as range
D) the time base is a linear, straight scale

In relation to radar systems that use pulse technology, the term Pulse Recurrence Rate (PRR) signifies the:
A) number of pulses per second.
B) delay after which the process re-starts.
C) ratio of pulse period to pulse width.
D) the number of cycles per second.

Ignoring pulse length, the maximum pulse repetition frequency (PRF) that can be used by a primary radar facility to detect targets unambiguously to a range of 200 NM is: (pps = pulses per second)

A) 308 pps.
B) 782 pps.
C) 405 pps.
D) 375 pps.

A radar facility transmitting at a Pulse Recurrence Frequency (PRF) of 1200 pulses/second will have a maximum unambiguous range of approximately:

A) 27 NM.
B) 270 NM.
C) 69 NM.
D) 135 NM.

A primary pulse radar system operates with a pulse repetition frequency of 400 pps. The maximum theoretical range of the system is:

A) 505 nm
B) 202 nm
C) 404 nm
D) 303 nm

A primary radar system has a pulse repetition frequency of 450 pps, ignoring pulse width and flyback at the CRT, the maximum range of the radar would be:

A) 320 NM.
B) 666 NM.
C) 333 NM.
D) 180 NM.

With regards to radio waves, which statement is true?

A) They are reflected by metallic objects with a size compatible to the wavelength.
B) They travel at 186,000nm a second in a vacuum.
C) High frequencies need large aerials.
D) The longer the wavelength the greater the surface attenuation.

The minimum range of a primary radar, using the pulse technique, is determined by the (i); the maximum unambiguous range by the (ii)

A) (i) pulse length (ii) pulse recurrence frequency.
B) (i) transmission frequency (ii) pulse recurrence frequency.
C) (i) transmission frequency (ii) transmitter power output.
D) (i) pulse length (ii) length of the time base.

Which combination of characteristics gives best screen picture in a primary search radar?

A) Long pulse length and narrow beam.
B) Long pulse length and wide beam.
C) Short pulse length and narrow beam.
D) Short pulse length and wide beam.

To increase the maximum theoretical range of a pulse radar one could increase:
A) the PRF and the power.
B) the power.
C) the PRF or the PRI.
D) the PW and the power.

The PRF of a radar is 1500 Hz, what is the PRI:
A) 6666.66 microseconds.
B) 666.66 microseconds.
C) 6.66 microseconds.
D) 66.66 microseconds.

For any given circumstances, in order to double the effective range of a primary radar the power output must be increased by a factor of:
A) 4
B) 8
C) 16
D) 2

Consider the following statements on a freely suspended magnetic needle in the terrestrial magnetic field:
A) the needle will align itself along the magnetic meridian.
B) All answers are correct.
C) the needle will not be influenced by the magnetic inclination (dip).
D) the needle will align itself with the direction of the magnetic lines of force.

A surface movement radar at an airfield has a maximum range of 10 nm. The maximum PRF, ignoring pulse length and fly back, is:
A) 405 pps
B) 1500 pps
C) 4049 pps
D) 8300 pps

The pulse repetition frequency of a signal having a pulse interval (pulse recurrence period) of 5 microseconds is:
A) 200 KHz
B) 2000 KHz
C) 6 MHz
D) 60 MHz

Which one of the following statements is correct concerning the use in primary radar of continuous wave transmissions as compared with pulse transmissions?
A) The equipment required is more complex in continuous wave radar but this is offset by greater reliability and accuracy.
B) A smaller common transmitter and receiver aerial can be used.
C) It is less effective in short range radars but more effective in long range radars.
D) It eliminates the minimum target reception range.

A primary radar has a pulse repetition frequency of 275 pps. The time interval between the leading edges of successive pulses is:

A) 36.4 milliseconds.
B) 3.64 milliseconds.
C) 3.64 microseconds.
D) 36.4 microseconds.

The beam width from a parabolic reflector aerial is:

A) dependant on the transmitted frequency.
B) dependant on the transmitted pulse repetition interval.
C) dependant on the transmitted pulse length.
D) dependant on the transmitted pulse repetition frequency.

Which of the following is not relevant to secondary radar:

A) the return signal is not affected by the size, aspect or shape or material make-up of the target.
B) the reflected signal varies according to the size of target.
C) the target must be active.
D) the target response can be coded to carry information as required.

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41. The main advantage of a continuous wave radar over a pulsed radar is:

A) removes the minimum range restriction.
B) permits measurement of Doppler in addition to improved range and bearing.
C) more complex equipment but better resolution and accuracy.
D) smaller more compact equipment.

A radio wave with a horizontal magnetic component would be best received by a ... aerial.

A) parabolic
B) magnetic
C) vertical
D) horizontal

In a primary radar using pulse technique, pulse recurrence frequency (PRF)/pulse recurrence rate (PRR) determines:

A) minimum range.
B) target discrimination
C) beam width.
D) maximum theoretical range.

In a cathode ray tube the grid potential is:

A) zero.
B) negative with respect to the cathode.
C) the same as the second anode.
D) the same as the cathode.

The maximum range of primary radar depends on:
A) wave length.
B) pulse recurrence frequency.
C) pulse length.
D) frequency.

The definition of a radar display will be best with:
A) narrow beamwidth and narrow pulsewidth.
B) narrow beamwidth and wide pulsewidth.
C) wide beamwidth and wide pulsewidth.
D) wide beamwidth and narrow pulsewidth.

If a primary radar has a pulse width of 1.5 microseconds and a PRF of 809 it will have:
A) min. 2 nm - max. 131 nm
B) min. 0.25 nm - max. 131 nm
C) min. 0.12 nm - max. 100 nm
D) min. 0.12 nm - max. 200 nm

The receiver in a primary radar:
A) must be protected from the influence of the high-power transmitter pulse.
B) must be very sensitive in order to detect weak signals.
C) All 3 answers are correct.
D) must have a short recovery time in order to receive echoes from near-by aircraft.

The term Doppler shift refers to:
A) the change in phase angle measured at the receiver.
B) the change in frequency measured at the receiver.
C) the change in the speed measured at the receiver.
D) the change in depression angle measured at the receiver.

Ground Radar:

A Surveillance Radar installation will often consist of:

A) A primary Radar and a VDF.
B) A Primary Radar and a Precision Radar.
C) An SSR and a Precision Radar.
D) A Primary radar and a Secondary Surveillance Radar (SSR).

An aerodrome ground movement radar is likely to operate in the ... band with a scan rate of ... revolutions per minute.

A) EHF, 20
B) EHF, 1000
C) UHF, 200
D) SHF, 60

The SHF band has been selected for Airfield Surface Movement Indicator (ASMI) radars in preference to the EHF band because:

A) the EHF band is not suitable for the provision of the very narrow beams needed for an ASMI radar.
B) the attenuation caused by precipitation is greater in the EHF band and reduces the radars effective range and usefulness.
C) the EHF band causes unacceptable radiation hazards to personnel.
D) target discrimination using the SHF band is better.

A radar has a PRF of 800 pps. What is the maximum theoretical range and the PRP?

A) 325 nm, 0.0125 micro seconds.
B) 325 nm, 1250 micro seconds.
C) 187.5 km, 0.0125 micro seconds.
D) 187.5 km, 1250 micro seconds.

A saw tooth voltage is used to generate the time base of a simple non rotating radar because:

A) range resolution is optimised.
B) a linear time base is required to correctly represent range and the fly back period is short.
C) bearing resolution is optimised.
D) this achieves the maximum range.

To double the range of a primary radar, the power must be increased by a factor of:

A) 16.
B) 8.
C) 2.
D) 4.

An SRA may be flown to:

A) 0.5 nm using QNH only.
B) 2.0 nm using QFE unless the pilot advises the controller the approach is to be flown on QNH.
C) 2.0 nm using QFE only.
D) 0.5 nm using QNH unless the pilot advises the controller the approach is to be flown on QFE.

In a primary radar system:

A) the radar is primarily used for range-finding.
B) all radio frequency energy is produced by the radar located at the radar site.
C) the radar is the primary aid for ATC.
D) the aircraft plays the secondary role, just listening to the radar signals from the ground radar.

A ground radar transmitting at a PRF of 1200 pulses/second will have a maximum unambiguous range of approximately:

A) 270 NM.
B) 135 NM.
C) 27 NM.
D) 67 NM.

A ground based radar with a scanner rotation of 60 rpm, a beam width in the order of .5° and a PRF of 10.000 pps would be:

A) a Precision Approach Radar.
B) an Airfield Surface Movement Indicator with a theoretical range of 8 nm.
C) a high resolution Surveillance Approach Radar.
D) an Airfield Surface Movement Indicator with a theoretical range of 16nm.

If a radar beam, at a frequency of 10.000 MHz, is radiated from a parabolic dish of diameter 15 cm, the azimuth target discrimination angle is:

A) 15°
B) 5°
C) 7°
D) 14°

The maximum range of a ground radar is limited by:

A) average power.
B) pulse width.
C) pulse recurrence rate.
D) peak power.

In which frequency band do most airborne weather, and ground based ATC, radar systems operate?

A) VHF
B) UHF
C) SHF
D) EHF

What is a typical range for an EN-route surveillance radar (RSR)?

A) Up to 250 nm.
B) Up to 25 nm.
C) UP to 80 nm.
D) Up to 2.500 nm.

The range of a primary radar would not be increased by:
A) increasing the pulse width of the transmitter.
B) increasing the transmitter wavelength.
C) increasing transmitter power.
D) increasing aerial diameter.

The PRF of a primary radar is 500. Its maximum range is:
A) 150 km.
B) 200 km.
C) 300 km.
D) 250 km.

Which of the following types of radar systems are most suited for short range operation?
A) Millimetric pulse.
B) Secondary continuous wave.
C) Primary continuous wave.
D) Centimetric pulse.

A long-range surveillance radar will typically use a frequency of:
A) 3000 MHz.
B) 10 GHz.
C) 600 MHz.
D) 1000 MHz.

The maximum PRF required for a range of 50 nm is:
A) 3240 pps.
B) 1620 pps.
C) 600 pps.
D) 300 pulses per second (pps).

Which of the following statements is true:
A) primary radar gives range not bearing of a reflected object.
B) only a secondary radar can be fitted to an aircraft.
C) secondary radar always measures the bearing of a reflecting object more accurately than primary radar.
D) primary radar uses echoes from a reflecting object, whereas secondary radar uses the response from a transponder.

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21. Ignoring pulse length and fly-back, a radar facility designed to have a maximum unambiguous range of 50 km will have a PRF (pulses per second) of:
A) 330.
B) 3000.
C) 6000.
D) 167.

Why does surface movement radar use a frequency in the SHF band and not EHF?

A) EHF is potentially hazardous to personnel on the area. This was completely overcome by switching to SHF.
B) EHF is absorbed and scattered by moisture in the air. Switching to SHF reduced the problem.
C) The power requirements of EHF were unsustainable in the UK.
D) SHF gives better definition of aircraft type than EHF.

A simple schematic diagram of a typical primary radar set, will show that:

A) The TR.-switch provides signals both to the Timebase and the Receiver.
B) The modulator receive the same input as the receiver.
C) The Display unit is fed information from the receiver and the timebase generator.
D) The timer is feeding timing signals directly to the magnetron.

A radar used by ATC has the following characteristics: Long wavelength, aerial rotation speed 5 RPM. Most likely this is:

A) terminal Surveillance Radar.
B) airfield Surface Movement Indicator.
C) an en route surveillance radar.
D) precision Approach Radar.

In a primary radar using pulse technique, the ability to discriminate between targets in azimuth is a factor of:

A) pulse length.
B) Pulse Recurrence Rate (PRR).
C) aerial rotation rate.
D) beam width.

A radar operates on a frequency of 10 GHz with an aerial of 24 inches diameter. The Beam width is:

A) 3°
B) 3,4°
C) 2°
D) 4°

What is the typical range for a Terminal Area surveillance radar (TAR)?

A) Up to 250 nm.
B) Up to 80 nm.
C) Up to 2.500 nm
D) Up to 25 nm.

Complete the following statement. Aircraft Surface movement Radar operates on frequencies in the (i) band employing an antenna that rotates at approximately (ii) revolutions per minute; it is (iii) possible to determine the type of aircraft from the return on the radar screen.

A) (i) EHF (ii) 30 (iii) never
B) (i) SHF (ii) 10 (iii) always
C) (i) SHF (ii) 60 (iii) sometimes
D) (i) EHF (ii) 100 (iii) never

On which of the following radar displays is it possible to get an indication of the shape and to some extent the type, of the aircraft generating the return?

A) Airborne Weather Radar (AWR).
B) Aerodrome Surveillance (approach) Radar.
C) Secondary Surveillance Radar (SSR).
D) Aerodrome Surface Movement Radar (ASMR).

What is the maximum theoretical range, in nm, of a radar whose PRF is 750 pps?

A) 108 NM.
B) 218 NM.
C) 200 NM.
D) 132 NM.

A radio facility transmits on a wavelength of 2.22 cm. The facility could be a ... operating on a frequency of...

A) doppler; 13500 MHz.
B) radio altimeter; 13500 MHz.
C) DME; 1350 MHz.
D) VDF; 135 MHz.

The maximum unambiguous (theoretical) range for a PRF of 1200 pps is:

A) 360 nm.
B) 67 nm.
C) 134 nm.
D) 180 nm.

The frequency band and rate of scan of Airfield Surface Movement radars are:

A) EHF; 10 RPM.
B) SHF; 200 RPM.
C) SHF; 60 RPM.
D) EHF; 100 RPM.

The maximum range obtainable from an ATC Long Range Surveillance Radar is approximately:

A) 100 NM.
B) 400 NM.
C) 300 NM.
D) 200 NM.

When a DME interrogates a ground station the PRF is:

A) 150 pps for 15,000 pulse pairs then reduces to 60 pps until locked on.
B) 150 pps until locked on.
C) 150 pps for 100 secs then reduces to 60 pps until locked on.
D) 24 pps until locked on.

What is the relationship between the wavelength and frequency of a radar wave and the dimensions of the reflection object to the reflectability?

A) The smaller the wave length the greater the transmitted frequency, the less likely the tendency for the return signal to originate from the smallest particles (eg. Fog).
B) The smaller the wave length the lower the transmitted frequency, the greater the tendency for the signal to refract around even the largest cloud water droplets producing no return signal (eg. Radar waves of 3 cm do not reflect from rain drops).
C) The smaller the wave length the greater the transmitted frequency, the greater the tendency for the return signal to originate from the smallest particles (e.g. Fog).
D) The smaller the wave length the lower the transmitted frequency, the greater the tendency for the signal to refract around even the largest cloud water droplets producing no return signal (eg. Radar waves of 10 cm do not reflect from rain drops).

The maximum range of primary radar is affected by:

A) all of the above.
B) transmission frequency.
C) PRF.
D) pulse width.

Assuming sufficient transmission power, the maximum range of a ground radar with a pulse repetition frequency of 450 pulses per second is: (Given: velocity of light is 300 000 km/second)

A) 1333 km.
B) 150 km.
C) 666 km.
D) 333 km.

What is the range of long range ground radar?

A) 50nm
B) 1000nm
C) 300nm
D) 200nm

The maximum pulse repetition frequency (PRF) that can be used by a primary radar facility in order to detect targets unambiguously at a range of 50 NM is: (pps = pulses per second)

A) 3240 pps.
B) 1620 pps.
C) 713 pps.
D) 610 pps.

Airborne weather radar:

In order to ascertain whether a cloud return on an Aircraft Weather Radar (AWR) is at or above the height of the aircraft, the tilt control should be set to: (Assume a beam width of 5°)

A) 2.5° up.
B) 0° .
C) 2.5° down.
D) 5° up.

The AWR transmitter is not normally selected on the ground because:

A) it can interfere with radars and approach aids.
B) its radiated energy can damage people and equipment.
C) none of these answers are correct.
D) it can overload the electrical system.

Using the airborne weather radar, before take-off:

A) the antenna tilt control should be set to max negative tilt.
B) the contrast control should be adjusted to maximum contrast.
C) the radar transmitter should not be operated when personnel is observed in the sector ahead of the aircraft.
D) the gain control should be adjusted according to the light conditions expected when airborne.

An Airborne Weather Radar system uses a frequency of 9 GHz because:

A) the frequency penetrates clouds quite easily enabling good mapping of ground features in the mapping mode.
B) it has a short wavelength so producing higher frequency returns.
C) the wavelength is such that reflections are obtained only from the larger water droplets.
D) the short wavelength allows signals to be reflected from cloud water droplets of all sizes.

The frequency of AWR is:

A) 93.75 GHz.
B) 937.5 MHz.
C) 9375 GHz
D) 9375 MHz.

A false indication of water may be given by the AWR display when:

A) flying over mountainous terrain.
B) there is cloud and precipitation between the aircraft and a cloud target.
C) flying over land with the Land/Sea switch in the Sea position.
D) attempting to use the mapping beam for mapping in excess of 50 nm.

AWR in the ... mode progressively ... as distances ... to equalise screen brightness.

A) mapping, decreases power, decrease.
B) weather, increases power, decrease.
C) weather, decreases gain, increase.
D) mapping, increases gain, decrease.

Weather radar is used by the pilot to assist in the:

A) detection of other aircraft through clouds.
B) detection and avoidance of all turbulence.
C) detection and determination of a route through active cloud formations.
D) detection and avoidance of potentially turbulent cloud cells.

In an Airborne Weather Radar that has a colour cathode ray tube (CRT) increasing severity of rain and turbulence is generally shown by a change of colour from:

A) yellow to orange to red.
B) green to yellow to red.
C) yellow to amber to blue.
D) green to red to black.

In which frequency band do most airborne weather radars operate?

A) VHF
B) EHF
C) SHF
D) UHF

Which of the following lists phenomena that CANNOT be detected by weather radar?

A) Dry hail; clear air turbulence.
B) Clear air turbulence; turbulence in cloud with precipitation.
C) Snow; clear air turbulence.
D) Snow; turbulence in clouds with precipitation.

A frequency of airborne weather radar is:

A) 9375 GHz.
B) 9375 kHz.
C) 93.75 MHz.
D) 9375 MHz.

When using AWR to detect long range ground features which of the following beams should be used:

A) The conical shaped beam.
B) The fan shaped beam.
C) The iso-echo beam.
D) Mapping mode.

Which of the following cloud types is most readily detected by airborne weather radar when using the weather beam?

A) Cirrocumulus
B) Stratus
C) Altostratus
D) Cumulus

Using airborne weather radar the weather beam should be used in preference to the fan shaped beam for mapping in excess of ... nm.

A) 60 to 70
B) 100 to 150
C) 150 to 200
D) 20 to 25

What frequency is typically chosen for AWR systems?

A) 9.375 GHz
B) 93.75 GHz
C) 9.375 MHz
D) 93.75 MHz

In weather radar the use of a cosecant beam in Mapping mode enables:

A) a greater radar range to be achieved.
B) higher definition echoes to be produced giving a clearer picture.
C) scanning of a large ground zone producing echoes whose signals are practically independent of distance.
D) better reception of echoes on contrasting terrain such as ground to sea.

In order to have good sensitivity to water droplets in cumuli type clouds, the wavelength of an AWR should be:

A) as short as is practicable.
B) between 0.5 to 1 cm.
C) approximately 3 cm.
D) as long as is practicable.

On a colour radar, the greatest turbulence is likely in a area where the targets:

A) coloured magenta.
B) show a clearly defined hole.
C) coloured red.
D) show a rapid gradient of change from magenta to yellow.

In Airborne Weather Radar (AWR), the main factors which determine whether a cloud will be detected are:

A) size of the water drops and diameter of radar scanner.
B) rotational speed of radar scanner and range from cloud.
C) range from cloud and wavelength/frequency used.
D) size of the water drops and wavelength/frequency used.

21. When switching on the weather radar, after start-up, a single very bright line appears on the screen. This means that the:

A) receiver is faulty.
B) transmitter is faulty.
C) scanner is not rotating.
D) scanning of the cathode ray tube is faulty.

A frequency of 10 GHz is considered to be the optimum for use in an airborne weather radar system because:

A) less power output is required in the mapping mode.
B) static interference is minimised.
C) greater detail can be obtained at the more distant ranges of the smaller water droplets.
D) the larger water droplets will give good echoes and the antenna can be kept relatively small.

In general the operation of airborne weather radar equipment on the ground is:

A) only permitted with certain precautions, to safeguard health of personnel and to protect equipment.
B) permitted anywhere.
C) unrestrictedly permitted in aerodrome maintenance areas.
D) totally prohibited.

While using the AWR in the weather mode, the strongest returns on the screen indicate:

A) areas of severe turbulence.
B) areas of high concentration of large water droplets.
C) areas of probable windshear.
D) areas of severe icing.

What causes echoes on airborne weather radar screens?

A) Hail.
B) All cloud.
C) Fog.
D) Water vapour.

A height ring can be used:

A) as the zero point for range measurement.
B) as a range marker.
C) to determine the aeroplanes height above the surface.
D) to determine that the weather radar is functioning.

The pencil shaped beam of an airborne weather radar is used in preference to the mapping mode for the determination of ground features:

A) beyond 50 to 60 NM because more power can be concentrated in the narrower beam.
B) beyond 150 NM because the wider beam gives better definition.
C) beyond 100 NM because insufficient antenna tilt angle is available with the mapping mode.
D) when approaching coast-lines in polar regions.

You want to use your airborne weather radar to detect areas with turbulence. Consider the following statements:

A) You should select the cosec beam and carefully adjust the aerial tilt.
B) If you are flying at low altitude, the detection of turbulence at levels below the aircraft may difficult because of ground returns.
C) Using the cosec beam, the height of top of clouds, with possible turbulence, may be calculated using the 1 : 60 rule.
D) All 3 answers are correct.

The airborne weather radar is using a 5° beam. A cloud is detected at a range of 60 miles. If the scanner is tilted up to 5° the cloud echo disappears. Using the tangent formula to determinate the height of the top of the cloud, in relation to the aeroplanes cruising level and select the nearest answer from the following:

A) 31.900 ft below the level.
B) 15.900 ft below the level.
C) 15.900 ft above the level.
D) 31.900 ft above the level.

In an AWR with a 5 deg beamwidth, how do you orientate the scanner to receive returns from clouds at or above your level?

A) 0 deg tilt
B) 5 deg uptilt
C) 2.5 deg downtilt
D) 2.5 deg uptilt

The antenna of an Airborne Weather Radar is stabilised:

A) in pitch and roll but only when 0° tilt has been selected.
B) in pitch and roll whether the stabilisation is on or off.
C) in pitch, roll and yaw.
D) in pitch and roll.

The mapping mode of Airborne Weather Radar utilises:

A) a cosecant2 fan shaped beam effective 50 nm to 70 nm.
B) a pencillweather beam from 70 nm to 150 nm.
C) a cosecantlfan shaped beam which is effective to 150 nm.
D) a pencillweather beam with a maximum range of 70 nm.

An aircraft heading 017° (T) as a small island showing on the AWR at 45nm range on the 60° left azimuth line.
To obtain a fix from this information you should plot:

A) range 45nm and QTE 137 from the centre of the island.
B) range 45nm and QTE 3 17 from the centre of the island.
C) range 45nm and QTE 060 from the centre of the island.
D) range 45nm and QTE 240 from the centre of the island.

When the airborne weather radar is operating in its primary mode, to detect precipitation:

A) the radar beam is pencil-shaped.
B) maximum tilt of the aerial will often be used.
C) the radar beam is a cosec-beam.
D) the range will be limited, compared to the range obtainable in the mapping mode.

The correct sequence of colours of a colour Airborne Weather Radar as returns get stronger is:

A) green; yellow; red.
B) yellow; green; red.
C) red; green; yellow.
D) red; yellow; green.

Airborne weather radar systems use a wavelength of approximately 3 cm in order to:

A) detect the larger water droplets.
B) detect the smaller cloud formations as well as large.
C) transmit at a higher pulse repetition frequency for extended range.
D) obtain optimum use of the Cosecant squared beam.

The main factors which affect whether an AWR will detect a cloud are:

A) the size of the water droplets and the range of the cloud.
B) the size of the water droplets and the wavelength/frequency.
C) the scanner rotation rate and the frequency/wavelength.
D) the size of the water droplets and the diameter of the antenna reflector.

The ISO-ECHO facility of an airborne weather radar is provided in order to:

A) extend the mapping range.
B) give an indication of cloud tops.
C) inhibit unwanted ground returns.
D) detect areas of possible severe turbulence in cloud.

An aircraft heading 137(M) has a small island showing on the AWR at 45nm range on the 30 left azimuth line.
Local variation is 12° W. To obtain a fix from this information you should plot:

A) Range 45 nm and QTE 287 from the centre of the island.
B) Range 45 nm and QTE 095 from the centre of the island.
C) Range 45 nm and QTE 107 from the centre of the island.
D) Range 45 nm and QTE 275 from the centre of the island.

In the MAPPING MODE the airborne weather radar utilises a:

A) fan shaped beam effective up to a range of 150 NM.
B) fan shaped beam effective up to a maximum of 50 NM to 60 NM range.
C) pencil beam to a maximum range of 60 NM.
D) pencil beam effective from zero to 150 NM.

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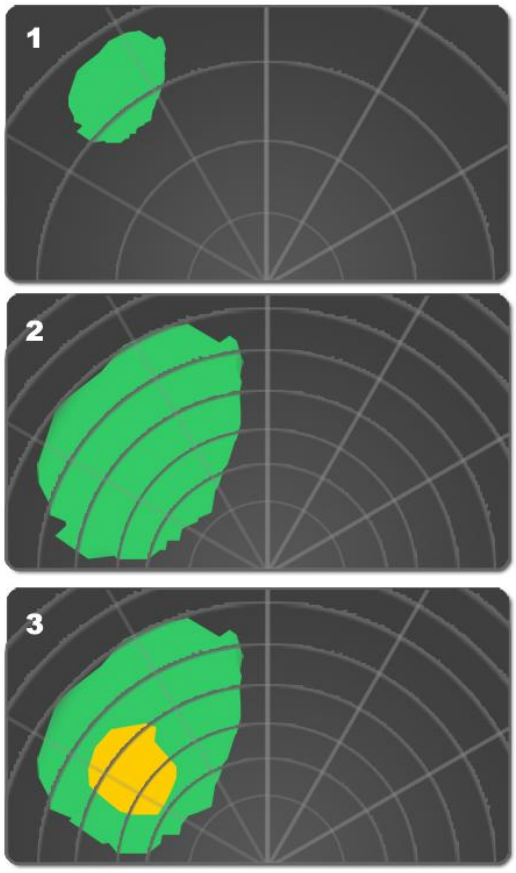
41. On the airborne weather radar display, different colours are used:

A) high ground.
B) to display different intensity of precipitation.
C) echoes from other aircraft
D) clouds, indicating different levels of visibility.

The sequence of AWR displays has been achieved by first selecting a (1) range and then (2) mode.

A) (1) shorter, (2) contour
B) (1) longer, (2) mapping
C) (1) shorter, (2) mapping
D) (1) longer, (2) contour



In an Airborne Weather Radar that has a colour cathode ray tube (CRT) the areas of greatest turbulence are indicated on the screen by:

A) large areas of flashing red colour.
B) blank iso-echo areas where there is no colour.
C) iso-echo areas which are coloured black.
D) colour zones being closest together.

If the AWR transmitter is required to be switched on before take-off the scanner should be tilted up with:

A) either of these modes selected.
B) the mapping mode selected.
C) none of these.
D) the weather mode selected.

The tilt angle on the AWR at which an active cloud just disappears from the screen is 4 degrees up. If the beam width is 5 degrees and the range of the cloud is 40 NM use the 1 in 60 rule to calculate the approximate height of the cloud relative to the aircraft.

A) 4000 above.
B) 6000 below.
C) 6000 above.
D) 4000 below.

On the AWR display the most severe turbulence will be shown:

A) by a steep colour gradient.
B) in flashing red.
C) alternating red and white.
D) by a black hole.

The centre of a small island is identified at the intersection of the 60° left bearing line and 15nm range arc of an airborne weather radar. If the aircrafts heading and height are 035° (M) and 42500ft what QTE and range should be plotted in order to obtain a fix from the island? (variation is 20° W)

A) 135 14 nm.
B) 175 15 nm.
C) 135 15 nm.
D) 135 13 nm.

An aircraft AWR in the iso-echo or contour mode is used for:

A) long range mapping.
B) identifying areas of maximum turbulence within a cloud.
C) identifying rain bearing clouds.
D) short range mapping.

The stabilisation of the weather radar, aerial is effective:

A) for up to +/- 30° of combined roll and pitch.
B) for up to +/- 5° roll and pitch.
C) for up to +/- 45° of combined roll and pitch.
D) for up to +/- 20° of combined roll and pitch.

Before commencing a flight the weather radar should:

A) be switched to stand-by but not used until airborne.
B) be kept at stand-by until line up with the runway.
C) be switched to a range function after push back to make sure it is functioning.
D) not be switched on until clear of buildings.

On switching on the AWR a single line appears on the display. This means that:

A) the transmitter is unserviceable.
B) the antenna is not scanning.
C) the receiver is unserviceable.
D) the CRT is not scanning.

The advantage of the use of slotted antennas in modern radar technology is to:

A) simultaneously transmit weather and mapping beams.
B) virtually eliminate lateral lobes and as a consequence concentrate more energy in the main beam.
C) have a wide beam and as a consequence better target detection.
D) eliminate the need for azimuth slaving.

In which mode of operation does the aircraft weather radar use a cosecant radiation pattern?

A) MAPPING
B) WEATHER
C) MANUAL
D) CONTOUR

The theoretical maximum range for an Airborne Weather Radar is determined by the:

A) transmission frequency.
B) transmission power.
C) pulse recurrence frequency.
D) size of the aerial.

A weather radar, set to the 100 NM scale, shows a squall at 50NM. By changing the scale to 50 NM, the return on the radar screen should:

A) decrease in area and move to the top of the screen.
B) decrease in area but not change in position on the screen.
C) increase in area and move to the top of the screen.
D) increase in area and appear nearer to the bottom of the screen.

Which of the following equipments uses primary radar principles?

A) Secondary Surveillance Radar (SSR).
B) Distance Measuring Equipment (DME).
C) Global Positioning System (GPS).
D) Airborne weather radar (AWR).

The ASMR operates in the ... band, the antenna rotates at ... rpm can ... distinguish between aircraft types.

A) SHF; 60; always
B) SHF; 60; sometimes
C) UHF; 120; never
D) UHF; 120; sometimes

The colours used on a conventional AWR to indicate increasing intensity of returns are:

A) green, yellow and orange.
B) blue, amber and red.
C) green, amber and red.
D) blue, green and red.

The beam width of a radar transmitter with a frequency of 9.4 GHz and an antenna diameter of 15° would be:

A) 7°
B) 8°
C) 6°
D) 5°

Airborne weather radar operates on a frequency of:
A) 8800 MHz because gives the best returns from all types of precipitation.
B) 9375 Mhz because it gives the best returns from rainfall associated with Cb.
C) 9.375 GHz because this frequency is bed for detecting aircraft in flight.
D) 13300 Mhz.

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61. Airborne Weather Radar is an example of ... radar operating on a frequency of ... in the ... band.
A) secondary; 9375 MHz; SHF
B) primary; 9375 Mhz; SHF
C) secondary; 9.375 MHz; UHF
D) primary; 8800 MHz; SHF

An airborne weather radar is required to detect targets up to a maximum range of 200 nm. Ignoring pulse length and flyback in the CRT calculate the maximum PRR.
A) 405 pps.
B) 1500 pps.
C) 750 pps.
D) 810 pps.

An airborne weather radar unit transmits a 5° beam from a parabolic dish aerial reflector assembly. If the wavelength is 4 cm, the diameter of the dish is:
A) 87,5 ins
B) 20 cm
C) 87,5 cm
D) 56,0 cm

Airborne weather radar uses a particularly high frequency radar signal, at 9 - 12 GHz, in order to:
A) All 3 answers are correct.
B) making it possible to present a colour display of the weather situation.
C) get good returns from droplets of water and other sorts of precipitation.
D) get the most accurate range and bearing information.

AWR in the contour mode is used for:
A) identifying areas of maximum turbulence within a cloud.
B) long range mapping.
C) short range mapping.
D) identifying rain bearing clouds.

The colours used to denote variations in rainfall rate on an Airborne Weather Radar screen are ... for very light or no returns, ... for light returns, ... for medium returns and ... for strong returns.
A) black, yellow, green, magenta,
B) black, green, yellow, magenta.
C) grey, green, yellow, red.
D) black, green, yellow, red.

When using the AWR to detect long range ground features the most suitable mode of operation or beam selected would be:

A) the mapping mode.
B) the fan shaped beam.
C) the manual mode.
D) the contour mode.

Which of the following is a complete list of airborne weather radar antenna stabilisation axes?

A) Roll and yaw.
B) Pitch and yaw.
C) Roll and pitch.
D) Roll, pitch and yaw.

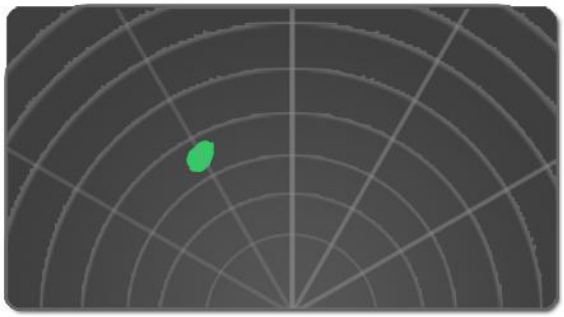
An aircraft at FL 250 is using its AWR which has a beam width of 5 degrees. A cloud at 25 nm ceases to paint when the tilt control is selected to 1 degree up. Using the 1 in 60 rule calculate the height of the cloud top.

A) 25000 ft
B) 21200 ft
C) 28800 ft
D) 26000 ft

An AWR is being used to map the ground between 50nm and 70nm in front of the aircraft. Which would be the correct beam to use and on what scale?

A) Conical beam, 150nm.
B) Conical beam, 50nm.
C) Cosecant beam, 50nm.
D) Cosecant beam, 150nm.

The picture shows the display of an airborne weather radar in the mapping mode indicating an island. If the aircraft heading is 040° (M) the magnetic bearing and range from the aircraft to the island is:



A) 010° , 200 nm.
B) 070° , 240 nm.
C) 010° , 40 nm.
D) 070° , 100 nm.

Typical Airborne Weather Radar (AWR) is gyro stabilised within limits in:

A) pitch and roll.
B) pitch, roll and yaw.
C) pitch and yaw.
D) yaw and turn.

The AWR can be checked on the ground provided:

i. the aircraft is clear of personnel, buildings and vehicles
ii. conical beam is selected
iii. maximum uptilt is selected
iv. the AWR must never be operated on the ground

A) ii, iii
B) i, ii, iii
C) iv
D) i, iii

A frequency used by airborne weather radar is:

A) 9.375 GHz.
B) 8800 MHz.
C) 93.75 GHz.
D) 1213 Mhz.

SSR (Secondary surveillance radar):

The selection of code 2000 on an aircraft SSR transponder indicates:
A) entry into airspace from an area where SSR operation has not been required.
B) unlawful interference with the planned operation of the flight.
C) transponder malfunction.
D) an emergency.

In the SSR terminology de-fruiting means:
A) The removal from the display of random responses.
B) Removing all different colours from the display, making it a mono-colour display.
C) Displaying only airplanes with a selected destination.
D) Displaying only airplanes changing their altitude.

The advantages of SSR mode S are:
A) improved resolution, TCAS.
B) data link, no voice communications required.
C) better resolution, selective interrogation.
D) TCAS, reduced RT communications.

In order to indicate unlawful interference with the planned operation of the flight, the aircraft Secondary Surveillance Radar (SSR) transponder should be selected to:
A) 7000.
B) 7600.
C) 7700.
D) 7500.

In order to indicate an emergency situation, the aircraft Secondary Surveillance Radar (SSR) transponder should be set to:
A) 7000
B) 7500
C) 7600
D) 7700

The ground Secondary Surveillance Radar (SSR) equipment incorporates a transmitter and receiver respectively operating in the following frequencies (transmitter; receiver):
A) 1090 MHz; 1030 MHz.
B) 1030 MHz; 1090 MHz
C) 1030 MHz; 1030 MHz
D) 1090 MHz; 1090 MHz.

When Mode C is selected on the aircraft SSR transponder the additional information transmitted is:
A) height based on QFE.
B) flight level based on 1013.25 hPa.
C) altitude based on regional QNH.
D) aircraft height based on sub-scale setting.

The code transmitted by a SSR transponder consists of:
A) frequency differences.
B) pulses.
C) amplitude differences.
D) phase differences.

Which one of the following switch positions should be used when selecting a code on the Transponder?
A) IDENT (Identification)
B) STBY (Standby)
C) NORMAL
D) OFF

The accuracy of SSR height as displayed to the air traffic controller is:
A) +/-25 ft.
B) +/-100 ft.
C) +/-50 ft.
D) +/-75 ft.

The selection of code 7500 on an aircraft SSR transponder indicates:
A) transponder malfunction.
B) radio communication failure.
C) an emergency.
D) unlawful interference with the planned operation of the flight.

Which of the following equipments works on the interrogator/transponder principle?
A) Secondary Surveillance Radar (SSR).
B) Aerodrome Surface Movement Radar.
C) Global Positioning System (GPS).
D) Airborne Weather Radar (AWR).

Secondary Surveillance Radar is a form of ... radar with ... type emissions operating in the ... band.
A) secondary; FM; SHF
B) primary; pulse; SHF
C) primary; pulse; UHF
D) secondary; pulse; UHF

In special Condition signals, to signify radio failure, which of the following codes should you select on your transponder?
A) ident.
B) 7700
C) 7500
D) 7600

Which statement regarding Mode S transponders is most correct?
A) Mode S transponders are used with TCAS III.
B) Mode S transponders reduce RT traffic and provide a datalink facility.
C) Mode S and Mode C transponders operate on different frequencies.
D) Mode S transponders are used to assist GPS positioning.

When the ATC transponder IDENT button is pressed by the pilot?
A) mode A will automatically be selected.
B) the controller will be urged to identify this airplane.
C) the airplanes echo on the controllers display will flash or fill in.
D) the airplanes identification will be sent to all SSRs within range.

The selection of code 7700 on an aircraft SSR transponder indicates:
A) unlawful interference with the planned operation of the flight.
B) transponder malfunction.
C) an emergency.
D) radio communication failure.

With regard to the advantages of SSR which of the following statements is correct?
A) Range, bearing and height can be calculated from reply signals.
B) Little power is required to effect longish range.
C) All of the above.
D) No aircraft manoeuvres are necessary for identification.

The selection of code 7600 on an aircraft SSR transponder indicates:
A) radio communication failure.
B) unlawful interference with the planned operation of the flight.
C) transponder malfunction.
D) an emergency.

The frequencies used by SSRs are:
A) interrogations are transmitted on 1090 MHz and transponder responses are transmitted on 1090 MHz.
B) interrogations are transmitted on 1030 MHz and transponder responses are transmitted on 1090 MHz.
C) interrogations are transmitted on 1090 MHz and transponder responses are transmitted on 1030 MHz.
D) interrogations are transmitted on 1030 MHz and transponder responses are transmitted on 1030 MHz.

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21. Which SSR mode A code should be selected when entering European airspace from an area where no code has been allocated:
A) 7000
B) 2000
C) 7500
D) 0000

A mode S transponder will:
A) respond to mode A interrogations but not mode C.
B) not respond to mode A/C as it is on a different frequency.
C) respond normally to mode A/C interrogations.
D) not respond to interrogations made on mode A.

The spacing between the two pulses transmitted by an SSR interrogator decides:

A) The ATC code to be set in the aircraft.
B) What service may be provided by the SSR.
C) The identification of that SSR.
D) What mode is used.

The availability of 4096 codes in SSR is applicable to mode:

A) S
B) All
C) A
D) C

With SSR, interrogation and response signals:

A) must be set by the pilot but are always 60 MHz apart.
B) are at standard frequencies separated by 60 MHz.
C) are at variable frequencies set by the controller but are always 63 MHz apart.
D) are separated by 63 MHz.

On a typical computer generated SSR display the following data on a particular flight will be shown:

A) Squawk code, Magnetic heading , Ground speed, Airplane callsign.
B) Squawk code, Flight level , True heading, Airplane callsign.
C) Destination, Flight level , Ground speed, Airplane callsign.
D) Squawk code, Flight level , Ground speed, Airplane callsign.

Selection of mode C on the SSR provides ATC with information based on:

A) aircraft height above QFE.
B) aircraft height above the surface.
C) aircraft altitude as indicated on the captains altimeter.
D) aircraft pressure altitude.

Data transmission and exchange is conducted in:

A) Mode S
B) Mode A
C) Mode C
D) Mode D

ATC area surveillance radars will normally operate to a maximum range of:

A) 300 nm.
B) 400 nm.
C) 100 nm.
D) 200 nm.

Which of the following Secondary Surveillance Radar (SSR) codes is used to indicate transponder malfunction?

A) 0000
B) 7600
C) 9999
D) 4096

In order to indicate radio failure the aircraft SSR transponder should be selected to code:
A) 7500.
B) 7700.
C) 7600.
D) 7000.

SSR, in ATC use:
A) suffers from greater attention (than primary radar) due to the higher frequency used.
B) uses primary radar techniques.
C) is complementary to primary radar.
D) replaces primary radar.

What is the maximum number of usable Secondary Surveillance Radar (SSR) transponder codes?
A) 4096
B) 3600
C) 1000
D) 760

The ATC transponder system, excluding Mode S, contains:
A) four modes, each 4096 codes.
B) two modes, each 1024 codes.
C) two modes, each of 4096 codes.
D) four modes, each 1024 codes.

The essential difference between a primary radar and a secondary radar system is that:
A) a primary radar relies on target reflections, whereas a secondary radar relies on a transponder at the target to generate a reply pulse or pulses.
B) a primary radar is ground based, whereas a secondary radar is an airborne system.
C) a primary radar is limited to line of sight, whereas a secondary radar is not.
D) a primary radar is pulsed, whereas a secondary radar uses CW techniques.

When a mode C interrogation is responded to, vertical position of the aircraft is coded and transmitted. This vertical position is referred to:
A) area QNH.
B) any of the above as directed by ATC.
C) the sub-scale of the altimeter.
D) 1013.2 hPa

Which one of the following Secondary Surveillance Radar (SSR) codes should be used by aircraft entering airspace from an area where SSR operation has not been required?
A) 2000
B) 7000
C) 5000
D) 0000

The transponder code set in an SSR system consists of:
A) 4 digits, forming any of 7777 different codes.
B) 4 digits, forming any of 4096 different codes.
C) 2 digits and 2 letters, forming any of 4096 different codes.
D) 4 digits, forming any of 9999 different codes.

Why is the effect of returns from storms not a problem with SSR?
A) The frequency is too high.
B) The PRF is jittered.
C) By the use of MTI to remove stationary and slow moving returns.
D) SSR does not use the echo principle.

Garbling is caused by:
A) aeroplane at range responding to interrogations from another ATC, SSR.
B) doppler effect on targets moving radial towards or away from the SSR.
C) aeroplanes in close proximity responding to the same interrogation.
D) an aeroplanes transponder responding to side lobes or reflections of the interrogation signal.

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41. A secondary radar can provide up to 4096 different codes. These 4096 codes can be used in:
A) mode A only.
B) mode S.
C) mode C only.
D) all modes.

When using SSR the ground controller will ask the pilot to cancel mode C if there is a discrepancy of more than ... feet between the altitude detected by the radar from the reply pulses and the altitude reported by the pilot read from an altitude with the subscale set to...
A) 100 feet; Regional QNH.
B) 200 feet; 1013 mb.
C) 300 feet; 1013mb.
D) 400 feet; QNE.

If an aircraft is hijacked it is recommended that the pilot set transponder code:
A) 7700.
B) 7600.
C) 7500.
D) 7300.

When both SSR and primary radar is presented on the controllers display?
A) The primary radar information is more accurate in bearing and distance.
B) Altitude information is presented for all targets.
C) The SSR information is more accurate in bearing and distance.
D) The primary radar information is superfluous.
SSR uses wide aperture aerials to:

A) improve range discrimination.
B) improve bearing discrimination.
C) reduce side lode effects.
D) reduce the vertical beam width.

The ATC transponder system, excluding Mode S, contains:
A) two modes, each 1024 codes
B) four modes, each 4096 codes
C) four modes, each 1024 codes
D) two modes, each of 4096 codes

The purpose of mode S is:
A) for data linking, ATC surveillance and reduced R/T communications and use by TCAS II.
B) for scientific use.
C) for use by links TCAS 3.
D) to improve HF communication.

The SSR ground transceiver interrogates on ... and receives responses on ...
A) 1090 MHz, 1090 MHz.
B) 1030 MHz, 1030 MHz.
C) 1090 MHz, 1030 MHz.
D) 1030 MHz, 1090 MHz.

What SSR modes are currently in use by ATC?
A) Mode C and Mode D.
B) Mode A and Mode B.
C) Mode A, Mode B and Mode C.
D) Mode A and Mode C.

Why is a secondary radar display screen free of storm clutter?
A) A moving target indicator facility suppresses the display of static or near static returns.
B) The principle of echo return is not used in secondary radar.
C) The frequencies employed are too low to give returns from moisture sources.
D) The frequencies employed are too high to give returns from moisture sources.

What are the frequencies used for interrogation and response for SSR?
A) 1090 MHz for interrogation from the aircraft 1030 MHz for response from the ground.
B) 1090 MHz for interrogation from the ground 1030 MHz for response from the aircraft.
C) 1030 MHz for interrogation from the ground 1090 MHz for response from the aircraft.
D) 1030 MHz for interrogation from the aircraft 1090, MHz for response from the ground.

Secondary radars require:

A) a target which will respond to the interrogation, and this target will always be ground based.
B) a quiescent target.
C) a target which will respond to the interrogation, and this target may be either an aircraft or a ground based transponder.
D) a target which will respond to the interrogation, and this target will always be an aircraft.

When an aircraft is operating its Secondary Surveillance Radar in Mode C an air traffic controllers presentation gives information regarding the aircrafts indicated flight level that is accurate to within:

A) + or - 50 FT.
B) + or - 100 FT.
C) + or - 75 FT.
D) + or - 25 FT.

What most affects the range available from a secondary radar?

A) The transmission power of ground transponder.
B) The height of aircraft and height of ground interrogator.
C) The transmission power of aircraft interrogator.
D) The PRP.

Consider the following statements on SSR Mode S:

A) Mode S will be able to address any particular of some 16 million aircraft.
B) All 3 statements are correct.
C) Mode S will have the ability to transmit short messages from the ground to a particular aircraft.
D) A mode S interrogator, when installed, will also collect data from old mode a and C transponders.

The frequency of an SSR ground transmission is:

A) 1090 +/- 0.3 Mhz.
B) 1050 +/- 0.5 Mhz.
C) 1030 +/- 0.2 Mhz.
D) 1120 +/- 0.6 Mhz.

Using SSR, the normal transmission from the ATC transponder in the aircraft consists of:

A) pulses giving the altitude, plus any ident pulse.
B) the two pulses received plus the aircraft identification.
C) the two pulses received plus an additional number of pulses between them.
D) the aircraft identification plus pulses giving the altitude.

In the SSR response, the operation of the transponder indent button:

A) sends a special pulse after the normal response pulse train.
B) sends a special pulse before the normal response pulse train.
C) transmits the aeroplanes registration or flight number as a data coded sequence.
D) sends a special pulse in the X position on the pulse train.

With regard to SSR:

A) The interrogator is on the ground and the transponder is on the ground.
B) The interrogator is on the ground and the transponder is in the aircraft.
C) The interrogator is on the aircraft and the transponder is in the aircraft.
D) The interrogator is in the aircraft and the transponder is on the ground.

The two main design functions of Secondary Surveillance Radar (SSR) Mode S are:

A) air to ground and ground to air data link communications and improved ATC aircraft surveillance capability.
B) continuous automatic position reporting using Global Positioning System (GPS) satellites and collision avoidance using TCAS II.
C) the elimination of ground to air communications and the introduction of automatic separation between aircraft using TCAS II.
D) collision avoidance using TCAS II and improved long range (HF) communication capability.

Use of radar Observations and Application to In-flight Navigation:

Two types of radar approaches may be available:

A) Surveillance approach and Final approach.
B) Surveillance approach and Precision approach.
C) Terminal approach and surveillance approach.
D) Final approach and Precision approach.

When carrying out a precision radar approach talkdown normally ceases at ... nm from touchdown:

A) 3nm.
B) 5nm
C) 2nm.
D) 0.5 nm.

In which of the following meteorological conditions would you expect to encounter an increased distance to the radar horizon:

A) surface inversion of temperature and humidity.
B) an inversion of temperature with a steep lapse rate of humidity.
C) surface steep lapse rate of temperature and humidity.
D) a steep lapse rate of temperature with an inversion of humidity.

Area navigation system
General philosophy:

Positions on a Flight Management Computer are updated with information from:
A) VOR / ADF.
B) DME / VOR.
C) DME / DME or DME / VOR.
D) DME / DME.

Under JAR-25 colour code rules, features displayed in amber/yellow on an Electronic Flight Instrument System (EFIS), indicate:
A) warnings.
B) flight envelope and system limits.
C) cautions, abnormal sources.
D) engaged modes.

Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), turbulence is coloured:
A) black.
B) red.
C) cyan.
D) white or magenta.

The radio navigation information used by the FMC is:
A) DME, VOR, ILS.
B) ADF, VOR, DME.
C) VOR, ADF, DME, ILS.
D) VOR, DME.

Basic RNAV requires a track-keeping accuracy of:
A) +/- 2NM or better for 75% of the flight time.
B) +/- 3NM or better for 90% of the flight time.
C) +/- 5NM or better throughout the flight.
D) +/- 5NM or better for 95% of the flight time.

Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), increasing intensity of precipitation are coloured in the order:
A) green, red, magenta, black.
B) amber/yellow, magenta, black.
C) green, amber/yellow, red, magenta.
D) black, amber/yellow, magenta, red.

ICAO Annex 11 defines Area Navigation (RNAV) as a method of navigation which permits aircraft operation on any desired flight path:

A) within the coverage of station-referenced navigation aids or within the limits of the capability of self- contained aids, or a combination of these.
B) outside the coverage of station-referenced navigation aids provided that it is equipped with a minimum of one serviceable self-contained navigation aid.
C) within the coverage of station-referenced navigation aids provided that it is equipped with a minimum of one serviceable self-contained navigation aid.
D) outside the coverage of station-referenced navigation aids provided that it is equipped with a minimum of two serviceable self-contained navigation aids.

Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), a selected heading is coloured:

A) magenta.
B) yellow.
C) green.
D) white.

The colour used on the B737-400 EHSI weather display to show turbulence is:

A) flashing red.
B) high colour gradient.
C) white or magenta.
D) magenta.

The limits of the VHF band are:

A) 300 - 3000 MHz.
B) 30 - 300 MHz.
C) 300 - 3000 KHz.
D) 3 - 30 MHz.

According to JAA JTSOs the colour red is used on an EFIS screen for:

i. Warnings
ii. Flight envelope and system limits
iii. Cautions, abnormal sources
iv. Scales and associated figures

Which selection of the above answers is correct?

A) (i) only
B) (i) & (ii)
C) (i) & (iii)
D) (ii) (iii) & (iv)

In the JAR OPS recommended colours for EFIS, the colour Cyan/Blue is recommended for:

A) sky.
B) Flight Director command information.
C) active modes.
D) performance and system limitations.

In a hybrid navigation system:

A) the aircrew has limited control over the navigation.
B) the aircrew has full control of all navigational matters, because all navigation is executed by the aircrew.
C) the information obtained from ATC and ground radars plays a dominant role.
D) data from two or more of sources is electronically compared and the best information is used.

Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), current data and values are coloured:

A) cyan.
B) red.
C) magenta.
D) white.

Attenuation of a radio wave is the:

A) change of its amplitude by use of sidebands.
B) reduction of its power by absorption, scattering or spreading.
C) change of its frequency by use of sidebands.
D) increase of its power by the combination of multi-path signals.

The colour recommended in JAR OPS 1 for the active route is:

A) magenta.
B) green.
C) cyan.
D) amber.

A VHF signal is transmitted from an aircraft at FL 230. It will be received by an aircraft at FL 50 when the aircraft are ... nm apart.

A) 148
B) 240
C) 278
D) 125

Under JAR-25 colour code rules, features displayed in green on an Electronic Flight Instrument System (EFIS), indicate:

A) cautions, abnormal sources.
B) the ILS deviation pointer.
C) the earth.
D) engaged modes.

A wavelength of 8.5 mm corresponds to a frequency of:

A) 35294 MHz.
B) 2833.3 MHz.
C) 28333 MHz.
D) 3529.4 MHz.

Under JAR-25 colour code rules features displayed in cyan/blue, on an Electronic Flight Instrument Systems (EFIS), indicate:

A) engaged modes.
B) the flight director bar(s).
C) the sky.
D) flight envelope and system limits.

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21. The JAR25 recommended colour for a down path waypoint is:

A) white.
B) green.
C) magenta.
D) cyan.

Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), selected data and values are coloured:

A) white.
B) yellow.
C) green.
D) magenta.

The navigational information that can be input to the FMC using a maximum of 5 alpha-numeric is:

A) navigation facilities, airways designators, latitude & longitude.
B) SIDs & STARs, rho/theta, airways designators.
C) reporting points, airways designators, navigation facilities.
D) latitude & longitude, reporting points, SIDs & STARs.

The JAR OPS colour for selected heading is:

A) green.
B) red.
C) cyan
D) magenta.

To increase the maximum theoretical range of a pulse radar system:

A) increase the PRF and reduce the power.
B) reduce the PRF and increase the power.
C) reduce the PRF and increase the PRF.
D) maintain the PRF and increase the power.

What are the Required Navigational Requirements of equipment intended for use for Basic Area Navigation?
A) RNP-1: for 95% of total flying time the aircraft will be within 1 nm of its intended position.
B) RNP-1: for 95% of total flying time the aircraft will be within 5 nm of its intended position.
C) RNP-1: for 95% of total flying time the aircraft will be within 1 km of its intended position.
D) RNP-1: for 95% of the flying time the aircraft will be within 5 km of its intended position.

What is the period of validity of the navigational database for a Flight Data Storage Unit?
A) 14 days
B) 21 days
C) 7 days
D) 28 days

Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), the active route/flight plan is coloured:
A) green.
B) magenta
C) yellow
D) cyan

The colour recommended in JAR OPS for armed AFCS modes is:
A) yellow.
B) magenta.
C) green.
D) white.

As a storm intensifies, the colour sequence on the AWR display will change:
A) green, yellow, red.
B) blue, green, orange.
C) black, yellow, amber.
D) green, yellow, amber.

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31. Under JAR-25 colour code rules for Electronic Flight Instrument Systems (EFIS), armed modes are coloured:
A) green.
B) magenta.
C) white.
D) amber/yellow.

The required accuracy for a basic system is:
A) +/-1 nm.
B) +/-1° .
C) +/-5° .
D) +/-5 nm.

Typical Flight deck Equipment and Operation:

The following flight plan has been inserted into the navigation system: WPT1, WPT2, WPT3, WPT4, WPT5.
Between WPT1 and WPT2, a clearance is given to proceed directly to WPT5. In order to achieve this the pilot must:

A) erase the flight plan and retype a new one.
B) erase (with CLR) WPT3 and WPT4.
C) use the automatic pilot in the heading mode (HDG) as it is not possible to modify the flight plan in flight.
D) type DIR TO WPT5 on his keyboard.

When can the IRS position be updated?

A) At significant waypoints only.
B) On the ground only.
C) At VOR beacons on route by the pilots.
D) Continuously by the FMC.

Why is an IRS known as a self contained system?

A) Because it only depends on input from global navigation satellite systems.
B) Because it is contained in one area in the aircraft.
C) Because it only depends on input for VOR/DME facilities.
D) Because it derives navigational data from relative movement via in-built sensors.

The Flight Management System (FMS) is organised in such a way that the pilot can:

A) modify the database every 14 days.
B) read and write at any time in the database.
C) modify the data in the database between two updates.
D) insert navigation data between two database updates.

Aircraft position determined by radio navigation in the FMC of a B737-400 is derived by:

A) DME/DME.
B) DME ranges and/or VOR or ADF bearings.
C) VOR/DME.
D) VOR/ADF.

Which component of the B737-400 Electronic Flight Instrument System generates the visual displays on the EADI and EHSI?

A) Flight Management Computer
B) Symbol Generator
C) Flight Control Computer
D) Navigation database

In an Electronic Flight Instrument System (EFIS) data relating primarily to automatic flight is provided by:

A) Air Data Computer, Inertial Reference Systems, Autothrottle.
B) Flight Control Computers, Inertial Reference Systems, Autothrottle.
C) Flight Control Computers, Flight Management Computers, Autothrottle.
D) Flight Management Computers, Flight Control Computers, Air Data Computers.

Radar returns, on a B737-400, can be displayed on all Electronic Horizontal Situation Indicator (EHSI) screen modes of an Electronic Flight Instrument System (EFIS) WITH THE EXCEPTION OF:

A) EXP VOR/ ILS, PLAN and MAP.
B) FULL NAV, PLAN and MAP.
C) FULL VOR/ILS, EXP VOR/ILS and PLAN.
D) FULL NAV, FULL VOR/ILS and PLAN.

When is the FMS position likely to be least accurate?

A) TOC
B) Just after take-off.
C) TOD
D) On final approach.

With regard to FMS, what are the possible modes of operation for dual FMC installations?

A) Dual, independent, and single.
B) Dual.
C) Dual and single.
D) None of the above.

The external reference used by the B737-400 FMC is:

A) VOR/DME.
B) All the above.
C) VOR/VOR.
D) DME/DME.

The FMC position is:

A) computer generated from the IRS and radio navigation positions
B) the average of the IRS positions
C) computer generated from the radio navigation positions
D) the average of the IRS and radio navigation positions

Which of the following can be input manually to the FMC using a maximum of 5 alphanumeric?

A) ICAO aerodrome designators, navigation facilities, SIDs and STARs.
B) Navigation facilities, reporting points, airways designators.
C) Waypoints, airways designators, latitude and longitude.
D) Waypoints, latitude and longitude, SIDs and STARs.

The databases on a FMC:

A) are read only.
B) can be modified by the pilot.
C) are updated once every 28 weeks.
D) can be read or written on to at any time.

Under JAR-25 colour code rules specified display features colour set 1 for Electronic Flight Instrument Systems (EFIS), selected data and values are coloured:

A) magenta.
B) white.
C) green.
D) yellow.

The Flight Management Computer (FMC) position is:

A) the computed position based on a number of sources (IRS, Radio, ILS, GPS etc).
B) another source of aircraft position; it is independent of other position sources (IRS, Radio, ILS etc).
C) the same as that given on the No. 1 IRS.
D) the actual position of the aircraft at any point in time.

Which one of the following sensors/systems is self-contained and obtains no external information?

A) Inertial Navigation System (INS) position.
B) Pressure altitude.
C) Magnetic heading.
D) VOR/DME radial/distance.

What are the first three screens on an FMS that require data input?

A) IDENT, POS, INIT REF.
B) POS, RTE, PERF INIT.
C) IDENT, POS, RTE.
D) POS, RTE, DEP.

What is Back Up FMS navigation mode?

A) When one FMS is a Master and the other is a Slave.
B) When one FMS operates independently from the other.
C) When only one FMS is operational.
D) When the FMC is suffering from some failure but there is still limited FMS function.

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A) When one FMS is a Master and the other is a Slave.
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C) When only one FMS is operational.
D) When the FMC is suffering from some failure but there is still limited FMS function.

When is the IRS position updated:

A) at VOR beacons en route by the pilots.
B) continuously by the FMC.
C) at significant waypoints only.
D) on the ground only.

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21. The FMS is composed of:

A) the flight management computer only.
B) the command display unit and the flight management computer.
C) the EFIS and EICAM displays.
D) the automatic flight control system and the power management controls system.

In an Electronic Flight Instrument System (EFIS) data relating primarily to navigation is provided by:

A) Inertial Reference Systems, Navigation radios, True airspeed and drift inputs.
B) Navigation radios, Flight Management Computer, Inertial Reference Systems.
C) Inertial Reference Systems, Aircraft Mapping Radar, Navigation radios.
D) Flight Management Computer, Aircraft Mapping Radar, Navigation radios.

Which of the following gives the best information about the progress of a flight between 2 en-route waypoints from a RNAV equipment?

A) ETD.
B) ETO.
C) ATA.
D) Elapsed time on route.

The FMC database is divided into two broad sections, namely

A) The Performance database and the ATC information database.
B) The Navigation database and the Performance database.
C) The Navigation database and the FMS database.
D) The CPU database and the Flight Engineers database.

In which of the following cases would ETOs and ETA at destination calculated by the Flight Management Computer (FMC) be correct?

A) When the actual winds match the forecast winds, and the actual cruising Mach number is equal to the FMC calculated Mach number.
B) When the FMC positions and GS are accurate.
C) When the FMC computes each ETO and ETA using the correct GS.
D) When the ETOs and ETA are based on the forecast winds calculated from the actual take-off time.

The database of an FMS (Flight Management System) is organised in such a way that the pilot can:

A) can modify the database every 28 days.
B) insert navigation data between two updates.
C) read and write at any time in database.
D) only read the database.

The navigation function of the flight management computer:

A) takes the IRS position and applies the Kalman filtering process to smooth the deviations caused by the Schuler period.
B) takes the IRS position and through the Kalman filtering process adjusts that position using external reference.
C) uses the IRS data through the Kalman filtering process to update the external reference position.
D) derives position from the IRS data and external reference through the Kalman filtering process.

The FMS database can be:

A) only read by the pilots.
B) altered by the pilots every 28 days.
C) read and altered by the pilots.
D) altered by the pilots between the 28 day updates.

The IRS position in the B737-800 can be updated:

A) on the ground and on final approach when using ILS or MLS equipped with DME.
B) at specified points when within 25 nm of both DME' s.
C) only on the ground.
D) when the pilot considers the accuracy of the IRS is below the basic RNAV limits.

The sequence of MCDU pages accessed on initialisation of the FMS is:

A) RTE, IDENT, POS INIT.
B) IDENT, POS INIT, RTE.
C) IDENT, POS INIT, RTE, PERF INIT.
D) POS INIT, IDENT, RTE.

Under JAR-25 colour code rules for EFIS, fixed reference symbols are coloured:

A) magenta.
B) red.
C) white.
D) green.

A laser reference system (IRS), as compared to a gyro reference system (INS):

A) is not strapped down and is adversely affected by g-forces.
B) the platform is strapped down but the accelerometers are not.
C) the accelerometers are strapped down but the platform is not.
D) is strapped down and is not adversely affected by g-forces.

Why is gate number requested by the FMC?

A) So that pilots can choose as an option this gate for the return flight.
B) To inform the company of departure gate by date link.
C) So that the FMS con convert the gate position into a WGS 84 co-ordinate for the inertial navigation system.
D) None of the above.

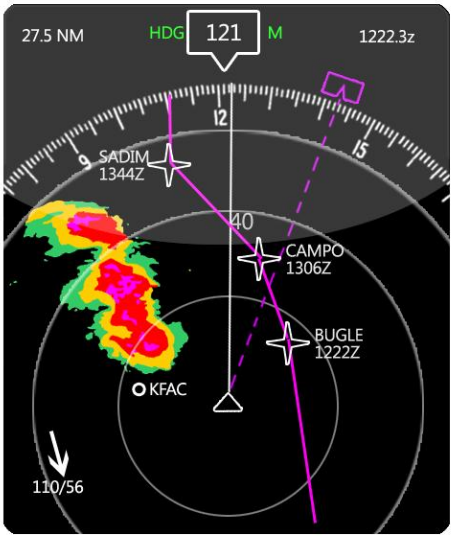
The track-line on the Electronic Horizontal Situation Indicator (EHSI) or Navigation Display of an Electronic Flight Instrument System:

A) corresponds to the calculated IRS TH and is correct during turns.
B) represents the track of the aircraft over the ground. When it coincides with the desired track, wind influence is compensated for.
C) indicates that the pilot has made a manual track selection.
D) indicates to the pilot that a manually selected heading is being flown.

Instrument Indication:

What does O followed by KFAC indicate?

A) An off route VOR/DME.
B) A destination airfield.
C) An alternate airfield.
D) An off route airfield.



An aircraft is flying at FL 140 where the COAT is -5° C. It is flying at an indicated air speed of 260 kts and is experiencing a headwind of 34 knots. When 150 nm from the FIR boundary it is instructed to reduce speed in order to delay arrival at the boundary by 5 minutes. The required reduction in indicated air speed is:

A) 15 kts.
B) 24 kts.
C) 33 kts.
D) 41 kts.

The JAR25 colour code for a down path waypoint is:

A) magenta.
B) white.
C) green.
D) cyan.

The JAR25 colour code for selected heading is:

A) amber.
B) magenta.
C) white.
D) green.

An aircraft tracking 060° (T) in still air has a relative bearing off an NDB of 035° at 1300. At 1312 the relative bearing is 070° . The groundspeed of the aircraft is 180 knots. What is the aircraft distance from the NDB at 1312:

A) 30 nm
B) 36 nm
C) 24 nm
D) 18 nm

Heading 145° T, TAS 270 kts, wind velocity 205° /30 kts. What is the drift and groundspeed?

A) 6° L; 256 kts.
B) 6° R; 258 kts.
C) 5° R; 256 kts.
D) 5° L; 252 kts.

Using a 2D RNAV system, an aircraft is flying from WP1 to WP2, a distance of 47 nm. The aircraft has 25 nm to run to WP2. WP2 is 270/37 nm from the VOR/DME and the aircraft is 32 nm from the same VOR/DME. The range readout will be:

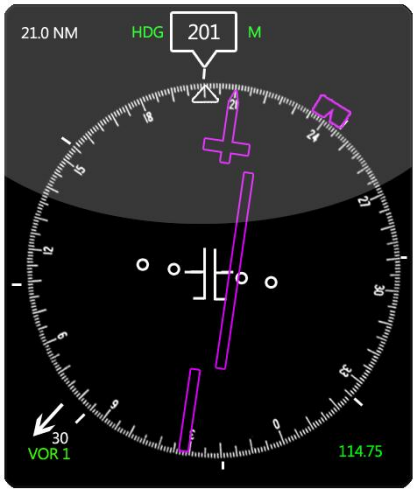
A) 25 nm
B) 37 nm
C) 32 nm
D) 47 nm

The heading inputs to the EHSI are from:

A) the IRS through the symbol generator.
B) the FMC through the symbol generator.
C) the FMC.
D) the IRS.

This EHSI is in ... mode.

A) VOR
B) EXP VOR
C) NAV
D) ILS



The JAR25 colour code for ILS deviation pointer is:

A) cyan.
B) amber.
C) green.
D) magenta.

You are maintaining a track of 315° M on a heading of 299° M. The variation at the aircraft is 12° E. The true heading is ..., the true track is ... and the drift is ...

A) 287° , 303° , 16° port.
B) 326° , 311° , 16° starboard.
C) 311° , 327 ° , 16° port.
D) 311° , 327° , 16° starboard.

The JAR25 colour code for precipitation rate in excess of 50 mm/hr is:
A) red.
B) amber.
C) white or magenta.
D) magenta.

On a B737-400, airborne weather radar can be displayed in all modes of EFIS and EHSI, except for:
A) FULL NAV, FULL VOR/ILS, PLAN.
B) FULL VOR/ILS, PLAN, EXP VOR/ILS.
C) PLAN, EXP VOR/ILS, MAP.
D) PLAN, MAP, EXP NAV.

An aeroplane flies over position A through true north of a VOR station sited at position B. Variation is 18° W at A and 10° W at B. The aeroplane is on VOR radial:
A) 018°
B) 350°
C) 010°
D) 342°

On which displays will the range markers be displayed regardless of the weather selection?
A) MAP & CTR MAP
B) MAP
C) PLAN, EXP ILSNOR, MAP & CTR MAP
D) EXP ILSIVOR, MAP & CTR MAP

The EHSI is showing 5 deg fly right with a TO indication. The aircraft heading is 280(M) and the required track is 270(M). The radial is:
A) 095
B) 275
C) 265
D) 085

If the pressure altitude is 25,000 feet and the Corrected Outside Air Temperature (COAT) is -15° with a CAS of 250 kts the Mach No. would be:
A) 0.66
B) 0.57
C) 0.63
D) 0.60

The JAR25 colour code for the active route is:
A) green.
B) yellow.
C) cyan.
D) magenta.

(Refer to figure 062-015)
The track from TBX to YTB is:
A) 073° (M)
B) 097° (T)
C) 180° (T)
D) 045° (T)

An aircraft flies from a VOR at 61N 013W to 58N 013W. The variation at the beacon is 13W and the variation at the aircraft is 5W. What radial is the aircraft on?
A) 005
B) 193
C) 187
D) 013

Required track 070° T, variation 30° W, deviation +1° , drift 10° S. What is the required compass heading?
A) 079°
B) 048°
C) 058°
D) 089°

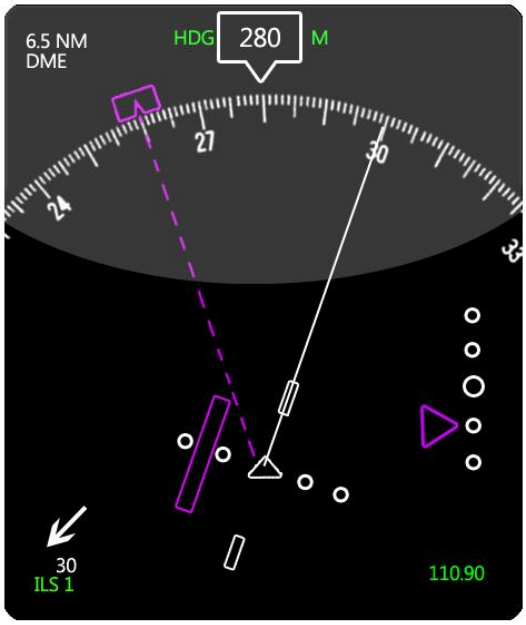
An aircraft is 15 nm from a phantom station on a 30 nm track between two phantom stations and 25 nm from the DME designating that station. The phantom station is 20 nm from the VOR/DME. The range readout in the aircraft will be:
A) 25.
B) 20.
C) 15.
D) 30.

An aircraft using a 2D RNAV system is on a leg of 50 nm between WP1 and WP2. The aircraft is 32 nm from WP2 and 25 nm from the VOR/DME designating WP2. WP2 is 22 nm from the VOR/DME. The range displayed on the equipment will be:
A) 18 nm.
B) 22 nm.
C) 32 nm.
D) 25 nm.

How does the Electronic Flight Instrument System display of a B737-400 respond to the failure of a VHF navigation (VOR) receiver?
A) It removes the associated magenta deviation bar and/or pointer from the display.
B) The deviation bar and/or pointer change colour to red and flash intermittently.
C) The pointer rotates around the display and a VOR 1 or 2 failure warning bar appears.
D) The pointer flashes and a VOR 1 or 2 failure warning bar appears.

The aircraft is:

A) right of the centreline and below the glidepath.
B) left of the centreline and above the glidepath.
C) right of the centreline and above the glidepath.
D) left of the centreline and below the glidepath.



On a 2 dot EFIS HSI in the approach (APR) mode expanded scale what does one dot indicate?

A) 0.5º
B) 2.0 NM
C) 0.5 NM
D) 1.0º

The needle of a CDI is showing 3 dots right with 268 set and FROM showing. The aircraft is on a VOR radial of:

A) 094
B) 274
C) 262
D) 082

The navigation database in the FMC:

A) is inaccessible to the flight crew.
B) can be modified by the pilots to meet route requirements.
C) can be amended by the pilots to update navigational data.
D) is read only for the pilots.

Types of area Navigation systems Input:

Which of the following combinations is likely to result in the most accurate Area Navigation (RNAV) fixes?

A) VOR/DME
B) NDB/VOR
C) VOR/VOR
D) DME/DME

VORDME Area Navigation (RNAV):

In a simple RNAV system the phantom station will be designated by:
A) DME/DME.
B) VOR/DME.
C) Any of the above.
D) VOR/VOR.

Which of the following is one of the functions of the Course-Line-Computer in a basic Area Navigation (RNAV) system?
A) It transfers the information given by a VOR/DME station into tracking and distance indications to any chosen Phantom Station/waypoint.
B) It checks the ground station accuracy using a built-in test programme.
C) It calculates cross track information for NDB approaches.
D) It automatically selects the two strongest transmitters for the Area-Nav-Mode and continues working by memory in case one of the two necessary station goes off the air.

The IRS position can be updated:
A) on the ground only.
B) at designated positions en-route and on the ground.
C) on the ground and overhead VOWDME.
D) at selected waypoints and on the ground.

The range to a required waypoint presented by RNAV system is:
A) neither plan range nor slant range.
B) slant range.
C) plan range.
D) plan range or slant range depending on RNAV settings.

What is the maximum off-track error permitted on P-RNAV systems?
A) ± 1 nm
B) ± 2 nm
C) ± 5 nm
D) ± 0.5 nm

The accuracy required of a precision area navigation system is:
A) 0.5 nm.
B) 2 nm.
C) 0.25 nm.
D) 1 nm.

The waypoint in a 2D area navigation system is known as ... because the equipment indications are as if there is a VOR/DME at that point.
A) ghost beacon
B) ghost station
C) phantom station
D) phantom beacon

The accuracy required of a basic RNAV equipment is:
A) +/-1 deg.
B) +/-5 nm.
C) +/-1 nm.
D) +/-5 deg.

The required accuracy of a precision RNAV (P-RNAV) system is:
A) 0.5 nm standard deviation or better.
B) 0.25 nm standard deviation or better.
C) 1.5 nm standard deviation or better.
D) 1 nm standard deviation or better.

The accuracy required of a basic RNAV system is:
A) +/-1 nm.
B) +/-5 deg.
C) +/-5 nm.
D) +/-1 deg.

The FMC position will be at its most inaccurate:
A) on final approach.
B) at TOD.
C) at TOC.
D) on take-off.

The most accurate information used by a RNAV system will be taken from:
A) VOR/DME
B) Twin DME
C) Twin ADF
D) Twin VOR

The most accurate position information will be derived from:
A) the IRS positions.
B) twin DME fixing.
C) VOR/DME fixes.
D) twin VOR fixing.

A precision RNAV system is required to be accurate to:
A) +/-5° .
B) +/-1 nm.
C) +/-1° .
D) +/-5 nm.

What is an example of a self contained RNAV system?
A) GPS
B) INS
C) VOR/DME
D) DME/DME

A basic 2D RNAV system will determine aircraft position using:
A) Twin VOR.
B) All of the above.
C) VOR/DME.
D) Twin DME.

In order to enter a waypoint that is designated by a VOR into an RNAV, the VOR:
A) does not have to be in range when entered or used.
B) has to be positively identified by one of the pilots.
C) does not have to be in range when entered but must be when used.
D) must be in range.

In a simple 2D RNAV system navigation is effected using:
A) VOR/DME.
B) All of the above.
C) Twin DME.
D) Twin VOR.

With VOR/DME basic area navigation, the displacement of the CDI needle represents:
A) angular displacement from the course line (e.g. 5 dots = 10° off track).
B) distance of track (e.g. 5 dots = 5 nm off track).
C) distance of track (e.g. 5 dots = 10 nm off track)
D) angular displacement from the course line (e.g. 5 dots = 5° off track).

The operation of a 2D RNAV system may be seriously downgraded:
A) because the computer cannot determine if the heading and altitude input are in error.
B) because the pilot cannot verify the correct frequency has been selected.
C) if the selected navigation facility is in excess of about 70 nm.
D) because the computer cannot determine if the aircraft is within the DOC of the programmed facilities.

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21. In relation to Area Navigation Systems (RNAV), which of the following is an Air Data input?
A) Doppler drift.
B) True airspeed.
C) VOR/DME radial/distance.
D) Inertial Navigation System (INS) position.

The period of validity of the navigational database is:
A) determined by the national authority and may be from 28 days to 56 days.
B) 28 days.
C) 56 days.
D) 1 month.

In its simplest form, RNAV may consist of:

A) ADF and VOR receivers with an associated navigation computer.
B) at least one VOR and 2 DME sets.
C) at least 3 DME sets and an associated navigation computer.
D) a VOR/DME receiver with an associated navigation computer.

In simple 2D RNAV equipment, the waypoint is known as a phantom station because:

A) the equipment transposes the VOR/DME designating the station to the waypoint.
B) the presentation the pilot sees is the same as if the aircraft was homing to a VOR/DME.
C) it is an acronym of phase notation time and motion.
D) it was an arbitrary name selected by the original designers.

The position used by the FMC in the B737-400 is:

A) Generated from the external reference and updated by the IRS as part of the Kalman filtering process.
B) an average of the two IRS positions, smoothed by the Kalman filtering process.
C) an average of the two IRS positions.
D) Taken from the selected IRS, smoothed by Kalman filtering and updated to the external reference.

RNAV equipment will:

A) All 3 answers are correct.
B) allow frequent changes in flight plan and ATC clearances to be executed by the air crew.
C) lead to a more economic air transport.
D) permit airplanes to be navigated along direct tracks between predetermined as well as chosen waypoints, with a high order of accuracy.

Which positions can be input to the FMC using a maximum of 5 alpha-numeric?

A) Latitude and longitude, reporting points and airways designators
B) SIDS & STARS, reporting points and airways designators.
C) SIDS & STARS and latitude and longitude.
D) Navigation facilities, reporting points and airways designators.

In order that a waypoint designated by a VOR can be used by a RNAV system:

A) the VOR need not be in range when input but must be when used.
B) the VOR need not be in range when input or used.
C) the VOR must be within range when the waypoint is input.
D) the VOR must be identified by the pilot.

Concerning FMC operation, which of the following is true:

A) the FMC combines the short term accuracy of the IRS with the short term accuracy of the external reference.
B) the FMC combines the short term accuracy of the IRS with the long term accuracy of the external reference.
C) the FMC combines the long term accuracy of the IRS with the long term accuracy of the external reference.
D) the FMC combines the long term accuracy of the IRS with the short term accuracy of the external reference.

The FMC in the RNAV function:

A) uses the IRS and/or external reference positions using Kalman filtering when information from both sources is used.
B) determines a position from the IRS or external reference through the Kalman filtering process.
C) determines a position from IRS and/or external reference through the Kalman filtering process.
D) uses the IRS position which it updates to the external reference through a process known as Kalman filtering.

An RNAV system based on VOR' s and DME' s (and horizontally outside the coverage of the VOR/DME stations):

A) will be limited in altitude to about 20 000 feet.
B) may use the built-in navigation computer to extend the area of coverage both vertically.
C) may be used for en route navigation and non-precision approaches.
D) will have a maximum safe range of 50 NM from the closest VOR/DME ground installation.

What is the deviation per dot on the HSI when using an 2-dot RNAV system in the approach mode?

A) 0,5 NM
B) 0,5°
C) 10 NM
D) 10°

An aircraft using a basic 2D RNAV system is on a section between WP1 and WP2 a distance of 45 nm. The aircraft is 20 nm from the phantom station; which is 270/30 nm from the VOR/DME. The aircraft is 15 nm from the VOR/DME. The range readout will show:

A) 20 nm.
B) 25 nm.
C) 30 nm.
D) 15 nm.

Above latitudes of 84° a twin FMS/triple IRS system will go to de-coupled operations. The reason for this is:

A) because the magnetic variation changes rapidly in high latitudes
B) to prevent error messages as the IRS longitudes show large differences.
C) to ease the pilots workload
D) to improve the system accuracy.

Which one of the following lists information given by a basic VOR/DME-based Area Navigation System?

A) Aircraft position in latitude and longitude.
B) True airspeed; drift angle.
C) Wind velocity.
D) Cross track distance; along track distance; angular course deviation.

The maximum range at which VOR bearing information will be used by the B737-400 FMC for fixing is:

A) 25 nm.
B) 50 nm.
C) 60 nm.
D) 10 nm.

With regard to RNAV, what are gybrid navigation systems?

A) VOR/DME system.
B) GNSS.
C) RNAV systems which use and merge information from a selection of self contained and externally referenced navigation system.
D) Loran C system.

According to ICAO (Annex 11), the definition of an RNAV system is:

A) one which enables the aircraft to navigate on any desired flight path within the coverage of appropriate ground based navigation aids only.
B) one which enables the aircraft to navigate on any desired flight path within the coverage of appropriate ground based navigation aids or within the specified limits of self contained on-board systems but not a combination of the two.
C) one which enables the aircraft to navigate on any desired flight path within the specified limits of self contained on-board systems.
D) one which enables the aircraft to navigate on any desired flight path within the coverage of appropriate ground based navigation aids or within the specified limits of self contained on-board systems or a combination of the two.

Erratic indications may be experienced when flying towards a basic VOR/DME-based Area Navigation System Phantom Station:

A) when the Phantom Station is out of range.
B) when operating at low altitudes close to the limit of reception range from the reference station.
C) because, under adverse conditions (relative bearing to the Phantom Station other than 180° /360°) it takes the computer more time to calculate the necessary information.
D) when in the cone of silence overhead the Phantom Station.

Precision RNAV (P-RNAV) requires a track-keeping accuracy of:

A) 0.5 NM standard deviation or better.
B) 1.0 NM standard deviation or better.
C) 1.5 NM standard deviation or better.
D) 0.25 NM standard deviation or better.

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41. With regard to RNAV, what are phantom or ghost stations?

A) Waypoints defined by radials and ranges from suitable VOR/DME facilities.
B) Waypoints which have been lost from the command display unit memory.
C) Temporary waypoints which are produced when the aircraft is over the cone of confusion of a VOR facility.
D) Spurious waypoints produced by the system when the aircraft exceeds the maximum theoretical range from the VOR facility.

In a 2D RNAV system a waypoint will be generated by... and is known as a...

A) Twin DME, phantom station
B) VOR/DME, phantom station
C) Twin DME, ghost station
D) VOR/DME, ghost station

RNAV routes are:

A) specified by waypoints defined as a positions in latitude and longitude based on the WGS 84 system.
B) selected according to TCAS inputs.
C) usually specified by waypoints co-incident with point source aids such as VOR, DME or NDB facilities.
D) none of the above are correct.

The phantom station in a 2D RNAV system may be generated by:

A) any of the above.
B) twin DME.
C) twin VOR.
D) VOR/DME.

Which one of the following inputs to an Area Navigation System (R-NAV) comes from an external, not on-board, system?

A) Pressure altitude.
B) VOR/DME radial/distance.
C) Inertial Navigation System (INS) position.
D) Magnetic heading.

What are the primary navigation inputs used by RNAV system?

A) Nav Aids, Mapping Radar, FMC database.
B) INS, Mapping Radar, FMC database.
C) Nav Aids, INS, FMC database.
D) INS, Nav Aids, TAS and Drift.

The sequence of displays accessed on initialisation is:

A) IDENT, POS INIT, RTE
B) IDENT, RTE, POS INIT
C) POS INIT, RTE, IDENT
D) POS INIT, IDENT, RTE

A basic 2D RNAV system will determine tracking information from:

A) VOR/DME.
B) Twin VOR.
C) twin DME.
D) Any of the above.

The FMC navigational database can be accessed by the pilots:

A) to read information only.
B) to update the database.
C) to change information between the 28 day updates.
D) to change the information to meet the sector requirements.

What is the deviation per dot on the HSI when using a 2-dot basic RNAV system in the en-route mode?

A) 10 NM
B) 1 NM
C) 5 NM
D) 2 NM

Flight director and autopilot coupling:

Typically the following sources of information are used by the FMS to establish the aircrafts position:

A) Map reading Weather radar, ILS, IRS, GNSS, Radio altimeter.
B) VOR/DME, ILS, ADF, GNSS, Radio altimeter.
C) VOR/DME, ADF, LORAN C, Radio altimeter.
D) VOR/DME, ILS, IRS, GNSS, Radio altimeter.

Self-contained and external referenced Navigation systems

Doppler:

After a long period in memory, Doppler:
A) will have wandered more over land than over sea.
B) falls back to INS.
C) requires updating.
D) should be switched to manual.

The 4-beam moving Janus array aligns with the aircraft centre line by:
A) all of the above.
B) measuring the drift and rotating the array by the same amount.
C) rotating the array until matched pairs of beams receive the same difference in Doppler shift.
D) rotating the array towards the beams with the smallest doppler shift.

The Doppler Navigation System is based on:
A) radio waves refraction in the ionosphere.
B) radar principles using frequency shift.
C) doppler VOR (DVOR) Navigation System.
D) phase comparison from ground station transmissions.

In the normal applications using Doppler shift registered in aircraft equipment:
A) The Doppler shift frequency will normally be displayed.
B) The Doppler shift, indicating ground speed, will always indicate a speed higher than the actual ground speed of the aircraft, due to depression of the beams.
C) The Doppler shift will be doubled, because it is based on measuring the frequency of a reflected signal from the ground.
D) The Doppler shift will only be detectable when a ground station is within range.

With regard to Doppler navigation system:
A) updating can be achieved using VOR/DME fix.
B) updating is the process of entering ne co-ordinates after taking a fix.
C) updating must be carried out as soon as possible after a prologed period in memory.
D) all of the above are correct.

Which of the following statements is correct when considering a Doppler navigation system?
A) sea bias can be reduced by using a gyro stabilised aerial array.
B) sea movement error produces higher frequency, and thus ground speed as indicated will be too low.
C) aerial misalignment will produce an error to drift angle.
D) all of the above

In using an airborne Doppler navigation system, the expected accuracy:

A) will be higher for cross-track movements than for movement along track.
B) is 0,1% in ground speed.
C) will be high when flying over a calm sea.
D) will be improved with careful adjustment of the antenna tilt.

Updating Doppler is undertaken when:

A) a new database is loaded.
B) the equipment is re-initialised with the data and time, and the atomic clock is actuated.
C) the co-ordinates are reset to revise the position base on alternative information.
D) all of the above.

A Doppler shift will occur:

A) If a receiver is moving during reception of transmissions from a fixed position transmitter.
B) If a transmitter is moving during transmission to a fixed position receiver.
C) When the distance between a transmitter and a receiver is changing during a transmission.
D) All 3 answers are correct.

Due to Doppler effect an apparent decrease in the transmitted frequency, which is proportional to the transmitters velocity, will occur when:

A) the transmitter and receiver move towards each other.
B) the transmitter moves away from the receiver.
C) the transmitter moves toward the receiver.
D) both transmitter and receiver move away from each other.

Using a hyperbolic navigation system, where the master and slave are 100 nm apart, an aircraft is 110 nm from the master and 70 nm from the slave. How far is the hyperbola passing through the aircraft from the slave at the point where the hyperbola crosses the base line:

A) 10 nm
B) 90 nm
C) 70 nm
D) 30 nm

What frequencies are allocated to Doppler Navigation systems?

A) 8,8 KHz and 13,3 KHz
B) 8,8 MHz and 13,3 MHz
C) 8,8 GHz and 13,3 GHz
D) 8,8 Hz and 13,3 Hz

A LOP is inaccurate and may be ambiguous:

A) in the vicinity of the base line bisector.
B) at night due to sky wave effect.
C) in the vicinity of the base line extensions.
D) at extreme ground wave range.

An apparent increase in the transmitted frequency which is proportional to the transmitter velocity will occur when:

A) the transmitter moves towards the receiver.
B) both transmitter and receiver move towards each other.
C) the receiver moves towards the transmitter.
D) the transmitter moves away from the receiver.

Sea bias error:

A) is due to the movement of the sea and is not affected by the land/sea switch.
B) is due to a change in Doppler shift over water and is partially corrected by the land/sea switch.
C) is due to the movement of the sea and can be partially corrected by the land/sea switch.
D) is due to a change in Doppler shift over water and is not affected by the land/sea switch.

The major source of cross-track error in a doppler navigation system is:

A) manoeuvring error.
B) latitude error.
C) altitude error.
D) compass error.

In day to day use the greatest cause of error in Doppler is:

A) pitch error.
B) weight error.
C) sea movement error.
D) input error.

Doppler may unlock over:

A) a calm sea.
B) ice.
C) shallow fast running water.
D) a desert surface.

A radio facility transmits on a wavelength of 2,22 cm. The facility could be a:

A) Doppler.
B) DME.
C) LORAN-C.
D) radio altimeter.

Loran-C:

Which of the following frequency-bands is used by the Loran C navigation system?
A) 10.2 - 13.6 kHz.
B) 1750 - 1950 kHz.
C) 978 - 1213 MHz.
D) 90 - 110 kHz.

Which of the following correctly gives the principle of operation of the Loran C navigation system?
A) Phase comparison between synchronised transmissions.
B) Differential range by phase comparison.
C) Frequency shift between synchronised transmissions.
D) Differential range by pulse technique.

The time difference is measured in a Loran receiver by:
A) phase comparison.
B) phase measurement.
C) indexing.
D) crystal oscillation.

The base-line between the LORAN C master and slave station is typically:
A) 600 - 1000 NM.
B) 50 - 150 NM.
C) 200 - 400 NM.
D) 1200 - 1500 NM.

When using hyperbolic navigation systems to provide lines of position, the basic measurements are:
A) Timing.
B) Angular displacement.
C) Of actual speed at short intervals of time.
D) Speed changes.

On a Loran C station pair, the lowest value of propagation delay time difference will be found:
A) at various points depending on the particular pair.
B) on the master base line extension.
C) on the base line bisector.
D) on the slave base line extension.

Loran is available for use:
A) in North and South America.
B) world-wide, pole to pole.
C) every where except the old eastern bloc.
D) north America, North Atlantic, parts of Europe and the Mediterranean.

To produce a two-position line fix, the ground elements of a hyperbolic navigation system must consist of at least:

A) 3 master stations and 3 slave stations.
B) 1 master and 1 slave station.
C) 2 master stations and 3 slave stations.
D) 2 slave stations and a master station serving them both.

The most accurate position lines, for a Loran C pair, are found:

A) on any base line extension.
B) behind the Slave station.
C) behind the master station.
D) along the base line bisector.

LORAN C:

A) is an hyperbolic navigation system.
B) sends coded radio transmissions from satellites in close Earth orbit.
C) utilises very high frequency radio transmissions.
D) operates using red, green and purple lanes.

Loran C coverage is:

A) global.
B) unrestricted between latitudes 70° N and 70° S.
C) confined to certain limited areas of the world.
D) unrestricted over the oceans and adjacent coastlines but limited over the major continental land masses.

Propagation error is due to:

A) differences in surface conductivity.
B) coastal refraction.
C) super refraction.
D) sky wave effect.

Using a hyperbolic navigation system a position is plotted that is 20 nm further from X than Y. X and Y are 100 nm apart. The hyperbola crosses the baseline:

A) 30 nm from Y.
B) 40 nm from X.
C) 50 nm from Y.
D) 40 nm from Y.

Loran C operates at a frequency of:

A) 1000 MHz
B) 100 KHz
C) 1000 KHz
D) 100 MHz

LORAN C is available:

A) globally.
B) in designated areas.
C) in continental areas.
D) in oceanic areas.

A hyperbola is a line of surface:

A) on which all points have a constant range difference from each other.
B) which intersects the base line at 90° in all planes except the vertical.
C) on which all points have the same difference of range from two fixed points.
D) of constant range from two fixed points.

The principle of operation of LORAN C is:

A) range by phase comparison.
B) differential range by pulse technique.
C) range by pulse technique.
D) differential range by phase comparison.

LORAN C operates using ..., which one ... as master and the others arranged around it and known as ... secondary (slave)...

A) satellites; satellite; W,X,Y and Z; satellites.
B) networks or chains of stations; station; red, green and purple; stations.
C) networks or chains of stations; stations; W,X,Y and Z; stations.
D) Satellites; Satellites; X,Y and Z; satellites.

In the LORAN C system a single master station may trigger two or more slave stations. The pulses transmitted from each of the slave stations may be identified by

A) the delay in time introduced at each slave station.
B) the carrier frequency used by each slave station.
C) the direction of the signal from the slave stations.
D) the identification signal they transmit.

Loran position lines/fixes in the coverage area are:

A) unreliable along the baseline.
B) available both day and night.
C) unreliable at night.
D) unreliable at down and dusk.

21. Which of the following statements concerning LORAN-C is correct?

A) It is a hyperbolic navigation system that works on the principle of differential range by pulse technique.
B) It is a hyperbolic navigation system that works on the principle of range measurement by phase comparison.
C) It is a navigation system based on secondary radar principles; position lines are obtained in sequence from up to eight ground stations.
D) It is a navigation system based on simultaneous ranges being received from a minimum of four ground stations.

A hyperbola cuts the base line 60 Km from the Master end and 150 Km from the Slave end. When on the same hyperbola at a range of 90 Km from the Master, the range from the Slave will be:

A) 150 km
B) 180 km
C) 300 km
D) 240 km

In a LORAN C system you will detect a constant time difference when moving:

A) along the Base line extension.
B) along the Base line.
C) along any hyperbola.
D) all 3 answers are correct.

In which navigation system does the master station transmit a continuous string of pulses on a frequency close to 100 kHz?

A) Doppler.
B) Loran C.
C) Decca.
D) GPS.

The accuracy of Loran is given as:

A) ± 1 km on 95% of occasions between 900 km and 1000 km over the sea.
B) ± 1/2 nm on 95% of occasions between 900 nm and 1000 nm over the sea.
C) ± 1/2 km on 95% of occasions between 900 km and 1000 km over the sea.
D) ± 1 nm on 95% of occasions between 900 nm and 1000 nm over the sea.

LORAN C use a radio frequency of:

A) around 260 kHz.
B) around 100 kHz.
C) around 1000 MHz.
D) around 30 kHz.

When data are published for an hyperbolic navigation system, they are valid:

A) for all propagation situations, also when night effect is dominant.
B) for a period of up to 5 years.
C) for all users at ground speeds up to 500 Kt.
D) for users at sea level.

In a hyperbolic navigation system the area of highest accuracy of a single line of position is:
A) along the base-line.
B) on the perpendicular to the base-line.
C) along the base-line extension.
D) at equidistance from the two ground stations.

All modern LORAN C receivers intended for use in aircraft:
A) Presents the aircraft position as bearing and distance from the master or slave stations.
B) Also have facilities to receive NDBs.
C) Have a built-in navigation computer, programmed for great circle navigation.
D) Call for the user to identify the received Master and Slave station before any positional information is displayed.

Which statement is most correct?
A) Loran C creates hyperbolic lines based on an atomic time standard.
B) Loran C creates elliptical lines based on differential range by Doppler.
C) Loran C creates hyperbolic position lines based on differential range by pulse technique.
D) Loran C creates hyperbolic lines based on a low sweep rate frequency modulated continuous wave.

In a LORAN C system the spacing between lines of position having a 10 milli sec time difference:
A) is most narrow along the base-line.
B) is most narrow along the perpendicular to the base-line.
C) is widest along the perpendicular to the base-line, equidistant from the master and slave stations.
D) is most narrow along the base-line extension.

Within the area of coverage of a hyperbolic navigation system, the highest accuracy of a two-position line fix will be achieved when:
A) the 2 position lines intersect on the base-line of one of them.
B) the 2 position lines intersect at right angles, and the distances to the ground stations are not too long.
C) the Master and the slave station are both located on the same base-line.
D) the 2 position lines are parallel and the distances to the ground are within the published area of coverage.

A Loran C chain is designated according to:
A) a frequency.
B) a colour coding.
C) a chain sequential number.
D) a Group Repetition Interval.

The frequencies used by LORAN C are:
A) 90 - 110 KHz.
B) 70 - 130 KHz.
C) 108 - 112 MHz.
D) 190 - 1750 KHz.

Loran C is a navigation system which uses:
A) pseudo range measurements.
B) differential range measurements.
C) rho/theta measurements.
D) slant range measurements.

Decca Navigation system:

In a hyperbolic navigation system accuracy is greatest:
A) along the right bisector of the baseline.
B) along the base line extension.
C) within a 30 nm radius of either station.
D) along the base line.

Which of the following statements most correctly describes the Decca navigation system?
A) It is a world wide navigation system based on geostationary satellites.
B) It is a long range (over 1000 NM) hyperbolic navigation system.
C) It is a medium range (200-300 NM) constant wave hyperbolic navigation system.
D) It is a short range (100-200 NM) pulsed radar navigation system.

In which frequency band does the Decca navigation system operate?
A) MF
B) VLF
C) LF
D) HF

The principle of operation of DECCA is:
A) comparison of phase shift.
B) analysis of time referenced scanning beam.
C) analysis of time of arrival and time difference by phase comparison.
D) identification of equal time differences from signals with coded group repetition intervals (GRI).

What is the normal range of accurate fixing using Decca by day?
A) 200 NM
B) 300 NM
C) 100 NM
D) 400 NM

In relation to Decca ground transmitters, hyperbolic position lines are lines on which all points will always have the same:
A) range from both.
B) difference in range from both.
C) phase angle from both signals.
D) difference in signal amplitude from both.

DECCA is:
A) is a low frequency hyperbolic navigation system, being very accurate and based on measuring the difference in time of arrival of two pulses, one from a master and the other from a slave station.
B) a short range hyperbolic navigation system, operating at Low frequencies.
C) using airborne equipment measuring phase difference between two received carrier waves, and is operating at Medium frequencies.
D) a long range hyperbolic navigation system, based on measuring the phase difference of carrier waves.

Which of the following statements accurately describes the availability of Decca navigation system coverage?
A) It is limited to Europe and parts of Africa.
B) It is available throughout the world without restriction.
C) It is limited to very specific local areas of Europe and the Middle East.
D) It is only available in Europe where it is confined to areas of the North Sea.

Global Navigation satellite Systems GNSS GPS GLONASS:

Which of the following statements is true in respect of GNSS?

A) The C/A code is the only code available for civilian use. It is transmitted only on L1.
B) The C/A code is for authorised (military) use only. It is transmitted on both L1 and L2.
C) The P code is for authorised (military) use only. It is transmitted only on L2.
D) The P code is the only code available for civilian use. It is transmitted on L.

In the GPS system Receiver Autonomous Integrity Monitoring (RAIM):

A) Means that the receiver itself selects 3 satellites from the 21 in orbit at any time.
B) Includes the operators final selection of the satellites that the receiver presents as suitable.
C) Means that the receiver evaluates the signals from 5 satellites and discards the signals from a satellite exhibiting anomalous pseudo range errors.
D) Means that the positions from 3 independent receivers are matched and blended to one accurate position.

The preferred GNSS receiver for airborne application is:

A) fast multiplex.
B) multi-channel.
C) multiplex.
D) sequential.

Signal reception is required from a minimum number of satellites that have adequate elevation and suitable geometry in order for a Satellite-Assisted Navigation System (GNSS/GPS) to carry out independent three dimensional operation, Receiver Autonomous Integrity Monitoring (RAIM) and to isolate any faulty satellite and remove it from contributing to the navigation solution. The number of satellites is:

A) 7
B) 6
C) 5
D) 4

In relation to the satellite navigation system NAVSTAR/GPS, the term inclination denotes the angle between the:

A) horizontal plane at the location of the receiver and the direct line to a satellite.
B) horizontal plane at the location of the receiver and the orbital plane of a satellite.
C) orbital plane and the earths axis.
D) orbital plane and the equatorial plane.

What are the effects, if any, of shadowing by parts of the aircraft (e.g. wing) on the reception of signals from NAVSTAR/GPS satellites?

A) It may prevent the reception of signals.
B) It causes multi-path propagation.
C) The signals will be distorted, however the error can be corrected for using an algorithm and information from unaffected signals.
D) It has no influence because high frequency signals are unaffected.

The visibility of GPS satellites is:

A) greatest at the poles.
B) the same at all points on and close to the surface of the earth.
C) dependent on the location of the user.
D) greatest at the equator.

The height derived by a receiver from the NAVSTAR/GPS is:

A) pressure altitude.
B) above ground level.
C) above the WGS84 ellipsoid.
D) above mean sea level.

GPS satellites transmit on two L-band frequencies with different types of signals. Which of these are generally available for use by civil aviation?

A) L1-coarse acquisition (C/A) with selected availability (S/A).
B) L2-coarse acquisition (C/A).
C) L1-precise (P).
D) L2-selected availability (S/A).

What is the minimum number of satellites required by a GPS in order to obtain a three dimensional fix?

A) 6
B) 5
C) 3
D) 4

Which of the following procedures must be adopted if, on a flight under IFR conditions using a NAVSTAR/GPS satellite navigation system receiver, the position fix obtained from the GPS receiver differs from the position of conventional navigation systems by an unacceptable amount?

A) The pilot must determine the reason for the deviation and correct the error or switch off the faulty system.
B) It must be continued under VFR conditions.
C) It may be continued using conventional navigation systems.
D) It may be continued using NAVSTAR/GPS; prior to the next flight all systems must be checked.

Which of the following combinations of satellite navigation systems provide the most accurate position fixes in air navigation?

A) NNSS-Transit and GLONASS.
B) NAVSTAR/GPS and GLONASS.
C) NAVSTAR/GPS and NNSS-Transit.
D) GLONASS and COSPAS-SARSAT.

In the event of the use of Selective Availability, how does this affect, if at all, the navigation accuracy of the NAVSTAR/GPS satellite navigation system?

A) It increases because only signals from satellites in the roost suitable geometric constellation are selected by the receiver.
B) It has no influence because, by selecting of the most suitable signals, the computing process in the receiver is quicker.
C) It degrades accuracy by reducing the number of available satellites.
D) It degrades position accuracy by manipulating satellite signals.

What datum is used for the Minimum Descent Altitude (MDA) on a non-precision approach when using the NAVSTAR/GPS satellite navigation system?

A) Radar altitude.
B) Barometric altitude.
C) If using Differential-GPS (D-GPS) the altitude obtained from the D-GPS, otherwise barometric altitude.
D) GPS altitude.

Current minimum operational standards for the GPS system calls for:

A) 4 satellites visible at least 10° above the horizon.
B) 5 satellites visible at least 7,5° above the horizon.
C) 3 satellites visible at least 7,5° above the horizon.
D) 4 satellites visible above the horizon.

Which of the following data, in addition to the Pseudo Random Noise (PRN) code, forms part of the so called Navigation Message transmitted by NAVSTAR/GPS satellites?

A) Time; positions of the satellites.
B) Almanac data; satellite status information.
C) Time; data to impair the accuracy of the position fix (Selective Availability SA).
D) Data to correct receiver clock error; almanac data.

How does Selective Availability (SA), if at all, affect the navigation accuracy of the NAVSTAR/GPS satellite navigation system?

A) It degrades position accuracy by manipulating satellite signals.
B) It degrades accuracy by reducing the number of available satellites.
C) It increases because only signals from satellites in the most suitable geometric constellation are selected by the receiver.
D) It has no influence because, by selecting of the most suitable signals, the computing process in the receiver is quicker.

One of the tasks of the control segment of the satellite navigation system NAVSTAR/GPS is to:

A) grant and monitor user authorisations.
B) manipulate the signals of selected satellites to reduce the precision of the position fix (Selective Availability SA).
C) monitor the status of the satellites.
D) manufacture and launch the satellites.

For RAIM activity there must be:

A) 6 satellites.
B) 3 satellites.
C) 5 satellites.
D) 4 satellites.

How many satellites are required for a 3D GPS fix using RAIM with the ability to discard one faulty satellite?

A) 5
B) 4
C) 3
D) 6

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21. GPS consists of three segments:

A) the space segment, the earth segment and the user segment.
B) the space segment, the control segment and the timer segment.
C) the space segment, the control segment and the user segment.
D) the satellite control segment, the control segment and the user segment.

An all in view satellite navigation receiver is one which:

A) monitors all 24 satellites.
B) selects and tracks all (in view) satellites and selects the best four.
C) tracks the closest satellites.
D) tracks selected satellites.

Which of the following statements is correct concerning the principle behind the correction of one of the NAVSTAR/GPS satellite navigation system errors by the transmission of the signals on two frequencies (L1 and L2)?

A) The effect of receiver noise can be reduced due to the interference of both frequencies.
B) The path delay of the signals in the earth atmosphere is proportional to the inverse of the carrier frequency squared.
C) The influence of shadowing on the GPS signals is proportional to the inverse of the carrier frequency squared.
D) The effect of signal reflections (multi-path effect) can be reduced due to the interference of both frequencies.

Unauthorised civilian users of NAVSTAR/GPS can access:

A) the C/A and P codes.
B) the C/A code.
C) the P and Y codes.
D) the P code.

Which of the following, if any, is a prerequisite if a receiver of a NAVSTAR/GPS satellite navigation system is to be used in combination with a multi sensor system?

A) The RAIM-function of the GPS receiver must be able to monitor all prescribed navigation systems.
B) The prescribed IFR-equipment must be in working correctly and the navigation information continuously displayed.
C) The prescribed IFR-equipment must be installed and operational.
D) Multi-sensor systems are not certificated for flights under IFR conditions.

What is the minimum number of NAVSTAR/GPS satellites required to produce an accurate independent 3-D position fix?

A) 3
B) 5
C) 24
D) 4

How does a receiver of the NAVSTAR/GPS satellite navigation system determine the elevation and azimuth data of a satellite relative to the location of the antenna?

A) The data is based on the direction to the satellite determined at the location of the antenna.
B) It calculates it by using Almanac data transmitted by the satellites.
C) The data is stored in the receiver together with the Pseudo Random Noise (PRN) code.
D) The data is determined by the satellite and transmitted together with the navigation message.

The NAVSTAR/GPS space segment:

A) provides X, Y, Z & T co-ordinates and the constellation data.
B) provides geographic position and UTC.
C) provides X, Y & Z co-ordinates and monitoring of the accuracy of the satellite data.
D) monitors the accuracy of the satellite data and provides system time.

Which satellite NAVSTAR/GPS navigation system error(s) are corrected for by the differential (D-GPS) technique?

A) Clock; Selective Availability (SA).
B) Clock; receiver noise.
C) Receiver noise.
D) Ephemeris.

The sky search carried out by a GNSS receiver:

A) is done prior to each fix.
B) is the procedure carried out by the monitoring stations to check the accuracy of the satellite data.
C) is done when the receiver position is in error.
D) involves the receiver downloading the almanac from each satellite before determining which satellites are in view.

Almanac data stored in the receiver of the satellite navigation system NAVSTAR/GPS is used for the:

A) fast identification of received signals coming from visible satellites.
B) correction of receiver clock error.
C) recognition of Selective Availability (SA).
D) assignment of received PRN-codes (Pseudo Random Noise) to the appropriate satellite.

Which of the following is the datum for altitude information when conducting flights under IFR conditions on airways using the NAVSTAR/GPS satellite navigation system?

A) The average of GPS altitude and barometric altitude.
B) Barometric altitude.
C) GPS altitude if 4 or more satellites are received otherwise barometric altitude.
D) GPS altitude.

Which of the following satellite navigation systems has Full Operational Capability (FOC) and is approved for specified flights under IFR conditions in Europe?

A) NNSS-Transit
B) COSPAS-SARSAT
C) GLONASS
D) NAVSTAR/GPS

Which of the following coordinate systems is used by the GPS receiver to determine position (Latitude, longitude and altitude)?

A) ED 50
B) EUREF 92
C) ED 87
D) WGS 84

Airborne GNSS receivers are protected from the effects of selective availability (SA) by:

A) warning transmitted on the satellite Nav message.
B) use of RAIM techniques.
C) warning transmitted from the ground segment.
D) NOTAMS.

How many GPS satellites must be in view of a receiver in order to resolve clock bias?
A) 3
B) 2
C) 1
D) 4

GPS system satellites transmit their signals on two carrier waves 1575 MHz and 1227 MHz and supply two possible codes accessible according to user (civil or military). Commercial aviation uses:
A) only the 1 575 MHz carrier wave and two codes.
B) only the 1 575 MHz carrier wave and one code.
C) the two carrier waves and one public code.
D) only the 1 227 MHz carrier wave and one code.

The GPS Navstar system transmits in the L1 and L2 frequency bands. Which bands are used for the P codes and which for the C/A codes?
A) Higher frequency for the P code only.
B) Lower frequency for the C/A code and higher frequency for the P code.
C) Higher frequency for the C/A code and lower frequency for the P code.
D) Higher frequency for the C/A and P codes.

The navigation processor of a GPS determines the aeroplanes track and groundspeed by:
A) computing the distance travelled from the last waypoint.
B) computing the distance between fixes over a 10 second period,
C) doppler frequency shift measurements.
D) doppler shift measured from the last known waypoint.

To provide 3D fixing with RAIM and allowing for the loss of one satellite requires ... SVs:
A) 4
B) 6
C) 5
D) 7

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41. What type of satellite navigation system NAVSTAR/GPS receiver is most suitable for use on board an aircraft?
A) Multiplex.
B) Multichannel.
C) Sequential.
D) Any hand held type.

In which frequency band do Satellite-Assisted Navigation systems (GNSS/GPS) provide position information that is available to civil aircraft?
A) EHF
B) SHF
C) UHF
D) VHF

Differential GPS (DGPS):

A) is used to differentiate between the signals from different satellites.
B) means to find the difference between a DR position produced by the navigation (between the GPS position and the real position) computer and the GPS position.
C) means to use the GPS receiver while in a known position, and register the difference.
D) is used to improve the accuracy of GPS signals within an area, by using data from a receiver placed in a known position as a correction to the data received in the aircraft from the satellites.

Which of the following statements about the accuracy that can be obtained with the differential technique (D- GPS) of the satellite navigation system NAVSTAR/GPS is correct?

A) The nearer a receiver is situated to a D-GPS ground station, the more accurate the position fix.
B) Only D-GPS allows position fixes accurate enough for Non Precision Approaches.
C) The increase in accuracy of position fixes is independent of the receiver position in relation to a D-GPS ground station.
D) A D-GPS receiver can detect and correct for SA providing a more accurate position fix.

In order to obtain a position it is necessary for the GNSS navigation processor to use a minimum of:

A) two Satellites.
B) three satellites.
C) two satellites and altimeter.
D) four satellites.

The navigation accuracy for civil users of the NAVSTAR/GPS satellite navigation system is mainly influenced by:

A) movement of the receiver during the computation process.
B) the Selective Availability (SA) function.
C) clock error inside the receiver.
D) receiver noise.

During flight using NAVSTAR/GPS and conventional navigation systems, you see a large error between the positions given by the systems. The action you should take is:

A) continue the flight in VMC.
B) continue using the GPS.
C) switch off the faulty system after determining which one is in error.
D) continue using the conventional systems.

In relation to the NAVSTAR/GPS satellite navigation system, what is involved in the differential technique (D- GPS)?

A) Receivers from various manufacturers are operated in parallel to reduce the characteristically receiver noise error.
B) The difference between signals transmitted on the L1 and L2 frequencies are processed by the receiver to determine an error correction.
C) Signals from satellites are received by 2 different antennas which are located a fixed distance apart. This enables a suitable receiver on the aircraft to recognise and correct for multipath errors.
D) Fixed ground stations compute position errors and transmit correction data to a suitable receiver on the aircraft.

What are the basic elements transmitted by NAVSTAR/GPS satellites?

i. offset of the satellite clock from GMT
ii. ephemeris data
iii. health data
iv. ionospheric delays
v. solar activity

A) i, ii, iii, iv, v
B) ii, iii, iv
C) i, ii, iv
D) i, ii, iii

How long does it take a NAVSTAR/GPS satellite to orbit the earth?

A) Approximately 24 hours (one sidereal day).
B) 365 days because the satellites are located in a geostationary orbit.
C) Approximately 12 hours (1/2 of a sidereal day).
D) 12 days.

Which of the following NAVSTAR/GPS satellite navigation system codes can be processed by unauthorised civil aviation receivers?

A) P
B) P and Y
C) C/A and P
D) C/A

Which one of the following is an advantages of a multi-sensor system using inputs from a global navigation satellite system (GNSS) and an inertial navigational system (INS)?

A) The GNSS can be used to update a drifting INS.
B) The only advantage of coupling both systems is double redundancy.
C) The average position calculated from data provided by both systems increases overall accuracy.
D) The activation of Selective Availability can be recognised by the INS.

The basic elements of the satellite navigation system NAVSTAR/GPS are the:

A) control, space and user segments.
B) antenna, the receiver and the central control unit (CDU).
C) atomic clock, power supply and transponder.
D) main control station, the monitoring station and the ground. antennas

The satellites used in the GPS

A) Do not cross the plane of the Equator
B) All have different planes of orbit
C) Orbit the Earth at an altitude of about 20 200 km
D) Are geostationary

In relation to the satellite navigation system NAVSTAR/GPS, All in View is a term used when a receiver:

A) requires the signals of all visible satellites for navigation purposes.
B) is receiving the signals of all visible satellites but tracking only those of the 4 with the best geometric coverage.
C) is receiving and tracking the signals of all 24 operational satellites simultaneously.
D) is tracking more than the required 4 satellites and can instantly replace any lost signal with another already being monitored.

The receiver aerial for a NAVSTAR/GPS system should be mounted:

A) in the vicinity of the receiver to avoid long transmission lines.
B) under the fuselage in order to receive correction data transmitted by D-GPS stations.
C) on the upper side of the fuselage in the vicinity of the centre of gravity.
D) inside the tail fin to minimise the influence of reflections from the wing and fuselage.

The number of satellites required to provide a 3D fix without RAIM is:

A) 3
B) 5
C) 4
D) 6

What is the inclination to the equatorial plane of the satellites orbit in the NAVSTAR GPS constellation?

A) 45° .
B) 35° .
C) 55° .
D) 65° .

Which GPS frequencies are available for commercial air transport?

A) 1575.42 MHz only.
B) 1227.6 MHz only.
C) 1227.6 MHz and 1575.42 MHz.
D) 1227.6 MHz or 1575.42 MHz.

What fix can be obtained from four satellites of the GPS system disregarding RAIM?

A) Latitude, longitude and altitude.
B) Latitude and longitude.
C) Latitude, longitude, altitude and time.
D) Latitude, longitude and time.

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61. In civil aviation, the height value computed by the receiver of the satellite navigation system NAVSTAR/GPS is the:

A) flight level.
B) geometric height above ground.
C) height above Mean Sea Level (MSL).
D) height above the WGS-84 ellipsoid.

What is the procedure to be followed if, on a flight under IFR conditions using the NAVSTAR/GPS satellite navigation system, the number of satellites required to maintain the RAIM (Receiver Autonomous Integrity Monitoring) function are not available?

A) The flight may be continued using other certificated navigation systems.
B) A constant heading and speed must be flown until the required number of satellites are again available.
C) The flight has to be continued under VFR conditions.
D) The flight may be continued as planned if at least 4 satellites are available and the pilot monitors the GPS- System manually.

In a Satellite-Assisted Navigation system (GNSS/GPS) a position line is obtained by:

A) the aircrafts receiver measuring the time difference between signals received from a minimum number of satellites.
B) the aircrafts receiver measuring the phase angle of the signal received from a satellite in a known position.
C) timing the period that is taken for a satellites transmission to reach the aircrafts receiver.
D) timing the period that is taken for a transmission from the aircrafts transmitter/receiver to reach and return from a satellite in a known position.

How does a NAVSTAR/GPS satellite navigation system receiver recognise which of the received signals belongs to which satellite?

A) Each satellite transmits its signal on a separate frequency.
B) Each satellite transmits its signal, on common frequencies, with an individual Pseudo Random Noise code.
C) The Doppler shift is unique to each satellite.
D) The receiver detects the direction from which the signals are received and compares this information with the calculated positions of the satellites.

The main task of the user segment (receiver) of the satellite navigation system NAVSTAR/GPS is to:

A) select appropriate satellites automatically, to track the signals and to measure the time taken by signals from the satellites to reach the receiver.
B) monitor the orbital planes of the satellites.
C) transmit signals which, from the time taken, are used to determine the distance to the satellite.
D) to monitor the status of the satellites, determine their positions and to measure the time.

The height of the GPS Navstar system above the earth in km is:

A) 19000 km.
B) 10250 km.
C) 20200 km.
D) 10900 km.

Concerning the NAVSTAR/GPS satellite navigation system, what is the meaning of the term Receiver Autonomous Integrity Monitoring (RAIM)?

A) It is a technique by which a receiver ensures the integrity of the navigation information.
B) It is a method whereby a receiver ensures the integrity of the Pseudo Random Noise (PRN) code transmitted by the satellites.
C) It is the ability of the GPS satellites to check the integrity of the data transmitted by the monitoring stations of the ground segment.
D) It is a technique whereby the receivers of the world-wide distributed monitor stations (ground segment) automatically determines the integrity of the navigation message.

What is RAIM and what is its function?

A) Integrity monitoring of satellites by the receiver to ensure accurate navigation.
B) GPS integrity monitoring of master and slave stations to ensure correct alignment.
C) Resolution and intensity monitoring for increased accuracy.
D) Integrity monitoring of satellites by the master station to increase accuracy.

A pseudo range in GNSS is in error because of:

A) ionospheric delays.
B) satellite clock error.
C) all of these
D) receiver clock error.

The distance measured between a satellite and a receiver is known as a pseudo-range because:

A) satellite and receiver are continually moving in relation to each other.
B) it is measured against idealised Keplerian orbits.
C) it is measured using pseudo-random codes.
D) it includes receiver clock error.

Which GNSS system can be used for IFR flights in Europe?

A) NAVSTAR/GPS
B) TNSS transit
C) COSPAS/SARSAT
D) GLONASS

The GPS satellite navigation system suffers from the following errors:

A) Ephemeris, clock bias, propagation.
B) Interference from other satellites, clock bias, time lag.
C) Ephemeris, time lag, interference from other satellites.
D) Ephemeris, interference from other satellites, propagation.

For GPS, the super-imposed navigation message on the C/A and P codes consists of the following elements:

i. Clock data for the satellite being tracked.
ii. Ephemeris for the satellite being tracked.
iii. Message data on obtaining UTC.
iv. For P users only, ionospheric delay corrections.
v. Almanac data.

A) all statements are correct except ii.
B) all statements are correct except v.
C) all statements are correct except iv.
D) all statements are correct.

One of the tasks of the space segment of the satellite navigation system NAVSTAR/GPS is to:

A) transmit signals to suitable receivers and to monitor the orbital planes autonomously.
B) monitor the satellites orbits and status.
C) transmit signals which can be used, by suitable receivers, to determine time, position and velocity.
D) compute the user position from the received user messages and to transmit the computed position back to the user segment.

Which of the following statements concerning the L1 and L2 NAVSTAR/GPS transmission frequencies and codes is correct?

A) The higher frequency is only used to transmit the P code.
B) The higher frequency is used to transmit both the C/A and P codes.
C) C/A and P codes are transmitted at different times on both frequencies.
D) The lower frequency is used to transmit both the C/A and P codes.

Signal reception is required from a minimum number of satellites that have adequate elevation and suitable geometry in order for a Satellite-Assisted Navigation System (GPS) to carry out independent three dimensional operation without the Receiver Autonomous Integrity Monitoring (RAIM) function. The number of satellites is:

A) 6
B) 4
C) 5
D) 3

The orbital planes of the satellite navigation system NAVSTAR/GPS are:

A) inclined 55° to the equatorial plane
B) inclined 90° to the equatorial plane
C) parallel to the equatorial plane
D) inclined 55° to the earth axis

How many operational satellites are required for Full Operational Capability (FOC) of the satellite navigation system NAVSTAR/GPS?

A) 18
B) 24
C) 30
D) 12

In respect of the use of GNSS, Dilution of Precision (DOP) is a loss of accuracy due to:

A) multi-path signals from some satellites.
B) ionospheric effects.
C) use of satellites at low altitudes.
D) relative position of the visible satellites.

A satellite navigation system requires information from ... satellites to give a three dimensional fix without considering RAIM.

A) 2
B) 3
C) 5
D) 4

81. The reason why the measured distance between a NAVSTAR/GPS satellite navigation system satellite and a receiver is called a Pseudo-Range is because the:

A) movement of satellite and receiver during the distance calculation is not taken into account.
B) calculated range includes receiver clock error.
C) measured distance is based on the Pseudo Random Noise code.
D) calculated range is based on an idealised Keplerian orbit.

Which of the following lists all the parameters that can be determined by a GPS receiver tracking signals from 4 different satellites?

A) Latitude and longitude.
B) Latitude, longitude and time.
C) Latitude, longitude, altitude and time.
D) Latitude, longitude and altitude.

In relation to the satellite navigation system NAVSTAR/GPS, which of the following statements correctly describes the term Pseudo Random Noise (PRN) signal?

A) PRN describes the continuous electro-magnetic background noise that exists in space.
B) PRN is the atmospheric jamming that affects the signals transmitted by the satellites.
C) PRN occurs in the receiver. It is caused by the signal from one satellite being received from different directions (multipath effect).
D) PRN is a code used for the identification of the satellites and the measurement of the time taken by the signal to reach the receiver.

The distance between a NAVSTAR/GPS satellite and receiver is:

A) determined by the phase shift of the Pseudo Random Noise code multiplied by the speed of light.
B) determined by the time taken for the signal to arrive from the satellite multiplied by the speed of light.
C) calculated from the Doppler shift of the known frequencies.
D) calculated, using the WGS-84 reference system, from the known positions of the satellite and the receiver.

In relation to the NAVSTAR/GPS satellite navigation system, Search the Sky is a:

A) procedure performed by the receiver to recognise new satellites becoming operational.
B) continuous procedure performed by the receiver that searches the sky for satellites rising above the horizon.
C) procedure that starts after switching on a receiver if there is no stored satellite data available.
D) continuous process by the ground segment to monitor the GPS satellites.

The NAVSTAR/GPS constellation comprises:
A) 24 satellites in 3 orbits.
B) 24 satellites in 6 orbits.
C) 24 satellites in 4 orbits.
D) 24 satellites in 8 orbits.

What is the purpose of the GPS control segment?
A) To control the use of the satellites by unauthorised users.
B) To monitor the satellites in orbit.
C) To maintain the satellites in orbit.
D) Degrade the accuracy of satellites for unauthorised users.

Of the types of GPS receivers available for civil aviation, which is the most advanced type?
A) The single channel receiver.
B) The multiplex receiver.
C) The continuous tracking receiver.
D) The multiple satellite receiver.

In which frequency bands are the L1 and L2 frequencies used by the satellite navigation system NAVSTAR/GPS for transmission of the navigation message?
A) EHF
B) SHF
C) VHF
D) UHF

GPS time is accurate to:
A) 52 micro seconds.
B) 340 nano seconds.
C) 52 nano seconds.
D) 340 micro seconds.

The accuracy of GNSS using the P code is better than ..., however, civil aircraft may expect an accuracy of about...
A) 30 metres; 3 metres
B) 3 metres; 30 metres
C) 3 metres; 100 metres
D) 30 metres; 100 metres

The GPS satellite navigation system operates by:
A) phase comparison.
B) measuring the time for the signal to travel to the receiver and back.
C) measuring the time for the signal to reach the receiver.
D) measuring the phase of the incoming signal.

Which of the following geometric satellite constellations provides the most accurate NAVSTAR/GPS position fix?

A) 4 satellites with an azimuth of 90° from each other and a low elevation above the horizon.
B) 3 satellites with an azimuth of 120° from each other and an elevation of 45° above the horizon.
C) 3 satellites with a low elevation above the horizon and an azimuth of 120° from each other together with a fourth directly overhead.
D) 4 satellites with an azimuth of 90° from each other and an elevation of 45° above the horizon.

Using GPS, the primary position information is in the form of:

A) Bearing and distance from the satellite.
B) Spheres, with the satellites in the centre of the spheres.
C) 3-dimensional position, with the Earths centre as reference.
D) Spheres, with the airplane in the centre of the spheres.

The number of satellites required for a fully operational NAVSTAR/GPS is:

A) 24
B) 12
C) 30
D) 21

INMARSAT coverage is limited to below 80° N and 80° S because:

A) the satellite orbits are geostationary.
B) the aurora borealis affects the satellite operation.
C) the satellites cross the equator at 55° and therefore do not traverse the polar region.
D) polar cap absorption affects the signals beyond those latitudes.

The NAVSTAR/GPS segments are:

A) space, control, user.
B) space, control, air.
C) space, control, ground.
D) space, ground, air.

At what approximate height above the WGS-84 ellipsoid are NAVSTAR/GPS satellites circling the earth?

A) 19500 km
B) 36000 km
C) 10900 km
D) 20200 km

In GPS the satellites operate on two frequencies known as:
A) L1 and L2, L1 carries the P codes, L2 carries the C/A code.
B) L1 and L2, L1 carries the C/A code, L2 carries the P code.
C) L1 and L2, L1 carries the C/A and P codes, L2 carries just the P code.
D) L1 and L2, L1 carries the P code, L2 carries the C/A and P codes.

The GPS satellites will pass positions on the Earth having latitude as high as:
A) 55°
B) 60°
C) 45°
D) 65°

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101. What is the minimum number of satellites required for a Satellite-Assisted Navigation System (GNSS/GPS) to carry out two dimensional operation?
A) 2
B) 4
C) 3
D) 5

Which of the following lists are all errors that affect the accuracy and reliability of the Satellite-Assisted Navigation system (GNSS/GPS)?
A) Satellite clock; satellite ephemeris; atmospheric propagation.
B) Satellite to ground time lag; atmospheric propagation; satellite clock.
C) Satellite mutual interference; satellite ephemeris; atmospheric propagation.
D) Satellite mutual interference; frequency drift; satellite to ground time lag.

Which of the following statements about the visibility of NAVSTAR/GPS satellites is correct?
A) It is greatest at the equator.
B) It varies, depending on the time and observers location.
C) It is the same throughout the globe.
D) It is greatest at the poles.

Ionospheric error in GPS will generally be in the order of:
A) 30 metres
B) 5 metres.
C) 1.5 metres.
D) 3 metres.

The time required for a GNSS receiver to download the satellite almanac for the: NAVSTAR/GPS is:
A) 30 seconds.
B) 12 hours.
C) 15 minutes.
D) 12.5 minutes.

A GPS receiver identifies individual satellites by:
A) unique frequency.
B) unique Coarse Acquisition (C/A) code.
C) unique encoded signal.
D) group repetition interval.

NAVSTAR GPS receiver clock error is removed by:
A) synchronisation with the satellite clocks on initialisation.
B) having an appropriate atomic time standard within the receiver.
C) adjusting the pseudo-ranges to determine the error.
D) regular auto-synchronisation with the satellite clocks.

The influence of the ionosphere on the accuracy of the satellite navigation system NAVSTAR/GPS is:
A) minimised by computing the average of all signals.
B) minimised by the receiver using a model of the atmosphere and comparing signals transmitted by the satellites.
C) negligible.
D) only significant if the satellites are located at a small elevation angle above the horizon.

Which one of the following errors can be compensated for by a NAVSTAR/GPS receiver comparing L1 and L2 frequencies?
A) Tropospheric
B) Ionospheric
C) Multipath
D) Receiver noise

The geometric shape of the reference system for the satellite navigation system NAVSTAR/GPS, defined as WGS 84, is:
A) a mathematical model that describes the exact shape of the earth.
B) an ellipsoid.
C) a geoid.
D) a sphere.

In the NAVSTAR/GPS satellite navigation system, what is the maximum time taken to receive the complete set of almanac data from all satellites?
A) 12 hours (= period of the satellites orbit).
B) 24 seconds (= 1 second per data frame).
C) 25 seconds (= 1 second per data frame).
D) 12.5 minutes (= 30 seconds per data frame).

In NAVSTAR/GPS the PRN codes are used to:
A) pass satellite ephemeris information.
B) pass satellite time, ephemeris and other information.
C) differentiate between satellites.
D) pass satellite time and ephemeris information.

The required 24 NAVSTAR/GPS operational satellites are located on:

A) 6 orbital planes with 4 satellites in each plane.
B) 6 orbital planes with 3 satellites in each plane plus 6 reserve satellites positioned in a geostationary orbital plane.
C) 4 orbital planes with 6 satellites in each plane.
D) 3 orbital planes with 8 satellites in each plane.

Clock bias is the process of correcting the pseudo range for:

A) receiver and satellite clock errors.
B) satellite clock errors.
C) UTC errors.
D) receiver clock errors.

In NAVSTAR/GPS the PRN codes are used to:

A) determine satellite range.
B) remove receiver clock error.
C) eliminate satellite clock and ephemeris errors.
D) reduce ionospheric and tropospheric errors.

There are two levels of positioning service when using GPS:

A) the pseudo positioning service and the standard positioning service.
B) the coarse positioning service and the standard positioning service.
C) the precision positioning service and the coarse positioning service.
D) the precision positioning service and the standard positioning service.

In the NAVSTAR/GPS satellite navigation system, Selective Availability (SA) is the artificial degradation of the navigation accuracy by:

A) dithering the satellite clock.
B) shutting off selected satellites.
C) using a less accurate atomic clock in a satellite for signal processing.
D) offsetting satellite atomic clocks by a predetermined constant amount.

In the NAVSTAR/GPS satellite navigation system, receiver clock error:

A) is the biggest part of the total error; it cannot be corrected
B) is negligible small because of the great accuracy the atomic clocks installed in the satellites
C) is corrected by using signals from four satellites
D) can be minimised by synchronisation of the receiver clock with the satellite clocks