Instrumentation

Flight Instruments

Air Data Instruments
Gyroscopic Instruments
Magnetic Compass
Radio Altimeter
Electronic Flight Instrument System (EFIS)
Flight management system (FMS)

Automatic flight control system

Flight Director
Autopilot
Flight envelope protection
Yaw Damper
Automatic Pitch Trim
Thrust computation
Auto throttle

Warning and recording equipment

Warnings general
Altitude Alert system
Ground proximity warning system
Traffic collision avoidance system TCAS II
Over speed Warning
Stall Warning System
Flight Data Recorder
Cockpit Voice Recorder

Power plant and system monitoring

Pressure gauges
Temperature gauges
RMI Indicator
Consumption gauge
Fuel gauge
Torque Meter
Vibration Monitoring
Remote (Signal) Transmission Signal
Electronic Flight Display (ECAM, EICAS)

Flight Instruments
Air Data Instruments:

When climbing at a constant mach number below the tropopause through an inversion:
A) the CAS will increase and the TAS will decrease.
B) the CAS and TAS will both decrease.
C) the CAS will decrease and the TAS will increase.
D) the CAS and TAS will both increase.

Which instrument does not connect to the static system?
A) Altimeter.
B) Vertical speed indicator.
C) Vacuum gauge.
D) Airspeed Indicator.

The static pressure error of the static vent on which the altimeter is connected varies substantially with the:
A) aircraft altitude.
B) static temperature.
C) Mach number of the aircraft.
D) deformation of the aneroid capsule.

The primary factor which makes the servo-assisted altimeter more accurate than the simple pressure altimeter is the use of:
A) an induction pick-off device.
B) a sub-scale logarithmic function.
C) more effective temperature compensating leaf springs.
D) combination of counters/pointers.

Cruising at FL390, M.84 is found to give a TAS of 499kt. The ISA deviation at this level will be:
A) -19.
B) -17.
C) +19.
D) +17.

Compressibility error in the ASI is normally corrected by:
A) Accurate calibration of the instrument
B) Use of the navigation computer
C) The error is insignificant and can be ignored
D) Use of a calibration card placed next to the instrument

The altitude indicated on board an aircraft flying in an atmosphere where all atmosphere layers below the aircraft are warm is:
A) equal to the standard altitude
B) the same as the real altitude
C) higher than the real altitude
D) lower than the real altitude

An aircraft is flying at an TAS of 310 Kt at FL290, temperature deviation is -6º C. The local speed of sound is:
A) 583 Kt.
B) 596 Kt.
C) 570 Kt.
D) 563 Kt.

What will the altimeter of an aircraft on the aerodrome indicate with QNH set on the subscale?
A) The airfield barometric pressure.
B) Airfield elevation.
C) The equivalent sea level pressure at the airfield.
D) Zero.

The reason for the adjustable index on the Machmeter being set at a different Mach number on different aircraft types is:
A) to correct for the differing position errors
B) to correct for the differing instrument errors
C) to indicate the best cruising Mach number for that aircraft
D) because different aircraft types have different critical Mach numbers

During a missed approach and go-around procedure the change of aircraft attitude plus raising of the landing gear and changing of flap settings can cause short term unpredictable errors in certain instruments. The instruments most likely to be affected in this case are:
A) the altimeter, artificial horizon and vertical speed indicator.
B) the vertical speed indicator, airspeed indicator and altimeter.
C) the machmeter, airspeed indicator, altimeter and vertical speed indicator.
D) the airspeed indicator, machmeter and vertical speed indicator.

Turbulent flow around a pressure head will cause:
A) density error.
B) an increase in the dynamic pressure.
C) approximately 95% of the position error.
D) 95% increase in manoeuvre induced error.

Dynamic pressure is given by:
A) The static energy formula: ½ density x V2
B) The static energy formula P1V1 = P2V2
C) The kinetic energy formula P1V1 = P2V2
D) The kinetic energy formula: ½ density x V2

An aircraft flying at Mach 0.83 is in air SAT 230 Kelvin. What is the TAS?
A) 495 kt
B) 490 kt
C) 575 kt
D) 470 kt

The advantages of an ADC over a traditional pitot - static system are:
1. position and compressibility correction.
2. reduced lag
3. ability to supply many instruments
4. ability to act as an altimeter following failure.

A) 1, 2 & 3
B) 2, 3 & 4
C) 1, 3 & 4
D) 1, 2 & 4

When the barometric subscale of the altimeter is adjusted to 1013.2 hPa, what type of altitude is being measured?
A) Indicated altitude.
B) Relative height.
C) True altitude.
D) Pressure altitude.

A servo altimeter has a quoted accuracy of 1 mb at mean sea level. The accuracy in the standard atmosphere is:
A) ± 30 ft at 20 000 ft and ± 100 ft at 20 000 ft
B) ± 50 ft at 20 000 ft and ± 90 ft at the tropopause
C) ± 50 ft at 10 000 ft and ± 100 ft at 40 000 ft
D) ± 27 ft at MSL and ± 50 ft at 10 000 ft

VNO is the maximum speed:
A) at which the flight controls can be fully deflected.
B) which must never be exceeded.
C) with flaps extended in landing position.
D) not to be exceeded except in still air and with caution.

An is aircraft flying at a TAS of 1100 knots at FL 650. A change in 0.1M causes a change in TAS of 57 knots.
The temperature deviation at FL 650 assuming an ISA atmosphere is:
A) +2.5
B) -2.5
C) +5
D) -5

The advantages provided by an air data computer to indicate the altitude are:
1. Position/pressure error correction
2. Hysteresis error correction
3. Remote data transmission capability
4. Capability of operating as a conventional altimeter in the event of a failure

The combination of correct statements is:
A) 1,2,3
B) 1,3,4
C) 1,2,3,4
D) 2,3,4

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21. An aircraft is passing 6,500 ft in a descent when the static line becomes blocked. The altimeter then reads:
A) zero
B) more than 6,500 ft
C) 6,500 ft
D) less than 6,500 ft

Considering the maximum operational Mach number (MMO) and the maximum operational speed (VMO), the captain of a pressurized aircraft begins his descent from a high flight level. In order to meet his scheduled time of arrival, he decides to use the maximum ground speed at any time of the descent. He will be limited :
A) initially by the MMO, then by the VMO below a certain flight level
B) by the MMO
C) by the VMO in still air
D) initially by the VMO, then by the MMO below a certain flight level

How many diaphragms are present in a basic Mach meter?
A) Two.
B) Three.
C) Four.
D) One.

The atmospheric pressure at FL 70 in a " standard + 10" atmosphere is:
A) 644.41 hPa
B) 942.85 hPa
C) 781.85 hPa
D) 1013.25 hPa

During a climb after take-off from a contaminated runway, if the total pressure probe of the airspeed indicator is blocked, the pilot finds that indicated airspeed :
A) increases abruptly towards VNE
B) decreases steadily
C) increases steadily
D) decreases, abruptly towards zero

Pressure error consists of which of the following:
A) Configuration change, manoeuvre induced errors, turbulence
B) Slipstream error, manoeuvre induced errors, turbulence
C) Configuration change, profile induced errors, turbulence
D) Configuration change, manoeuvre induced errors, slipstream

The purpose of the IVSI is to:
A) indicate to the pilot instantaneously when an aircraft pitches in turn, especially steep turns.
B) give an instantaneous indication of the aircraft's vertical speed when a climb or descent has been initiated.
C) eliminate lag by passing static pressure directly into the case before entering the metering device.
D) automatically initiate climbs and descents through the automatic flight control system.

On board an aircraft the altitude is measured from the:
A) pressure altitude.
B) standard altitude.
C) density altitude.
D) temperature altitude.

When an altimeter is used for SSR it is always referenced to:
A) 1013.25 hPa
B) QFE
C) QNH
D) The pressure setting in use

The pressure measured at the forward facing orifice of a pitot tube is the:
A) total pressure.
B) static pressure.
C) dynamic pressure.
D) total pressure plus static pressure.

Indication of Mach number is obtained from:
A) An ordinary airspeed indicator scaled for Mach numbers instead of knots.
B) Indicated speed (IAS) compared with true air speed (TAS) from the air data computer.
C) A kind of echo sound comparing velocity of sound with indicated speed.
D) Indicated speed and altitude using a speed indicator equipped with an altimeter type aneroid.

When descending through an isothermal layer at a constant Calibrated Airspeed (CAS), the True Airspeed (TAS) will:
A) increase at an exponential rate.
B) decrease.
C) increase at a linear rate.
D) remain constant.

Aircraft with pressurized cabin in flight:
When switching to the alternate static pressure source, the pointer of the Vertical Speed Indicator:
A) indicates a climb, then settles down and reads incorrectly
B) indicates a descent, then settles down and reads incorrectly
C) indicates correctly
D) indicates a slight continuous descent

The subscale of an altimeter is set to 1030 mb and indicates 4500 ft when the QNH is 996 mb. Assuming 1 mb equals 30 ft, the altitude of the aircraft AMSL is:
A) 5520 ft
B) 3990 ft
C) 3180 ft
D) 3480 ft

The errors to which the machmeter is subject are:
A) instrument error, position error, compressibility error and manoeuvre induced error.
B) instrument error, position error.
C) instrument error, position error, barometric error, temperature error and manoeuvre induced error.
D) instrument error, position error, density error and manoeuvre induced error.

Pressure error in an altimeter arises because:

A) The true external static pressure is not accurately transmitted to the instrument

B) The true external dynamic pressure is not accurately transmitted to the instrument

C) The true external kinetic pressure is not accurately transmitted to the instrument

D) The true external pitot pressure is not accurately transmitted to the instrument

The airspeed indicator is calibrated to:

A) ISA at mean sea level

B) ISA at 36,000 ft

C) the full ISA

D) ISA at the height the aircraft is flying

An increase of 0.15 in Mach number results in an increase of 93 kt in TAS. If the temperature deviation from ISA is +9° C, the FL is:

A) FL 220

B) FL 170

C) FL 200

D) FL 90

The QNH is by definition the value of the:

A) atmospheric pressure at the level of the ground over flown by the aircraft.

B) altimeter setting so that the needles of the altimeter indicate the altitude of the location for which it is given.

C) altimeter setting so that the needles indicate zero when the aircraft is on ground at the location for which it is provided.

D) atmospheric pressure at the sea level of the location for which it is given.

Given:

M: Mach number
Ts: static temperature
Tt: total temperature

Which of the following statements is correct?

A) $Ts = Tt / (1+0.2M^2)$

B) $Ts = Tt / (0.2M^2)$

C) $Ts = Tt \times (1+0.2M^2)$

D) $Ts = Tt \times (0.2M^2)$

41. As an airplane climbs higher, the true airspeed for a given indicated airspeed will:

A) Decrease
B) Vary depending on the actual value of the indicated airspeed and the angle of attack
C) Increase
D) Remain the same

If the pitot line to an ASI becomes totally blocked during a climb, the ASI reading will:

A) progressively decrease.
B) progressively increase.
C) drop to zero.
D) remain unchanged.

What is the significance of the yellow arc in an airspeed indicator?

A) Normal operating range
B) Structural warning range
C) Never exceed range
D) Turbulent operations range

Which of the following instruments require pitot and static pressure inputs?

A) Airspeed indicator only.
B) Airspeed indicator, machmeter and vertical speed indicator.
C) Airspeed indicator and machmeter.
D) Airspeed indicator, vertical speed indicator, altimeter.

At a constant calibrated airspeed (CAS), the Mach number:

A) remains unchanged when the outside temperature decreases.
B) increases when the altitude increases.
C) decreases when the altitude increases.
D) remains unchanged when the outside temperature increases.

Which of the following could cause a pressure (position) error:

1. Changes in configuration
2. Manoeuvres
3. Turbulence

A) All the statements are correct
B) 2 and 3 are correct
C) 1 and 2 are correct
D) 1 and 3 are correct

With a constant weight, irrespective of the airfield altitude, an aircraft always takes off at the same:
A) true airspeed.
B) equivalent airspeed.
C) ground speed.
D) calibrated airspeed.

An aircraft is flying straight and level, over a warm air mass. The altimeter reading will be:
A) oscillating around the correct height
B) greater than the real height
C) less than the real height
D) correct

The reading of a Mach indicator is independent of:
A) the total pressure.
B) the static pressure.
C) the differential pressure measurement.
D) the outside temperature.

The airspeed indicator of an aircraft is provided with a moving red and white hatched pointer. This pointer indicates the:
A) maximum speed in VMO operation, versus temperature.
B) speed indicated on the autothrottle control box versus altitude.
C) maximum speed in VMO operation versus altitude.
D) speed indicated on the autothrottle control box, versus temperature.

VLE is the maximum:
A) flight speed with landing gear down.
B) speed with flaps extended in a given position.
C) speed at which the landing gear can be operated with full safety.
D) speed authorized in flight.

An aircraft is flying at M0.86 at FL320. The temperature deviation is +10° C. The TAS is:
A) 481 kts
B) 512 kts
C) 522 kts
D) 607 kts

The difference between static air temperature and total air temperature is known as:
A) hot ramp radiation
B) corrected outside air temperature
C) the recovery factor
D) the ram rise

If the alternate static source is used, the resulting reading will be:
A) Too high reading of altitude.
B) Too low reading of airspeed.
C) No reading of airspeed.
D) Too low reading of altitude.

When flying from a sector of warm air into one of colder air, the altimeter will:
A) be just as correct as before.
B) overread.
C) underread.
D) show the actual height above ground.

Today's airspeed indicators (calibrated to the Saint-Venant formula), indicate, in the absence of static (and instrumental) error:
A) The equivalent airspeed, in all cases
B) The true airspeed
C) The calibrated airspeed (CAS) in all cases
D) The airspeed, whatever the altitude

When descending through an isothermal level (at a constant Mach number) the TAS will .... (i), the CAS .... (ii) and the LSS will .... (iii):
A) i remain constant ii increase iii remain constant
B) i decrease ii decrease iii remain constant
C) i remain constant ii decrease iii increase
D) i increase ii increase iii decrease

A pitot tube measures:
A) Dynamic minus static pressure
B) Static pressure
C) Dynamic plus static pressure
D) Dynamic pressure

An aircraft is flying at 0.86 M, temperature 218 Kelvin. The TAS is:
A) 575 kt
B) 477 kt
C) 607 kt
D) 494 kt

An aircraft flies from A to B with QNH at A of 1019mb set on the altimeter subscale throughout the flight.
Assuming all other errors are zero and that 1 mb = 30 feet, when overhead B, QNH 1013 mbs, the altimeter will be:
A) under indicating by 180 feet
B) over indicating by 120 feet
C) indicating true altitude
D) over indicating by 180 feet

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61. If the static line to the ASI becomes blocked during a climb, the ASI reading will:
A) progressively overread.
B) progressively underread.
C) remain fixed.
D) increase, no matter what the actual airspeed is.

Indicated airspeed (as read on the airspeed indicator] will:
A) Increase in tailwind.
B) Remain unchanged in headwind and tailwind.
C) Decrease in tailwind.
D) Increase in headwind.

An aircraft is flying at FL 390, temperature -56.5° C at Mach 0.85. The TAS of the aircraft is:
A) 476
B) 485
C) 561
D) 472

The colour arcs of an ASI are in ascending speed order?
A) white, yellow and red
B) green, yellow and red
C) blue, yellow and red
D) white, green and yellow

The velocity maximum operating (V.M.O.) is a speed expressed in:
A) true airspeed (TAS).
B) computed airspeed (COAS).
C) calibrated airspeed (CAS).
D) equivalent airspeed (EAS).

When side-slipping, one of the instruments below will give an incorrect indication:
A) Attitude Indicator.
B) Vertical Speed Indicator.
C) Airspeed Indicator.
D) Altitude Indicator.

Sound propagates through the air at a speed which only depends on:
A) density.
B) pressure.
C) temperature and the pressure.
D) temperature.

A pitot blockage of both the ram air input and the drain hole with the static port open causes the airspeed indicator to:
A) read a little low.
B) freeze at zero.
C) react like an altimeter.
D) read a little high.

A pressure head is subject to the following errors:
A) position, manoeuvre induced and instrument errors.
B) position and manoeuvre induced errors.
C) position, manoeuvre induced and temperature errors.
D) position, manoeuvre induced and density errors.

The limits of the white scale of an airspeed indicator are:
A) VSO for the lower limit and VLE for the upper limit
B) VSO for the lower limit and VFE for the upper limit
C) VS1 for the lower limit and VLE for the upper limit
D) VS1 for the lower limit and VFE for the upper limit

If the outside temperature at 35 000 feet is -40° C, the local speed of sound is:
A) 247 kt.
B) 686 kt.
C) 596 kt.
D) 307 kt.

The altimeter in the attached figure shows:

A) FL 270
B) a height of 2700 ft
C) FL 27
D) a pressure altitude of 20700 ft

In a combined mach/airspeed indicator the purposes of the BARBER POLE is to indicate:
A) VMO and this value decreases at high altitudes
B) The maximum safe airspeed with flaps/slats extended
C) VMO and this is a fixed value at all altitudes
D) VMO and this value increases at high altitudes

An aircraft is flying at 4000 ft from a high temperature area to a cold temperature area where the temperature difference is 20º C. What will be the actual height of the aircraft:
A) 3680 ft
B) 4320 ft
C) 3840 ft
D) 4000 ft

If the ambient temperature decreases, the TAS of an aircraft cruising at a constant Mach number will:
A) remain constant.
B) decrease because local speed of sound decreases.
C) increase because local speed of sound increases.
D) increase because local speed of sound decreases.

A VSI metering unit incorporates a capillary tube to compensate for:
A) temperature and pressure changes with height
B) viscosity changes
C) barometric error
D) position error

The temperature at the airport is 23º C, what is the local speed of sound:
A) 694 knots
B) 616 knots
C) 671 knots
D) 644 knots

What does a vertical speed indicator actually measure?
A) The rate of pressure change.
B) The rate of temperature change.
C) The rate of altitude change.
D) The rate of temperature and altitude change.

VSO is shown on an ASI by a:
A) White arc
B) Red radial line
C) Green arc
D) Yellow arc

An aircraft is flying at FL 290, TAS 500 knots, 0.86M, the temperature deviation is:
A) -8
B) +7
C) -15
D) +25

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81. Where a M/IAS indicator is being used:
A) At high altitudes, the VMO pointer retains a fixed position which indicates the maximum operating Mach Number permitted
B) At high altitudes, the VMO pointer retains a fixed position which indicates the maximum operating IAS permitted
C) At low altitudes, the VMO pointer retains a fixed position which indicates the maximum operating Mach Number permitted
D) At low altitudes, the VMO pointer retains a fixed position which indicates the maximum operating IAS permitted

EAS is:
A) CAS corrected for compressibility
B) CAS corrected for position error
C) IAS corrected for instrument error only
D) IAS corrected for compressibility

For an altimeter, pressure fluctuations at the static vent cause:
A) Temperature error
B) Barometric error
C) Position error
D) Hysteresis error

The combined Machmeter / ASI is subject to the following errors:
A) position, density, instrument, compressibility, manoeuvre induced
B) those of the Machmeter only
C) instrument and compressibility only
D) instrument, pressure and temperature only

The machmeter employs:
A) Two capsules with their axes linked
B) Two capsules with their axes at 90° to each other
C) A capsule linked to a dashpot
D) Two capsules

The response time of a vertical speed detector may be increased by adding a:
A) return spring.
B) second calibrated port.
C) correction based on an accelerometer sensor.
D) bimetallic strip.

In the IVSI, lag error:
A) is eliminated by the use of logarithmic presentation.
B) is virtually eliminated by using a special dashpot accelerometer assembly.
C) is only eliminated when initiating a climb or descent.
D) is eliminated by feeding a sample of static pressure to the case and delaying it to the capsule.

Which of the following lists the errors of the machmeter?
A) Compressibility, position, density, instrument and manoeuvre induced
B) Lag, position, density, compressibility and temperature
C) Position, manoeuvre induced, lag, density and instrument
D) Position, manoeuvre induced and instrument

A pitot tube covered by ice which blocks the ram air inlet will affect the following instrument (s):
A) vertical speed indicator only.
B) altimeter only.
C) airspeed indicator only.
D) airspeed indicator, altimeter and vertical speed indicator.

If an aircraft is equipped with one altimeter which is compensated for position error and another altimeter which is not, and all other factors being equal:

A) at high speed, the non compensated altimeter will indicate a higher altitude.
B) there will be no difference between them if air the data computer is functioning normally.
C) ATC will get an erroneous altitude report SSR.
D) At high speed the non compensated altimeter will indicate a lower altitude.

A temperature sensor having a recovery factor of 0.75 indicates 30° C. Static Air Temperature (SAT) is 25° C.
How high is the Ram-rise?

A) 5° C.
B) 6.7° C.
C) 18.8° C.
D) 40° C.

When climbing at a constant Mach number below the tropopause, in ISA conditions, the Calibrated Airspeed (CAS) will:

A) increase at an exponential rate.
B) decrease.
C) remain constant.
D) increase at a linear rate.

An Air Data Computer (ADC):

A) Measures position error in the static system and transmits this information to ATC to provide correct altitude reporting
B) Is an auxiliary system that provides altitude information in the event that the static source is blocked
C) Converts air data measurements given by ATC from the ground in order to provide correct altitude and speed information
D) Transforms air data measurements into electric impulses driving servo motors in instruments

What corrections must be applied to indicated airspeed to produce true airspeed?

A) Correction for altitude and wind.
B) Correction for heading and altitude.
C) Correction for altitude and temperature.
D) Correction for wind and temperature.

An increase of 0.15 Mach results in an increase of 93 kt TAS of an aircraft. The local speed of sound is:
A) 620 kt
B) 560 kt
C) 580 kt
D) 685 kt

An aircraft is in level flight at FL100 over a mountain range, which extends up to 2.400 metres AMSL. If the regional QNH is 998 hPa (use 30 ft/hPa), what is the approximate terrain clearance?
A) 450 feet.
B) 1.681 feet.
C) 2.581 feet.
D) 7.869 feet.

The Airspeed Indicator measures:
A) Static pressure
B) Differential pressure
C) Static pressure changes
D) Differential pressure changes

If the static source to an airspeed indicator (ASI) becomes blocked during a descent the instrument will:
A) read zero.
B) continue to indicate the speed applicable to that at the time of the blockage.
C) under-read.
D) over-read.

Match true airspeed (TAS) with the associated definition:
A) Calibrated airspeed corrected for altitude and non-standard temperature.
B) Actual speed of an aircraft over ground.
C) The airspeed you read directly from the airspeed indicator.
D) Indicated airspeed corrected for installation and instrument errors.

Compressibility is corrected for when obtaining:
A) CAS from IAS and the correction is normally subtractive
B) EAS from CAS and the correction is always subtractive
C) EAS from CAS and the correction is normally subtractive
D) CAS from IAS and the correction can be either additive or subtractive

101. An aircraft flies an altitude of 3500 feet from A, elevation 700 feet QNH 1015 mb to B, elevation 1120 feet QNH 992 mb. Assuming the altimeter sub-scale is not changed, the aircraft will arrive over B at a height of:

A) 1690 feet
B) 2810 feet
C) 3500 feet
D) 2670 feet

The Mach number is:

A) the ratio of the indicated airspeed to the sonic velocity at the altitude considered.
B) the ratio of the aircraft conventional airspeed to the sonic velocity at the altitude considered.
C) a direct function of temperature ; it varies in proportion to the square root of the absolute temperature.
D) the ratio of the aircraft true airspeed to the sonic velocity at the altitude considered.

In An Air Data Computer (ADC), aeroplane altitude is calculated from:

A) Measurement of absolute barometric pressure from a static source on the fuselage.
B) Measurement of outside air temperature (OAT).
C) Measurement of elapsed time for a radio signal transmitted to the ground surface and back.
D) The difference between absolute and dynamic pressure at the fuselage.

Calibrated air speed is:

A) IAS plus compressibility correction
B) IAS plus instrument error correction
C) IAS plus density error correction
D) IAS plus the pressure error

CAS is IAS corrected for:

A) temperature error.
B) compressibility.
C) density error.
D) position error and instrument error

Change of temperature as an aircraft climbs or descends:

A) must be corrected using a computer or correction tables.
B) is compensated at the metering unit by means of a capillary and orifice.
C) has no effect on the VSI readings, as only static pressure is used in this instrument.
D) will affect VSI readings whenever actual temperature lapse rate differs from the standard atmosphere temperature lapse rate.

If the alternate static source is selected, the greatest error in the machmeter will be:
A) density error
B) lag
C) manoeuvre induced error
D) position error

The restricted choke in the VSI:
A) will prevent the instrument being damaged by high rates of climb and descent
B) compensates for changes in temperature and density only
C) compensates for time lag in the instrument
D) creates a differential pressure between the capsule and the case as its main function

The error in altimeter readings caused by the variation of the static pressure near the source is known as:
A) barometric error.
B) instrument error.
C) hysteresis effect.
D) position pressure error.

Match indicated airspeed (IAS) with the associated definition:
A) Calibrated airspeed corrected for altitude and non-standard temperature.
B) Indicated airspeed corrected for installation and instrument errors.
C) The airspeed you read directly from the airspeed indicator.
D) Actual speed of an aircraft over the ground.

The ISA temperature and pressure for 18 000 ft are:
A) -20.7º C and 506 hPa respectively
B) -12.7º C and 506 hPa respectively
C) -12.7º C and 595.2 hPa respectively
D) -20.7º C and 595.2 hPa respectively

The principle of operation of a servo-assisted pressure altimeter is that:
A) static pressure is used in the same way as a simple altimeter except that several capsules are used
B) static pressure changes are converted via an E- and I-bar transducer into electrical signal which is used, via a follow-up system, to move a digital counter and pointer system
C) static pressure enters an aneroid capsule causing it to expand
D) static and pitot pressure are compared with the resultant pressure being used to drive the counter and pointer system

When flying from low pressure to high pressure, the barometric error of an altimeter will cause the instrument to:
A) underread the true altitude of the aircraft.
B) overread the true altitude of the aircraft.
C) indicate a higher altitude than the correct one.
D) indicate the true altitude.

In a non-pressurized aircraft, if one or several static pressure ports are damaged, there is an ultimate emergency means for restoring a practically correct static pressure intake:
A) slightly opening a window to restore the ambient pressure in the cabin
B) descending as much as possible in order to fly at a pressure as close to 1013.25 hPa as possible
C) calculating the ambient static pressure, allowing for the altitude and QNH and adjusting the instruments
D) breaking the rate-of-climb indicator glass window

The Total Air Temperature probe measures total temperature (TAT) by:
(SAT = Static Air Temperature)
A) TAT = SAT + heating due to compressibility.
B) TAT = SAT + kinetic heating.
C) TAT = SAT - kinetic heating.
D) TAT = SAT - heating due to compressibility.

The limits of the yellow scale of an airspeed indicator are:
A) VNO for the lower limit and VNE for the upper limit.
B) VLE for the lower limit and VNE for the upper limit.
C) VLO for the lower limit and VNE for the upper limit.
D) VFE for the lower limit and VNE for the upper limit.

VFE is the maximum speed:
A) with the flaps extended in landing position.
B) at which the flaps can be operated in turbulence.
C) with the flaps extended in take-off position.
D) with the flaps extended in a given position.

Compared to the VSI what errors are eliminated by the IVSI?
A) lag
B) pressure
C) temperature
D) turning

The possibility of ingress of moisture to the instruments:
A) is prevented by drain traps
B) is prevented by fitting blanks
C) is prevented by having the pitot head and static vents lower than the instruments
D) is prevented by the anti-icing heaters

If the pitot tube is clogged, which instrument(s) is/are affected?
A) Altimeter only.
B) Vertical speed indicator only.
C) Airspeed indicator only.
D) Altimeter and airspeed indicator.

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121. Select the correct statement:
A) CAS = TAS corrected for density error
B) EAS = CAS corrected for compressibility error
C) EAS = IAS corrected for position error
D) TAS = EAS corrected for compressibility error

We are maintaining a constant flight level. That means:
A) the outside air pressure is constant if the temperature remains constant.
B) the altitude is constant when the sea-level pressure is constant.
C) the outside air pressure is constant.
D) the altitude above sea level is constant.

The vertical speed indicator indications may be in error for some seconds after starting or finishing a climb or descent. The error is a result of:
A) a combination of position error and manoeuvre induced errors.
B) manoeuvre induced errors only.
C) a combination of time lag and manoeuvre induced errors.
D) a combination of time lag and instrument error.

Which statement is correct for the Vertical Speed Indicator (VSI) during a climb:
A) The pressure inside the capsule drops faster than the pressure inside the case
B) The pressure inside the capsule drops faster than the pressure outside the case
C) The pressure outside the capsule drops slower than the pressure inside the case
D) The pressure inside the capsule drops slower than the pressure inside the case

During a steady climb the pitot head becomes totally blocked by ice. As the climb continues the indications of the machmeter will:
A) progressively under indicate the Mach number
B) go to zero and stay there
C) stick at the Mach number at the time of blockage
D) increase no matter what the actual Mach number

The purpose of the vibrating device of an altimeter is to:
A) allow damping of the measurement in the unit.
B) inform the crew of a failure of the instrument.
C) reduce the effect of friction in the linkages.
D) reduce the hysteresis effect.

The vertical speed indicator of an aircraft flying at a true airspeed of 100 kt, in a descent with a slope of 3° indicates:
A) -50 ft/min
B) -150 ft/min
C) -500 ft/min
D) -300 ft/min

The mach number is the:
A) true airspeed (TAS) divided by the local speed of sound.
B) corrected airspeed (CAS) divided by the local speed of sound.
C) indicated airspeed (IAS) divided by the local speed of sound.
D) equivalent airspeed (EAS) divided by the local speed of sound.

Within a temperature range of +50° and -20° C the VSI is accurate to within limits of:
A) +/- 250 ft/min
B) +/- 100 ft/min
C) +/- 200 ft/min
D) +/- 50 ft/min

Density varies:
A) Inversely with pressure and directly with temperature
B) Directly with pressure and inversely with temperature
C) Directly with temperature and pressure
D) Inversely with temperature and pressure

The Mach number is a function of the:
A) Isobaric gradient of the fluid.
B) humidity of the air.
C) relative air temperature.
D) Absolute temperature of the air.

The reason for having a square-law compensation in the airspeed-indicator mechanism is:
A) The ram air pressure decreases with the square-root of the airspeed
B) The ram air pressure increases with the square-root of the airspeed
C) The differential pressure decreases with the square of the airspeed
D) The differential pressure increases with the square of the airspeed

VLO is the maximum:
A) speed with flaps extended in a given position.
B) flight speed with landing gear down.
C) speed at which the landing gear can be operated with full safety.
D) cruising speed not to be exceeded except in still air with caution.

Total Air Temp is always... than Static Air Temp and the difference varies with...
A) colder, altitude.
B) warmer, TAS.
C) colder, CAS.
D) warmer, altitude.

The hysteresis error of an altimeter varies substantially with the:
A) mach number of the aircraft.
B) static temperature.
C) aircraft altitude.
D) time passed at a given altitude.

The airspeed indicator circuit consists of pressure sensors. The pitot tube directly supplies:
A) the dynamic pressure.
B) the total pressure and the static pressure.
C) the total pressure.
D) the static pressure.

Indicated airspeed corrected for position error is:
A) True air speed.
B) Ground speed.
C) Calibrated airspeed.
D) Equivalent air speed.

If the static source of an altimeter becomes blocked during a descent the instrument will:
A) under-read.
B) indicate a height equivalent to the setting on the millibars subscale.
C) continue to display the reading at which the blockage occurred.
D) gradually indicate zero.

The vertical speed indicator VSI is fed by:
A) total pressure.
B) dynamic pressure.
C) differential pressure.
D) static pressure.

Given:

1. Ts: the static air temperature (SAT)
2. Tt: the total air temperature (TAT)
3. Kr: the recovery coefficient
4. M: the Mach number

The total temperature can be expressed by the formula:

A) $Tt = Ts(1+0.2 \times Kr \times M^2)$
B) $Tt = Ts(1+0.2 \times M^2)$
C) $Tt = Ts/(1+0.2 \times Kr \times M^2)$
D) $Tt = Ts(1-0.2 \times M^2)$

---

141. The full International Standard Atmosphere (ISA) is assumed in the calibration of:

A) the vertical speed indicator and the machmeter
B) the vertical speed indicator only
C) the pressure altimeter only
D) the pressure altimeter and the airspeed indicator

In a standard atmosphere and at the sea level, the calibrated airspeed (CAS) is:

A) higher than the true airspeed (TAS).
B) equal to the true airspeed (TAS).
C) lower than the true airspeed (TAS).
D) independent of the true airspeed (TAS).

Compressibility Error requires a .... (i) correction because it is .... (ii) of ....(iii) pressure. It gives .... (iv):

A) (i) negative (ii) an increase (iii) dynamic (iv) EAS
B) (I) negative (ii) a decrease (iii) static (iv) EAS
C) (i) positive (ii) a decrease (iii) static (iv) TAS
D) (i) positive (ii) an increase (iii) dynamic (iv) TAS

The IVSI is less reliable than the VSI when:

A) Overshooting
B) At an angle of bank of 55°
C) Pulling G
D) Both b and c

The servo altimeter is better than a sensitive altimeter because:

A) It improves temperature error
B) It improves barometric error
C) It improves high altitude error
D) All the above are correct

The operating principle of the vertical speed indicator (VSI) is based on the measurement of the rate of change of:

A) Static pressure.
B) Dynamic pressure.
C) Kinetic pressure.
D) Total pressure.

During a straight and uniform climb, the pilot maintains a constant calibrated airspeed (CAS):

A) The Mach number is constant and the true airspeed (TAS) is constant.
B) The Mach number increases and the true airspeed (TAS) increases.
C) The Mach number is constant and the true airspeed (TAS) decreases.
D) The Mach number increases and the true airspeed (TAS) is constant.

Dynamic pressure is:

A) Pitot pressure minus static pressure
B) Pitot pressure plus static pressure
C) Density and static pressure
D) Static pressure minus pitot pressure

If the static vent becomes blocked during climb:

A) the VSI will indicate a decreasing rate of climb.
B) the VSI will stop at the rate of climb of the aircraft at the time of blockage.
C) the VSI will return to zero.
D) the VSI will indicate an increasing rate of climb.

The limits of the green scale of an airspeed indicator are:

A) VS1 for the lower limit and VNE for the upper limit.
B) VS0 for the lower limit and VNO for the upper limit.
C) VS1 for the lower limit and VNO for the upper limit.
D) VS1 for the lower limit and VLO for the upper limit.

Gyroscopic Instruments:

Under normal operating conditions, when an aircraft is in a banked turn, the rate-of-turn indicator is a valuable gyroscopic flight control instrument. When it is associated with an attitude indicator it indicates :

1. the angular velocity of the aircraft about the yaw axis
2. the bank of the aircraft
3. the direction of the aircraft turn
4. the angular velocity of the aircraft about the real vertical

The combination of correct statements is:

A) 1, 2
B) 3, 4
C) 2, 4
D) 1, 3

Inside an artificial horizon:

A) the inner ring is tied to the vertical by a control system.
B) there is only one gimbal ring.
C) the inner ring is pivoted laterally inside the outer ring and the outer ring is pivoted longitudinally inside the case.
D) the rotor axis is kept level by a calibrated spring attached to the outer ring and the instrument case.

The fundamental difference between an INS and an IRS is that:

A) The INS is a strap down system with 2 accelerometers mounted 90º to each other
B) The IRS is a strap down system with 3 accelerometers mounted 90º to each other
C) The IRS is a strap down system with 2 accelerometers mounted 90º to each other
D) The INS is a strap down system with 3 accelerometers mounted 90º to each other

The purpose of the flux-valve is:

A) to sense the direction of the earth's magnetic field relative to the airplane.
B) to align the spokes with the earth's magnetic field in order to get maximum voltage from the pick-up coils.
C) to measure the strength of the earth's magnetic field.
D) to provide flux for the automatic slaving system.

In a left turn, the ball of the turn co-ordinator is out to the right, what corrective action is required?

A) more left bank.
B) more left rudder.
C) more right bank.
D) decrease elevator pitch.

A DGI has:
A) two degrees of freedom & a vertical spin axis.
B) one degree of freedom & a horizontal spin axis.
C) two degrees of freedom & a horizontal spin axis.
D) one degree of freedom & a vertical spin axis.

The case of an air driven turn and balance indicator is leaking. A rate 1 turn of 360° will take:
A) Less than two minutes
B) Two minutes exactly
C) None of the above
D) More than two minutes

In a Gyro magnetic Compass the flux gate transmits information to the:
A) erecting system.
B) heading indicator.
C) amplifier.
D) error detector.

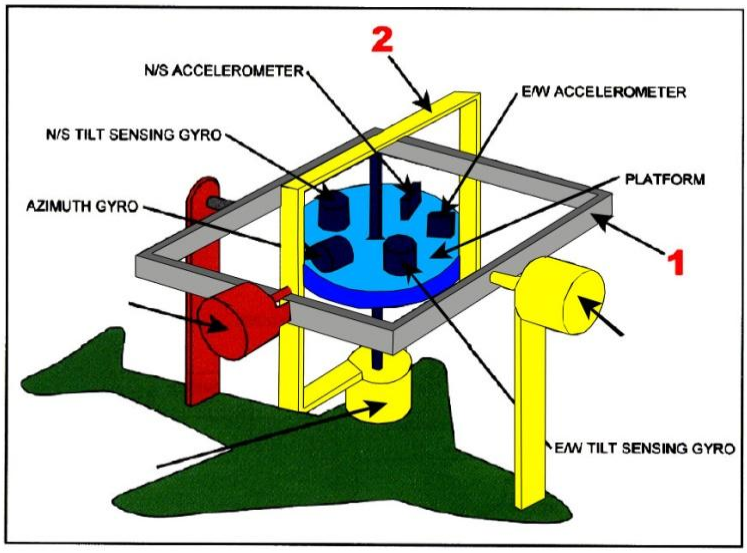
Typical directional gyro indicator errors are:
A) random wander, gimballing errors and apparent wander due to earth's rotation.
B) parallax errors and gimballing errors.
C) gimballing errors, position error and friction error.
D) instrument error, synchro error and wandering errors.

The flux valve in a RIMC:
A) is made of hard-iron magnetic steel.
B) is supplied with AC current.
C) is fed with DC current.
D) has its own self exciter unit.

The sustained oscillation in the Ring Laser Gyro (RLG) is initially caused by:
A) the gas (or plasma) inside the triangular cavity is ionised by the voltage, causing helium atoms to collide with and transfer energy to the neon atoms.
B) the spontaneous return of photons to a higher energy level, which in turn produces, excited neon atoms.
C) the corner mirrors, which reflect the radiation energy, back to the photons.
D) the pressure fluctuation in the high pressure mixture of helium and neon gases in the triangular cavity.

The attached diagram shows a gyro-stabilized platform. 1 is a .... gyro gimbal and 2 is a .... gyro gimbal.

A) ROLL ; YAW
B) PITCH ; ROLL
C) PITCH ; YAW
D) ROLL ; PITCH



A tied gyro has .... (i) planes of freedom and is always controlled in .... (ii) of these planes by .... (iii):

A) (i) 3 (ii) at least one (iii) an external force
B) (i) 2 (ii) both (iii) gravity
C) (i) 3 (ii) both (iii) an external force
D) (i) 3 (ii) only one (iii) gravity

What angle of bank should you adopt on the attitude indicator for a standard rate (rate 1) turn while flying at an IAS of 130 Kt?

A) 15°
B) 30°
C) 20°
D) 10°

What indications should you get from the turn-and-slip indicator during taxi?

A) the ball stays fixed in the centre position during the turn, and the needle deflects in the direction of the turn
B) the ball moves freely opposite the turn, and the needle deflects in the direction of the turn
C) the ball moves freely in the direction of the turn, and the needle deflects in the opposite direction of the turn
D) the ball stays fixed in the centre position during the turn, and the needle deflects in the opposite direction of the turn

The purpose of the slaving torque motor is:

A) to produce a precessive force in order to align the gyro with the horizontal plane
B) to produce a precessive force in order to align the gyro with the earth's magnetic field
C) to take inputs from the flux valve and apply appropriate correction to the gyro
D) to produce a precessive force in order to align the gyro with the vertical plane

In a Slaved Gyro Compass System the output of the flux-valve is fed to:

A) the slaving torque motor directly.
B) to the indicator.
C) the stator in the slaved gyro control.
D) to the power supply of the gyro unit.

The amber ALERT light on an INS control and display unit:

A) illuminates steadily after passing a way point in manual mode, until the next leg is programmed in
B) illuminates steadily for 2 minutes before reaching the next way point
C) illuminates if power from the aircraft bus bar has been lost and the system is operating on standby battery
D) flashes for 2 minutes before reaching the next way point

An INS with the accelerometers aligned N/S and E/W is limited to use at latitudes below about 82° . This is because:

A) at high speed on East or West tracks the rate of convergence is faster than the azimuth motor can correct
B) the functions of Secant Latitude and Tangent Latitude used for certain corrections in the computer start to approach infinity and the computer cannot handle the rapid changes involved
C) the correction for the Coriolis effect of earth rotation approaches infinity above 82° lat
D) it loses horizontal reference as dip becomes large

The product of the first integration of the E/W acceleration sensed by an INS system is:

A) speed along the local parallel
B) departure
C) speed along the local horizontal
D) distance

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21. The characteristics of the directional gyro (DG) used in a gyro stabilised compass system are:

A) two degrees of freedom, whose axis aligned with the vertical to the location is maintained in this direction by an erecting system.
B) one degree of freedom, whose vertical axis, aligned with the real vertical to the location is maintained in this direction by an automatic erecting system.
C) two degrees of freedom, whose horizontal axis corresponding to the reference direction is maintained in the horizontal plane by an automatic erecting system.
D) one degree of freedom, whose horizontal axis is maintained in the horizontal plane by an automatic erecting system.

What is known as the " Schuler Period" has a length of:
A) 84.4 minutes.
B) 84.4 seconds.
C) 84.4 Hertz.
D) 84.4 hours.

Assume a perfectly frictionless DI is corrected to give zero drift on the ground at 30° N. The DI is set to read 270° in an aircraft tracking along the 60° parallel at a groundspeed of 545 knots. The DI reading after 80 minutes:
A) 257.33°
B) 254.66°
C) 286.80°
D) 283.66°

The indication of the directional gyro as an on-board instrument are valid only for a short period of time. The causes of this inaccuracy are:

1. The earth's rotation
2. The longitudinal acceleration
3. The aircraft's motion over the surface of the earth.
4. The mechanical defects of the gyro
5. The gyro's weight
6. The gimbal mount of the gyro rings

The combination of correct statements is:
A) 1,3,4.
B) 1,3,4,6.
C) 1,2,3,4,5,6.
D) 2,5,6.

The rotational speed of an air-driven gyro is normally:
A) 9000 - 12000 RPM
B) 6000 - 9000 RPM
C) 14000 - 16000 RPM
D) 4400 - 4600 RPM

The corrections fed to the platform gimbal motors of a north referenced inertial navigation system during the ALIGN mode use inputs from:
A) all the above
B) the longitude setting, the latitude setting, the air data computer
C) the latitude setting, the longitude setting, the accelerometers
D) the latitude setting, the accelerometers

Erection systems are provided for the purpose of:
A) Erecting and maintaining the gyro in its horizontal position
B) Aligning a directional gyro in its horizontal position
C) Erecting and maintaining the gyro in its vertical position
D) Aligning a directional gyro in its vertical position

The rotational speed of the gyro in a rate of turn indicator is .... (i) than in the direction indicator to .... (ii):
A) (i) Higher (ii) increase rigidity
B) (i) Lower (ii) reduce rigidity
C) (i) Higher (ii) reduce apparent wander
D) (i) Lower (ii) increase the resultant precessional force

When an aircraft has turned 270 degrees with a constant attitude and bank, the pilot observes the following on a classic artificial horizon:
A) too much nose up and bank to low.
B) attitude and bank are correct.
C) too much nose up and bank correct.
D) too much nose up and bank to high.

A directional gyro is:
1. a gyroscope free around two axis
2. a gyroscope free around one axis
3. capable of self- orientation around an earth-tied direction
4. incapable of self-orientation around an earth-tied direction

The combination which regroups all of the correct statements is:
A) 2 - 4.
B) 1 - 4.
C) 2 - 3.
D) 1 - 3.

The heading information originating from the gyromagnetic compass flux valve is sent to the:
A) error detector.
B) amplifier.
C) heading indicator.
D) erector system.

An aircraft is flying a rate 1 turn at 480 kt TAS. What is the diameter of the turn?
A) 2 NM
B) 3 NM
C) 5 NM
D) 6 NM

At the second state of integration E/W speed is converted into E/W distance gone. To convert this departure into change of longitude it has to:
A) be divided by Tangent of the latitude
B) be multiplied by Cosine of the latitude
C) be divided by Secant of the latitude
D) be multiplied by Secant of the latitude

The rate gyro indicates the correct rate of turn when the rate of .... (i) precession due to the spring is .... (ii) to the .... (iii) rate of turn:
A) (i) secondary (ii) equal (iii) aircraft
B) (i) torque (ii) opposite (iii) primary
C) (i) primary (ii) balanced by and equal (iii) aircraft
D) (i) secondary (ii) opposite (iii) aircraft

The rotational speed of the gyroscope in a turn indicator falls below the correct operational speed. A 90° turn at an indicated RATE ONE on this turn indicator will take:
A) more than 30 seconds
B) less than 30 seconds
C) 30 seconds
D) 30 seconds ± 10 seconds either way

What is the Schuler period?
A) 1 oscillation in azimuth.
B) 84 minutes.
C) 21 minutes.
D) 63 minutes.

Alignment of a RLG INS takes:
A) Less than 10 minutes
B) 15 – 20 minutes
C) 84.4 minutes
D) 10 – 15 minutes

A longitude error in an INS will cause:
A) Will be corrected for once the E/W accelerometer has aligned to true north
B) Will cause no problems at all
C) Poor alignment and degraded accuracy
D) A failure to align

An airborne instrument, equipped with a gyro with 1 degree of freedom and a horizontal spin axis is a:
A) fluxgate compass.
B) directional gyro.
C) turn indicator.
D) gyromagnetic compass.

The heading read on the dial of a directional gyro is subject to errors, one of which is due to the movement of the aircraft. This error...

A) is dependent on the ground speed of the aircraft, its true track and the average latitude of the flight.
B) is at its greatest value when the aircraft follows a meridional track.
C) shows itself by an apparent rotation of the horizontal axis of the gyroscope which seems to turn at 15° per hour to the right in the northern hemisphere.
D) is, in spite of this, insignificant and may be neglected.

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41. The control and display unit of an inertial navigation system indicates a position of 4810.9° N 00012.2° W on a ramp position 4807.5° N 00005.1° E. What is the radial error rate of the system if it has been in NAV mode for 8 hours 20 minutes:

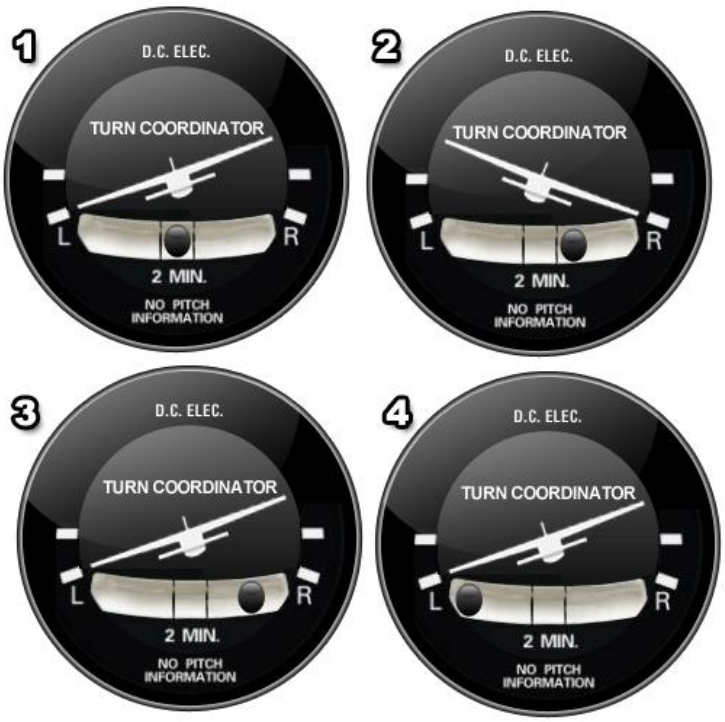
A) 14.3 NM/hr
B) 1.37 Km/hr
C) 1.37 NM/hr
D) 11.42 NM/hr

The directional gyro keeps its rotation axis aligned toward:

A) magnetic North.
B) a point in space.
C) a point on the Earth's surface.
D) geographic North.

The diagram representing a left turn with insufficient rudder is:

A) 1
B) 3
C) 2
D) 4



A turn and balance indicator uses a:
A) Rate gyro
B) Space gyro
C) Tied gyro
D) Earth gyro

Among the systematic errors of the " directional gyro" , the error due to the earth rotation make the north reference turn in the horizontal plane. At a mean latitude of 45° N, this reference turns by...
A) 7.5° /hour to the right
B) 7.5° /hour to the left
C) 15° /hour to the right
D) 10.5° /hour to the right

What is an operational difference between the turn coordinator and the turn and slip indicator?
A) the turn coordinator indicates bank angle only; the turn and slip indicator indicates rate of turn and co- ordination.
B) the turn coordinator indicates roll rate, rate of turn, and co-ordination; the turn and slip indicator indicates rate of turn and co-ordination.
C) the turn coordinator is always electric; the turn and slip indicator is always vacuum-driven.
D) the turn coordinator indicates angle of bank; the turn-and-slip indicator indicates turn rate in co-ordinated flight.

What is the main cause of precession?
A) Magnetic declination.
B) Magnetic variation.
C) Bearing friction.
D) The Earth's rotation.

The operational limits of a typical air driven direction indicator:
A) are not restrictive to heading
B) are overcome by twin air jets
C) are due to the air jets being attached to the inner gimbal ring
D) are 85° in roll and pitch

The basic properties of a gyroscope are:
A) Precession and torque
B) Torque and inertia
C) Rigidity and inertia
D) Precession and rigidity

The turn coordinator and artificial horizon shown in attached figure show the aircraft to be turning left at rate one:

A) and skidding out with nose below the horizon
B) slipping in with nose below the horizon
C) with too much bank and nose below the horizon
D) with insufficient bank and nose above the horizon

The operating principle of the pendulous vane unit erecting system is:

A) The influence of gravity on the pendulous vanes and the gyro rotors.
B) The influence of gravity on the pendulous vanes.
C) The influence of gravity on the gyro rotors.
D) The air flow reaction through the open vanes.

The term 'toppling', when applied to gyros is:

A) wander in the vertical plane.
B) gyroscopic precession.
C) wander in the horizontal plane.
D) real wander and apparent wander.

Gimballing error:

A) will disappear after a turn is completed.
B) will be zero on only two headings during a 360° turn.
C) will remain until the gyro is reset.
D) will only occur during a 360° turn.

The purpose of the caging knob (Directional Gyro) is:

A) to reset the heading.
B) to prevent the gyro toppling.
C) to reset the heading and to prevent toppling.
D) to prevent apparent wander.

Deviation compensation in a flux gate compass is done:
A) By the pilot
B) Electronically
C) Mechanically
D) Both mechanically and electronically

The acceleration errors of en electrical artificial horizon are reduced compared to those of an air driven one by:
A) spinning the electrical rotor slower
B) reducing the erection rate of the gyro assembly
C) the use of compensation stilts
D) designing the gyro so that it is not pendulous

The torque motor of a gyro stabilised magnetic compass:
A) precesses the directional gyro.
B) moves the Selsyn stator.
C) moves the heading pointer.
D) takes its input from the flux valve.

A turn indicator is an instrument which indicates rate of turn. Rate of turn depends upon:
1. bank angle
2. aeroplane speed
3. aeroplane weight

The combination regrouping the correct statements is:
A) 1 and 3.
B) 1, 2, and 3.
C) 1 and 2.
D) 2 and 3.

When an aircraft has turned 90 degrees with a constant attitude and bank, the pilot observes the following on a classic artificial horizon:
A) attitude and bank correct.
B) too much nose-up and bank too low.
C) too much nose-up and bank correct.
D) too much nose-up and bank too high.

The maximum drift error sensed by an uncompensated DGI will be:
A) 30 deg per hour.
B) 45 deg per hour.
C) 15 deg per hour.
D) 60 deg per hour.

61. Where is the earth rate wander, and the transport wander of a gyro equal to zero?
A) 45 N.
B) North Pole.
C) 45 S.
D) Equator.

While inertial platform system is operating on board an aircraft, it is necessary to use a device with the following characteristics, in order to keep the vertical line with a pendulous system:
A) with damping and a period of about 84 seconds
B) without damping and a period of about 84 minutes
C) with damping and a period of about 84 minutes
D) without damping and a period of about 84 seconds

The errors of an INS fall into 3 categories:
A) Bounded, unbounded and inherent
B) Bounded, unbounded and velocity
C) Coriolis, unbounded and inherent
D) Bounded, unbounded and accelerometer

What is the Schuler period?
A) 48 seconds.
B) 84 minutes.
C) 84 seconds.
D) 48 minutes.

The pendulum type detector system of the directional gyro feeds:
A) a torque motor on the sensitive axis.
B) 2 torque motors arranged horizontally.
C) a levelling erection torque motor.
D) a nozzle integral with the outer gimbal ring.

A DGI is assumed to be frictionless. Its latitude nut is set for 56° N. The reading that you would expect to see after flying West along the parallel of 48° N for 45 minutes at a TAS of 480 kts with a Wind velocity of 090/60 would be:
A) 261.3°
B) 281.3°
C) 277.6°
D) 278.5°

A Stand-by-horizon or emergency attitude indicator:

A) Is fully independent of external energy resources in an emergency situation.
B) Is automatically connected to the primary vertical gyro if the alternator fails.
C) Only works if there is a complete electrical failure.
D) Contains its own separate gyro.

A turn indicator is built around a gyroscope with:

A) 1 degree of freedom.
B) 2 degrees of freedom.
C) 0 degree of freedom.
D) 3 degrees of freedom.

An artificial horizon with an electrical driven gyroscope has greatly reduced take-off errors. This is because:

A) it is fitted with a roll cut-out switch and a linear cut-out switch
B) the fast erection switch is used to overcome topple by increasing the erection rate to a high value
C) the gyro has greater rigidity, is less bottom heavy and there is a roll cut-out switch fitted
D) the gyro has greater rigidity, is less bottom heavy and there is a linear accelerometer cut-out switch fitted

With reference to Inertial Navigation Systems, the functions of the integrators are:

1. at the second stage of integration to suppress unbounded errors (when in the NAV mode)
2. at the first stage of integration to convert acceleration, with respect to time, into speed, (when in the NAV mode)
3. at the second stage of integration to convert speed, with respect to time, into distance gone, (when in the NAV mode).
4. to align the platform (when in the level and align modes)

A) only (2) and (3) of the above statements are true
B) only (1), (2) and (3) of the above statements are true
C) all the above statements are true
D) only (2), (3) and (4) of the above statements are true

The basic properties of a gyroscope are:

1. The gyro's weight
2. The rigidity in space
3. The inertia
4. The high RPM
5. The precession

The combination of correct statements is:

A) 2, 5
B) 3, 4
C) 2, 3, 5
D) 1, 3, 5

A slaved directional gyro derives it's directional signal from:

A) the flight director
B) the flux valve
C) the air-data-computer
D) a direct reading magnetic compass

When decelerating in an aircraft with an air driven artificial horizon you would expect to see:

A) A climbing turn to starboard
B) A descending turn to starboard
C) A descending turn to port
D) A climbing turn to port

A gyromagnetic compass or heading reference unit is an assembly which always consists of:

1. a directional gyro
2. a vertical axis gyro
3. an earth's magnetic field detector
4. an azimuth control
5. a synchronising control

The combination of correct statements is:

A) 2,3,5.
B) 2,5.
C) 1,4.
D) 1,3,5.

A standby artificial horizon must have the following properties:

1. a remote gyro
2. its own power supply
3. only to be used in emergency
4. its own gyro
5. one for each certified pilot

A) 2, 3, & 4
B) 2 & 4
C) 1,3, & 5
D) all the above

Rigidity in a gyroscope is:

A) the tendency it has to remain in its plane of rotation and resist attempts to alter its position.
B) to what extremes the flight attitudes might be before the gyro topples.
C) a way to express the stability of the inner and outer gimbal rings.
D) the reaction 90° in the direction of rotation when applying force to the spinning wheel.

Apparent wander of a gyro is caused by:

A) clear air turbulence.
B) external torque.
C) gimbal friction.
D) rotation of the earth.

In a turn at constant angle of bank, the rate of turn is:

A) dependant on weight and proportional to TAS.
B) independent of weight and proportional a to TAS.
C) dependant on weight and inversely proportional to TAS.
D) independent of weight and inversely proportional a to TAS.

When using an INS platform Coriolis affects:

A) Both a & b
B) The N/S accelerometer
C) Neither a nor b
D) The E/W accelerometer

The gyromagnetic compass torque motor:

A) causes the directional gyro unit to precess.
B) causes the heading indicator to precess.
C) feeds the error detector system.
D) is fed by the flux valve.

---

81. The properties of a Turn Indicator are:

1. One degree of freedom
2. two degrees of freedom
3. two springs connected to the aircraft frame
4. spin axis in the longitudinal plane
5. spin axis parallel to the yaw axis
6. spin axis in the lateral plane

A) 1, & 6
B) 1, & 4
C) 2, & 5
D) 2, & 6

The input signal of the amplifier of the gyromagnetic compass resetting device originates from the:
A) directional gyro erection device.
B) flux valve.
C) directional gyro unit.
D) error detector.

When, in flight, the needle and ball of a needle-and-ball indicator are on the left, the aircraft is:
A) turning left with too much bank.
B) turning right with too much bank.
C) turning left with not enough bank.
D) turning right with not enough bank.

While flying, a red flag labelled " HDG" appears in the indicator (HSI) of a Slaved Gyro Compass System. This indicates that:
A) The flux valve is not supplying reliable information to the compass system
B) The autopilot has detected an error between the actual aircraft heading and the pre-selected heading
C) None of the above
D) The flux valve has detected an error between the actual aircraft heading and the pre-selected heading

Apparent drift in a direction indicator is:
A) non-existent at all latitudes because of the drift-nut attached to one of the gimbals.
B) 7 1/2° /hour at 30° N and 30° S, and zero at the poles.
C) 7 1/2° /hour at 30° N and 30° S, and zero at the equator.
D) 15° /hour at the equator and zero at the poles.

The latitude nut of the direction indicator is on the .... (i) gimbal and this causes the gyro to precess around its .... (ii) axis:
A) (i) inner (ii) vertical
B) (i) inner (ii) horizontal
C) (i) outer (ii) vertical
D) (i) outer (ii) horizontal

In a DGI what error is caused by the gyro movement relative to the earth?
A) transport Wander.
B) latitude error.
C) real wander.
D) earth Rate.

The torque motor of a slaved gyro compass:
A) moves the heading pointer.
B) moves the Selsyn stator.
C) precesses the gyro in the vertical plane.
D) precesses the gyro in the horizontal plane.

The rotor spinning axis of the electrically driven artificial horizon is erected and maintained vertical by:
A) the fast erection device
B) commutator switches
C) mercury switches
D) the pendulosity of the rotor assembly

You are at 30° N flying on a northerly heading. Your DI reading will:
A) decrease at a decreasing rate
B) increase at a decreasing rate
C) increase at an increasing rate
D) decrease at an increasing rate

In order to align a strapdown inertial unit, it is requited to insert the local geographical coordinates. This is necessary to:
A) Check operation of laser gyros
B) Position the computing trihedron with reference to earth
C) Determine magnetic or true heading
D) Re-erect laser gyros

If a 180º steep turn is made to the right and the aircraft is rolled out to straight and level flight by visual reference, the miniature aircraft on the Attitude Indicator will...
A) show a slight skid and climb to the right.
B) show a slight climb and turn to the right.
C) show a slight slip and descent to the right.
D) show a slight climb and turn to the left.

On the ground, during a left turn, the turn indicator indicates:
A) needle in the middle, ball to the right.
B) needle to the left, ball to the left.
C) needle to the left, ball to the right.
D) needle in the middle, ball to the left.

When an aircraft has turned 360 degrees with a constant attitude and bank, the pilot observes the following on a classic artificial horizon:
A) too much nose-up and bank too high.
B) attitude and bank correct.
C) too much nose-up and bank correct.
D) too much nose-up and bank too low.

Following 180° stabilized turn with a constant attitude and bank, the artificial horizon indicates:
A) too high pitch up and too high banking.
B) too high pitch-up and too low banking.
C) too high pitch-up and correct banking.
D) attitude and banking correct.

While accelerating on take-off, what would be the expected indications on an electrically driven Attitude Indicator?
A) none of the above - it will indicate correctly
B) a descending turn to the left
C) a climbing turn to the left
D) a climbing turn to the right

During an acceleration phase at constant attitude, the resetting principle of the artificial horizon results in the horizon bar indicating a:
A) constant attitude.
B) nose-down attitude.
C) nose-up attitude.
D) nose-down followed by a nose-up attitude.

Air-driven gyro rotors are prevented from spinning too fast by the:
A) pressure outflow valve
B) pressure reducing valve
C) electronic speed regulator module
D) vacuum relief valve

An aircraft is flying at a TAS of 270 knots. What AOB will give a rate 1 turn:
A) 15°
B) 30°
C) 34°
D) 17°

Why is an INS platform virtually unusable at very high latitudes?
A) The value of earth rate affecting the E/W accelerometer is a component dependent on the sine Lat. At high latitudes this component is nearly zero and makes alignment to magnetic north virtually impossible
B) The value of earth rate affecting the E/W accelerometer is a component dependent on the sine Lat. At high latitudes this component is nearly zero and makes alignment to true north virtually impossible
C) The value of earth rate affecting the E/W accelerometer is a component dependent on the cosine Lat. At high latitudes this component is nearly zero and makes alignment to true north virtually impossible
D) The value of earth rate affecting the E/W accelerometer is a component dependent on the cosine Lat. At high latitudes this component is nearly zero and makes alignment to magnetic north virtually impossible

101. If the needle and the ball of a Turn & Slip indicator both show right, what does it indicate:

A) turn to right & too much bank.
B) turn to left & too much bank.
C) turn to right & too little bank.
D) turn to left & too little bank.

In a turn and slip indicator, the gyro is spinning at a greater speed than normal. What will the effect be on the indicated rate of turn?

A) It will be more accurate than usual.
B) It will cause more precision and rigidity.
C) It will overread.
D) It will underread.

What are the advantages of a laser gyro compared to a conventional gyro?

A) uses more power.
B) has a longer cycle life.
C) takes longer to align.
D) takes longer to set up/ spin up.

If an INS platform is not accurately aligned with true north:

A) The N/S accelerometer will sense an acceleration force caused by the rotation of the earth
B) The E/W accelerometer will sense an acceleration force caused by the rotation of the earth
C) The N/S accelerometer will sense a velocity force caused by the rotation of the earth
D) The E/W accelerometer will sense a velocity force caused by the rotation of the earth

Which of the following is true regarding the turn coordinator?

A) It has a tied gyroscope
B) Its gyro is offset by 300 to the longitudinal axis of the aircraft
C) It responds to rate of turn only
D) It gives angle of bank and rate of turn

When, in flight, the needle of a needle-and-ball indicator is on the left and the ball on the right, the aircraft is:

A) turning right with not enough bank
B) turning left with too much bank
C) turning right with too much bank
D) turning left with not enough bank

The principle of operation of the turn and slip indicator is best described as:

A) a single gimbal gyroscope in which a spring, opposing the primary precession, in turn produces a secondary precession equal to the aircraft rate of turn

B) an earth gyro in which a calibrated spring ensures the tilt of the gyro is proportional to the aircraft rate of turn

C) a space gyro which uses the force of precession against a spring to give a reading of the aircraft rate of turn

D) a single gimbal gyroscope whose primary precession is opposed by a spring which, in turn, produces a second precession equal and opposite to the aircraft rate of turn

The inertial platform in a north-referenced inertial navigation system is torqued to perform like a Schuler pendulum, so that when the platform moves over the earth:

A) answers b and c are correct

B) the platform will always oscillate with respect to true north

C) the platform remains level and aligned regardless of any aircraft accelerations

D) gyro drift errors are cancelled out

The triangular cavity in a RLG is filled with which combination of gases:

A) Hydrogen and argon

B) Hydrogen and neon

C) Helium and argon

D) Helium and neon

The inner gimbal assembly of an artificial horizon is pivoted .... (i) in the .... (ii):

A) (i) laterally (ii) case

B) (i) longitudinally (ii) outer gimbal

C) (i) to give freedom (ii) pitch plane

D) (i) longitudinally (ii) rolling plane

A gravity erector system is used to correct the errors on:

A) an artificial horizon.

B) a gyromagnetic compass.

C) a turn indicator.

D) a directional gyro.

The heading reference unit of a three-axis data generator is equipped with a gyro with:

A) 1 degree of freedom and vertical spin axis.

B) 1 degree of freedom and horizontal spin axis.

C) 2 degrees of freedom and vertical spin axis.

D) 2 degrees of freedom and horizontal spin axis.

An aircraft initiates a rate one turn at a TAS of 270 kt. How far will it have travelled after 25 seconds:
A) 5.88 NM
B) 7.84 NM
C) 1.96 NM
D) 3.92 NM

The rate-of-turn is the:
A) aircraft speed in a turn.
B) pitch rate in a turn.
C) change-of-heading rate of the aircraft.
D) yaw rate in a turn.

The position accuracy of an RLG INS is:
A) 1 NM/hr
B) 5 NM/hr
C) 10 NM/hr
D) 2 NM/hr

A laser gyro consists of:
A) 2 electrodes (anodes + cathodes).
B) a laser generating two light waves.
C) two moving cavities provided with mirrors.
D) a gyro with 2 degrees of freedom.

An IRS with laser gyros should (i) .... be Schuler tuned, and (ii) .... be strapped down.
A) (i) always (ii) always
B) (i) never (ii) always
C) (i) always (ii) never
D) (i) never (ii) never

A failed RMI rose is locked on 090° and the ADF pointer indicates 225° . The relative bearing to the station is:
A) 315° .
B) 225° .
C) Impossible to read, due to failure RMI.
D) 135° .

What is the maximum drift of a gyro, due to earth rate:
A) 90 deg per hour.
B) 15 deg per hour.
C) 5 deg per hour.
D) 180 deg per hour.

With regard to the turn indicator, the spring:
A) Directly balances yaw
B) Gives a linear relationship between extension and secondary force
C) Produces a secondary precession that opposes yaw
D) Produces a secondary precession equal to yaw

---

121. A space gyro has .... (i) gimbal rings with .... (ii) planes of freedom:
A) (i) 3 (ii) 3
B) (i) 2 (ii) 3
C) (i) 3 (ii) 2
D) (i) 2 (ii) 2

If a turn and balance indicator overspeed the result will be:
A) Under-indication of the turn
B) No turn will be indicated
C) Over-indication of the turn
D) The rate of turn will be indicated correctly

An aircraft is flying along the 60° S parallel. After one hour the DI indication has increased by 21° . If the latitude nut of the DI has been set to zero drift on the ground at 30° S, the groundspeed of the aircraft is:
A) 520
B) 537
C) 450
D) 473

Laser gyros are used in an IRS. Why must accurate Lat & Long be inserted?
A) to check the function of the laser gyros
B) to determine the computed trihedron
C) to determine magnetic north
D) to compensate for aircraft movement

Among the flight control instruments, the artificial horizon plays an essential part. It uses a gyroscope with:
(Note - in this question, the degrees of freedom of a gyro are determined by the number of gimbal rings it comprises)
A) two degrees of freedom, whose axis is oriented and continuously maintained to local vertical by an automatic erecting system.
B) two degrees of freedom, whose horizontal axis corresponding to a reference direction is maintained in a horizontal plane by an automatic erecting system.
C) one degree of freedom, whose horizontal axis is maintained in a horizontal plane by an automatic erecting
D) one degree of freedom, whose vertical axis oriented in the direction of the real vertical to the location is maintained in this direction by an automatic erecting system.

In a right turn while taxiing, the correct indications on a Turn & Slip Indicator are:
A) Needle left, ball left.
B) Needle right, ball right.
C) Needle right, ball left.
D) Needle left, ball right.

When, in flight, the needle and ball of a needle-and-ball indicator are on the right, the aircraft is:
A) turning right with not enough bank.
B) turning right with too much bank.
C) turning left with too much bank.
D) turning left with not enough bank.

At a low bank angle, the measurement of rate-of-turn actually consists in measuring the:
A) yaw rate of the aircraft
B) angular velocity of the aircraft
C) pitch rate of the aircraft
D) roll rate of the aircraft

The rotor in an electric artificial horizon is tied to the vertical by:
A) torque motors and level switches
B) mercury switches only
C) a jet of air from the rotor impinging on a wedge plate which is on the inner gimbal
D) a jet of air from the outer gimbal striking the rotor buckets

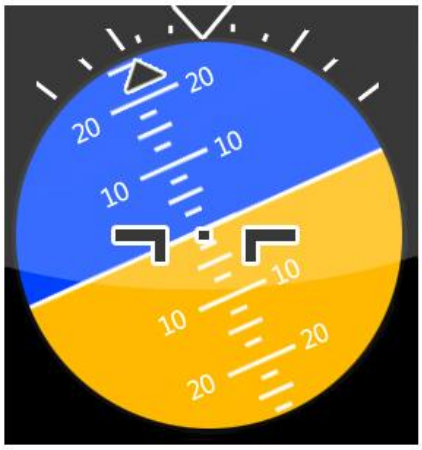
In a turn at constant rate, the turn indicator reading is:
A) inversely proportional to the aircraft true airspeed.
B) proportional to the aircraft true airspeed.
C) independent to the aircraft true airspeed.
D) proportional to the aircraft weight.

In a left turn while taxiing, the correct indications are:
A) Needle right, ball left.
B) Needle right, ball right.
C) Needle left, ball right.
D) Needle left, ball left.

The gimbal error of the directional gyro is due to the effect of:
A) the aircraft's track over the earth.
B) an apparent weight and an apparent vertical.
C) too slow precession on the horizontal gimbal ring.
D) a bank or pitch attitude of the aircraft.

The turn coordinator and artificial horizon illustrated in the attached figure show the aircraft to be turning:

A) left with skid
B) right at 30 degrees angle of bank with slip
C) right with insufficient bank and the nose above the horizon
D) right at 30 degrees angle of bank with skid



The vertical reference unit of a three-axis data generator is equipped with a gyro with:

A) 2 degrees of freedom and vertical spin axis
B) 1 degree of freedom and horizontal spin axis
C) 2 degrees of freedom and horizontal spin axis
D) 1 degree of freedom and vertical spin axis

The turn rate indicator uses a gyroscope:

1. with one degree of freedom.
2. with two degrees of freedom
3. the frame of which is supported by two return springs.
4. the spinning wheel axis of which is parallel to the pitch axis.
5. the spinning wheel axis of which is parallel to the yawing axis.
6. the spinning wheel axis of which is horizontal.

The combination regrouping all the correct statements is:

A) 2, 3 and 6
B) 1, 3, and 6
C) 2 and 3
D) 1 and 6

An aircraft is flying at a 120 kt true airspeed (VV), in order to achieve a rate 1 turn, the pilot will have to bank the aircraft at an angle of:

A) 36° .
B) 30° .
C) 12° .
D) 18° .

A 2 axis gyro measuring vertical changes will have:
A) one degree of freedom horizontal axis.
B) two degrees of freedom horizontal axis.
C) two degrees of freedom vertical axis.
D) one degree of freedom vertical axis.

The rigidity of a gyro is improved by:
A) increasing RPM and concentrating the mass at the hub of the rotor.
B) decreasing RPM and concentrating the mass at the hub of the rotor.
C) increasing RPM and concentrating the mass on the periphery of the rotor.
D) decreasing RPM and concentrating the mass on the periphery of the rotor.

In the building principle of a gyroscope, the best efficiency is obtained through the concentration of the mass:
A) close to the axis and with a high rotation speed..
B) close to the axis and with a low rotation speed..
C) on the periphery and with a low rotation speed..
D) on the periphery and with a high rotation speed.

Failure of the electrical supply to an electrically driven direction indicator may be indicated by:
A) A low ammeter reading.
B) A low voltmeter reading.
C) Low suction.
D) A red warning flag.

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141. Which of the following statements is most correct when describing a turn co-ordinator?
A) It is suitable for a stand-by artificial horizon.
B) It responds to aircraft bank angle as well as turning rate.
C) It displays turn and pitch for a rate one turn only.
D) It indicates the angle of bank and turn rate.

A rate integrating gyro is a detecting element used in
1. An inertial attitude unit
2. An automatic pilot
3. A stabilizing servo system
4. An inertial navigation system
5. A rate-of-turn indicator

The combination of correct statements is:
A) 2,3,4.
B) 1,4.
C) 1,2,3,4,5.
D) 2,3,5.

Concerning the directional gyro indicator, the latitude at which the apparent wander is equal to 0 is:

A) the North pole.
B) latitude 30° .
C) latitude 45° .
D) the equator.

In a turn indicator, the measurement of rate of turn consists for:

A) high bank angle, in measuring the yaw rate
B) high bank angle, in measuring the roll rate
C) low bank angle, in measuring the roll rate
D) low bank angle, in measuring the yaw rate

The directional gyro axis no longer spins about the local vertical when it is located:

A) in the latitude 45° .
B) on the equator.
C) in the latitude 30° .
D) on the North pole.

Which of the following are errors of a DGI:

1. earth rate
2. transport wander
3. banking when pitched up
4. annual movement of poles
5. mechanical problems

A) 1, 2, 3, & 5
B) 2, 3, & 5
C) all 5
D) 3, 4, & 5

The forces which affect the balance ball in a turn and slip indicator are:

A) weight and centripetal force.
B) weight, lift vector and TAS.
C) weight and centrifugal force.
D) centripetal force, attitude and weight.

The indications on a directional gyroscope or gyrocompass are subject to errors, due to:

1. rotation of Earth.
2. aeroplane motion on Earth.
3. lateral and transversal aeroplane bank angles.
4. north change.
5. mechanical defects.

Chose the combination with true statements only:

A) 1,2,3,5.
B) 3,4,5.
C) 1,2,4,5.
D) 2,3,5.

When turning left on the ground the turn and slip indicator:

A) will show a left bank and slip
B) will show a left bank and skid
C) will not indicate on the ground
D) will show a skid

Magnetic Compass:

Variation is defined as the angle between:
A) CN and the longitudinal axis of the aircraft.
B) MN and CN.
C) TN and CN.
D) TN and MN.

For a position in the southern hemisphere, the effect of acceleration errors are greatest on headings:
A) 135° (C) and 315° (C).
B) 090° (C) and 270° (C).
C) 045° (C) and 225° (C).
D) 180° (C) and 360° (C).

A compass swing is used to:
A) align compass north with true north.
B) get true north and lubber line aligned.
C) align magnetic north with true north.
D) align compass north with magnetic north.

In a standby direct reading compass there is:
A) a circular magnet or pair of bar magnets pendulously mounted.
B) a non-pendulously mounted magnet system.
C) a low magnetic moment system, either of circular or bar configuration.
D) a single pendulously mounted bar magnet.

During deceleration following a landing in Northerly direction, the magnetic compass will indicate:
A) a heading fluctuating about 360° .
B) an apparent turn to the East.
C) no apparent turn.
D) an apparent turn to the West.

During deceleration following a landing in a southerly direction, a magnetic compass made for the northern hemisphere indicates:
A) an apparent turn to the east.
B) an apparent turn to the west.
C) no apparent turn.
D) no apparent turn only on northern latitudes.

What should be the indication on the magnetic compass when rolling into a standard rate turn to the right from a south heading in the Northern Hemisphere?

A) The compass will indicate a turn to the left.
B) The compass will indicate the approximate correct magnetic heading if the roll into the turn is smooth.
C) The compass will indicate a turn to the right, but at a faster rate than is actually occurring.
D) The compass will remain on south for a short time, then gradually catch up to the magnetic heading of the airplane.

The magnetic heading can be derived from the true heading by means of a:

A) map showing the isoclinic lines.
B) map showing the isogonal lines.
C) compass swinging curve.
D) deviation correction curve.

The detector unit of a remote indicating compass is normally:

A) fixed in the azimuth.
B) free in the vertical.
C) free in the horizontal plane.
D) fixed in the vertical plane only.

Aircraft magnetism:

A) does not vary with aircraft latitude but does vary with aircraft heading
B) varies with aircraft heading and latitude
C) varies with latitude but does not vary with aircraft heading
D) does not vary with aircraft heading or latitude

In a steep turn, the northerly turning error on a magnetic compass on the northern hemisphere is:

A) equal to 180° on a 270° heading in a right turn.
B) none on a 090° heading in a right turn.
C) equal to 180° on a 090° heading in a right turn.
D) none on a 270° heading in a left turn.

The quadrantal deviation of a magnetic compass is corrected by using:

A) pairs of permanent magnets.
B) magnetized needles.
C) hard iron pieces.
D) soft iron pieces.

Concerning magnetic compasses, deviation is:

A) Compass North.
B) A card in the cockpit showing compass heading errors.
C) The angular difference between magnetic North and compass North.
D) The angular difference between magnetic North and true North.

The directive force of the earth's magnetic field:

A) increases as magnetic latitude increases.
B) is greatest at the magnetic equator.
C) increases as the magnetic variation increases.
D) varies with the heading of the aircraft.

The purpose of the Annunciator unit of the Remote Indicating compass is to:

A) show whether the compass is operating either in the GYRO or COMPASS mode
B) advise if the gyro is subject to excessive wander
C) display the serviceability of the compass
D) indicate that the gyro is synchronised with the detector unit

When turning from 060° to 320° in the Northern Hemisphere the direct reading compass will .... (i) causing an .... (ii) indication of the turn. Liquid Swirl will .... (iii) the error:

A) (i) over read (ii) under (iii) decrease
B) (i) under read (ii) over (iii) increase
C) (i) over read (ii) under (iii) increase
D) (i) under read (ii) over (iii) decrease

In the Northern Hemisphere, a magnetic compass will normally indicate a turn towards North if:

A) a right turn is entered from an east heading.
B) an aircraft is accelerated while on an east or west heading.
C) a left turn is entered from a west heading.
D) an aircraft is decelerated while on an east or west heading.

In the northern hemisphere, during deceleration following a landing in an Easterly direction, the magnetic compass will indicate:

A) a constant heading.
B) an apparent turn to the South.
C) a heading fluctuating about 090° .
D) an apparent turn to the North.

An aircraft in the southern hemisphere is turning from a heading of 045° (C) to 315° (C) using a DGI. At the end of the turn the compass will read... than 315° and liquid swirl will... this effect.

A) more; decrease.
B) less, decrease.
C) more, increase.
D) less, increase.

Which of the following statements are correct:

A) Dip is inversely proportional to H
B) Dip is inversely proportional to Z
C) Dip decreases with increased in latitude
D) Dip is proportional to H

---

21. Which of the following will effect a direct reading compass?
    1. ferrous metals
    2. non-ferrous metals
    3. electrical equipment

A) 1 & 2.
B) 1 & 3.
C) 1 only.
D) all 3.

An aircraft turns left from 045° to 315° in the Southern Hemisphere. The magnets turn (i) .... and liquid swirls (ii) ... causing an error.

A) (i) anti-clockwise (ii) clockwise
B) (i) clockwise (ii) anti-clockwise
C) (i) anti-clockwise (ii) anti-clockwise
D) (i) clockwise (ii) clockwise

In the Southern hemisphere, during deceleration following a landing in a Westerly direction, the magnetic compass will indicate:

A) an apparent turn to the South
B) a heading fluctuating about 270°
C) an apparent turn to the North
D) no apparent turn

The main cause of error in a DRMC is:

A) parallax in the rose.
B) turning.
C) crosswinds - particularly on east/west headings.
D) magnetic deviation.

If the CH = 220° , var. = E12, dev. = W2, what is the corresponding TH?
A) TH = 234° .
B) TH = 210° .
C) TH = 230° .
D) TH = 206° .

In a remote indicating compass, direction sensing is achieved by means of:
A) a magnet mounted in the unit which is always located in the port wing.
B) detection of the earth's magnetic flux and uses the direction and intensity of the flux density, measured in a magnetic bar to indicate direction.
C) the RMI which acts as a master indicator, transmitting signals to the aircraft instruments regarding heading.
D) a detector unit which is attached to the aircraft structure and senses the value of DIP to establish the aircraft position in the earth's field.

The main requirements of a direct reading magnetic compass are that it should be:
A) easily read, floating in a transparent liquid, quick to react to change in aircraft heading.
B) aperiodic, horizontal, sensitive.
C) positioned directly in front of the pilot, easily corrected for magnetic deviation, aperiodic.
D) horizontal, sensitive, periodic.

The deviating effect of vertical soft iron .... (i) with decrease of magnetic latitude, due to the .... (ii) of H and the .... (iii) of Z:
A) (i) decreases (ii) increase (iii) increase
B) (i) decreases (ii) increase (iii) decrease
C) (i) increases (ii) decrease (iii) decrease
D) (i) increases (ii) decrease (iii) increase

When accelerating on a westerly heading in the Northern Hemisphere the needle of the DIC will:
A) Turn anti-clockwise giving an apparent turn towards north
B) Turn clockwise giving an apparent turn towards north
C) Turn clockwise giving an apparent turn towards south
D) Turn anti-clockwise giving an apparent turn towards south

An aircraft is taking off on a runway heading 045 deg, in still air, with a compass having 0 deg deviation. The runway is on an agonic line. What will the compass read if you are in the northern hemisphere?
A) compass moves to more than 045° .
B) compass moves to less than 045° .
C) compass remains on 045° .
D) compass stays on 045° if wings are kept level.

A pilot wishes to turn left on to a northerly heading with 10° bank at a latitude of 50° North. Using a direct reading compass, in order to achieve this he must stop the turn on an approximate heading of:
A) 030° .
B) 330° .
C) 355° .
D) 015° .

Among the errors of a magnetic compass, are errors:
A) due to Schuler type oscillations.
B) due to cross-wind gusts particularly on westerly or easterly headings.
C) in North seeking, due to bank angle and magnetic heading.
D) of parallax, due to oscillations of the compass rose.

An aircraft is fitted with a direct reading magnetic compass. Upon landing in a northerly direction the compass will indicate:
A) a turn towards West.
B) no change.
C) an oscillation to its North alignment.
D) a turn towards East.

A pilot wishes to turn left on to a southerly heading with 20° bank at a latitude of 20° North. Using a direct reading compass, in order to achieve this he must stop the turn on an approximate heading of:
A) 170° .
B) 190° .
C) 160° .
D) 200° .

In the Southern hemisphere, during deceleration following a landing in an Easterly direction, the magnetic compass will indicate:
A) a heading fluctuating about 090° .
B) no apparent turn.
C) an apparent turn to the North.
D) an apparent turn to the South.

A pilot wishes to turn right on to a southerly heading with 20° bank at a latitude of 20° North. Using a direct reading compass, in order to achieve this he must stop the turn on an approximate heading of:
A) 150° .
B) 210° .
C) 170° .
D) 190° .

With reference to the flux valve of a remote indicating compass:

A) the flux valve is pendulously mounted and so it is not subject to or affected by the earth's magnetic field.
B) the flux valve is pendulously mounted and is free to turn to remain aligned with the earth magnetic field.
C) the flux valve is fixed to the aircraft and so turns with the aircraft to measure the angle between the aircraft and the earth's magnetic field.
D) the flux valve is not subject to acceleration errors.

The main reason for having the centre of gravity below the pivot point in a card-type magnetic compass is:

A) To compensate for the horizontal magnetic component H such that the magnet system is within approx. 2° of the true horizontal between 60° N and 40° S.
B) To make it less sensitive to hard- and soft-iron magnetism in the aircraft.
C) To compensate for the vertical magnetic component Z such that the magnet system is within approx. 2° of the true horizontal between 60° N and 40° S.
D) To cancel out the systems pendulosity and its tendency to oscillate backwards and forwards about its equilibrium position.

An aircraft takes off on a runway with an alignment of 45° . The isogonic line on the area chart indicates 0° . The compass deviation is 0° . On a takeoff with zero wind, the northerly turning error:

A) will be null if the wings are kept level
B) is such that the compass will indicate a value noticeably below 045°
C) is such that the compass will indicate a value noticeably above 045°
D) will be null

During deceleration following a landing in a Southerly direction, the magnetic compass will indicate:

A) a heading fluctuating about 180° .
B) no apparent turn.
C) an apparent turn to the West.
D) an apparent turn to the East.

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41. During a sustained turn... the nearer magnetic pole, the effect of liquid swirl will... compass turning error.

A) towards; increase.
B) away from; not affect.
C) away from; increase.
D) towards; not affect.

The quadrantal deviation of the magnetic compass is due to the action of:
A) the hard iron ices and the soft iron pieces influenced by the hard iron pieces.
B) the soft iron pieces influenced by the geomagnetic field.
C) the hard iron pieces influenced by the geomagnetic field.
D) the hard iron pieces influenced by the mild iron pieces.

The purpose of a compass swing is to attempt to coincide the indications of:
A) true north and magnetic north.
B) compass north and true north.
C) compass north and magnetic north.
D) compass north and the lubber line.

To improve the horizontality of a compass, the magnet assembly is suspended from a point:
A) below the centre of gravity.
B) above the centre of gravity.
C) on the centre line of the magnet.
D) varying with magnetic latitude.

The compass heading can be derived from the magnetic heading by reference to a:
A) compass swinging curve.
B) map showing the isogonic lines.
C) map showing the isoclinic lines.
D) deviation correction curve.

If an aircraft, fitted with a DRMC, takes off on a westerly heading, in the northern hemisphere, the DRMC will indicate:
A) no turn.
B) a turn to the north.
C) a turn to south.
D) oscillates about west.

The fields affecting a magnetic compass originate from:

1. magnetic masses
2. ferrous metal masses
3. non ferrous metal masses
4. electrical currents

The combination of correct statements is:
A) 1, 2, 3, 4.
B) 1, 2, 3.
C) 1, 2, 4.
D) 1, 3, 4.

Magnetic compass swinging is carried out to reduce as much as possible:
A) regulation.
B) variation.
C) deviation.
D) acceleration.

The purpose of compass swinging is to determine the deviation of a magnetic compass:
A) at any latitude.
B) on any heading.
C) at a given latitude.
D) on a given heading.

The principal advantage of a gyromagnetic compass (slaved gyro compass) is:
A) It does not have to be aligned with the north
B) None of the above
C) It does not precess
D) It combines the north-seeking ability of the magnetic compass with the stability of the direction indicator

A remote indicating compass has usually less deviation error than a panel mounted compass because:
A) it is carrying a well damped floating magnet.
B) the indication system consists of toroidal-wound coils forming a Magnesyn system with little interference.
C) it receives a higher flux-density from the earth's magnetic field.
D) it is normally mounted in a part of the airplane where magnetic interference is minimal.

In a standby compass the magnet system is immersed in a transparent liquid. The purpose of this liquid is to:
A) increase sensitivity, decrease aperiodicity.
B) increase sensitivity, reduce liquid swirl.
C) increase sensitivity, increase aperiodicity.
D) increase sensitivity at high latitudes, lubricate bearings.

When carrying out a turn at the magnetic equator there will be:
A) no turning error when turning through east or west only.
B) no turning error.
C) a tendency to underread turns due to liquid swirl.
D) a tendency to underread turns through south and overread turns through north.

When accelerating on an easterly heading in the northern Hemisphere, the magnet system of a direct reading magnetic compass will:
A) Turn anti-clockwise, indicating an apparent turn towards north
B) Turn clockwise, indicating an apparent turn towards north
C) Turn clockwise, indicating an apparent turn towards south
D) Turn anti-clockwise, indicating an apparent turn towards south

The " sensor part" of the flux-valve is:
A) Separate electronic magnetic compass
B) Separate GPS signal receiver
C) The three pick-up coils
D) The two pick-up coils

In the Northern hemisphere, during deceleration following a landing in a Westerly direction, the magnetic compass will indicate:
A) an apparent turn to the South.
B) no apparent turn.
C) an apparent turn to the North.
D) a heading fluctuating about 270° .

When turning onto a northerly heading the rose of a magnetic compass tends to " undershoot;" when turning onto a southerly heading it tends to " overshoot" :

1. these compass indications are less reliable in the northern hemisphere than in the southern hemisphere.
2. these compass oscillations following a lateral gust are not identical if the aircraft is heading north or south.
3. this behaviour is due to the mechanical construction of the compass.
4. this behaviour is a symptom of a badly swung compass.

The correct statements are:
A) 1, 2, and 4.
B) 2 and 3.
C) 2, 3, and 4.
D) 1 and 3.

A pilot wishes to turn right on to a northerly heading with 20° bank at a latitude of 40° North. Using a direct reading compass, in order to achieve this he must stop the turn on to an approximate heading of:
A) 350°
B) 010°
C) 330°
D) 030°

Radio Altimeter:

A radio altimeter can be defined as a:
A) ground radio aid used to measure the true height of the aircraft.
B) ground radio aid used to measure the true altitude of the aircraft.
C) self contained on board aid used to measure the true altitude of the aircraft.
D) self contained on board aid used to measure the true height of the aircraft.

A radio altimeter is:
A) ground based and measures true height.
B) ground based and measures true altitude.
C) aircraft based and measures true height.
D) aircraft based and measures true altitude.

During the approach to landing the radio altimeter indicates a height of 650 ft. This is:
A) height above the runway threshold
B) height above the ground and the lowest point on the landing gear
C) height above the ground and the aircraft CG
D) height from the mean sea level to the aircraft

The data supplied by a radio altimeter:
A) concerns only the decision height.
B) is used only by the radio altimeter indicator.
C) indicates the distance between the ground and the aircraft.
D) is used by the automatic pilot in the altitude hold mode.

The aircraft radio equipment which emits on a frequency of 4400 MHz is the:
A) high altitude radio altimeter.
B) primary radar.
C) radio altimeter.
D) weather radar.

The low-altitude radio altimeters used in precision approaches:
1. operate in the 1540-1660 MHz range.
2. are of the pulsed type.
3. are of the frequency modulation type.
4. have an operating range of 0 to 5000 ft.
5. have a precision of +/- 2 feet between 0 and 500 ft.

The combination of the correct statements is:
A) 1, 3, 4, 5.
B) 3, 5.
C) 1, 2, 4, 5.
D) 1, 3, 5.

Modern low altitude radio altimeters emit waves in the following frequency band:
A) SHF (Super High Frequency).
B) HF (High Frequency).
C) UHF (Ultra High Frequency).
D) VLF (Very Low Frequency).

The frequency sweep rate of the Radio Altimeter is in the order of:
A) 4,250 MHz
B) 4,850 MHz
C) 4,250 KHz
D) 48,50 GHz

When a height limit is set on a Radio Altimeter the red light warning will flash when:
A) The aircraft is above the selected height
B) None of the above
C) Within 15 ft of the selected height
D) More than 15 ft below the selected height

The accuracy of a Radio Altimeter at 200 feet would be:
A) 10 feet
B) 20 feet
C) 2 feet
D) 4 feet

The operating frequency range of a low altitude radio altimeter is:
A) 4200 MHz to 4400 MHz.
B) 460 MHz to 480 MHz.
C) 4.6 GHz to 4.8 GHz.
D) 420 MHz to 440 MHz

A radio signal has a frequency of 3 GHz. Its wave length is:
A) 10 cm.
B) 100 cm.
C) 1.0m.
D) 1.0 cm.

In low altitude radio altimeters, the reading is zero when main landing gear wheels are on the ground. For this, it is necessary to:

A) compensate residual altitude due to antennas height above the ground and coaxial cables length.
B) account for signal processing time in the unit and apply a correction factor to the reading.
C) change the display scale in short final, in order to have a precise readout.
D) place the antennas on the bottom of the aeroplane.

The operation of the radio altimeter of a modern aircraft is based on:

A) a combination of frequency modulation and pulse modulation.
B) amplitude modulation of the carrier wave.
C) frequency modulation of the carrier wave.
D) pulse modulation of the carrier wave.

During the approach, a crew reads on the radio altimeter the value of 650ft. This is an indication of the true:

A) height of the aircraft with regard to the ground at any time.
B) altitude of the aircraft.
C) height of the aircraft with regard to the runway.
D) height of the lowest wheels with regard to the ground at any time.

For most radio altimeters, when a system error occurs during approach the..

A) DH lamp flashes red.
B) DH lamp flashes red and the audio signal sounds.
C) Audio warning signal sounds.
D) Height indication is removed.

In low altitude radio altimeters, the height measurement (above the ground) is based upon:

A) a frequency modulation wave, for which the frequency variation between the transmitted wave and the received wave after ground reflection is measured.
B) a wave transmission, for which the frequency shift by DOPPLER effect after ground reflection is measured.
C) a pulse transmission, for which time between transmission and reception is measured on a circular scanning screen.
D) a triangular amplitude modulation wave, for which modulation phase shift between transmitted and received waves after ground reflection is measured.

Electronic Flight Instrument System (EFIS):

Which colours are typically used on an EHSI?
A) Black, blue, purple, red, green and white.
B) White, green, magenta, cyan, yellow and red.
C) Magenta, brown, black and green.
D) Red and blue.

In PLAN mode:
A) the wind arrow is oriented to True North.
B) the weather radar display data is inhibited.
C) the display may be oriented to grid North.
D) the active flight path appears as a red line joining successive waypoints.

Modes available for (EFIS) HSI on some units are:
A) airspeed and Mach
B) MAP and PLAN
C) VOR, ILS, MAP and AUTO SELECT
D) only from manometric sources

An EFIS installation on a B737 consists of:
A) two screens and one symbol generator.
B) four screens and two symbol generators.
C) four screens and three symbol generators.
D) two screens, one control panel and two symbol generators.

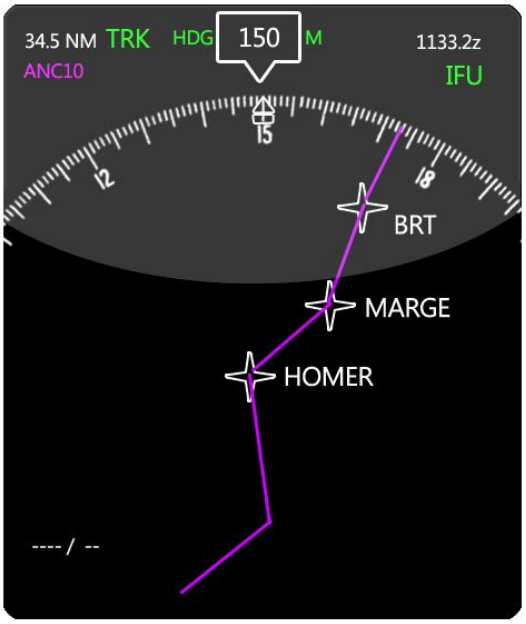
Weather data can not be displayed on the EHSI in which of the following modes:
A) PLAN
B) MAP
C) VOR
D) ILS

In which of the following EHSI modes are weather radar returns not available?
A) Any expanded mode.
B) Plan mode.
C) Any full rose mode.
D) Plan mode and any full rose mode.

The groundspeed is indicated on an ADI in which of the following colours:
A) White
B) Yellow
C) Green
D) Magenta

Which mode is selected on the following Navigation Display (EHSI)?

A) Full NAV mode
B) Map mode
C) Centre Map mode
D) Plan mode

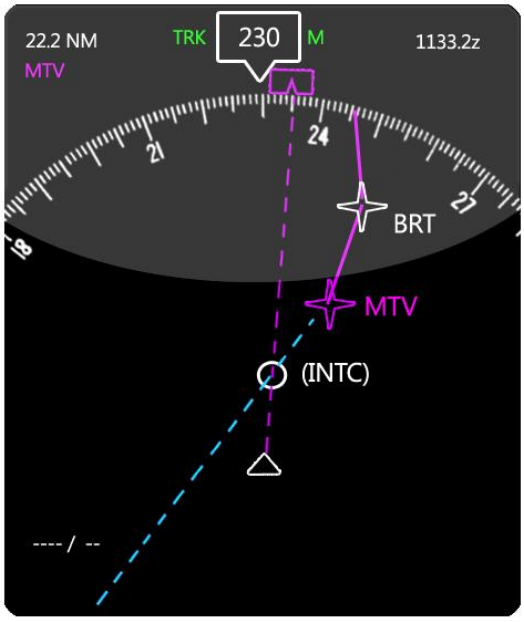


Cautionary information on an EHSI is displayed in:

A) yellow/amber.
B) cyan/blue.
C) white.
D) red/magenta.

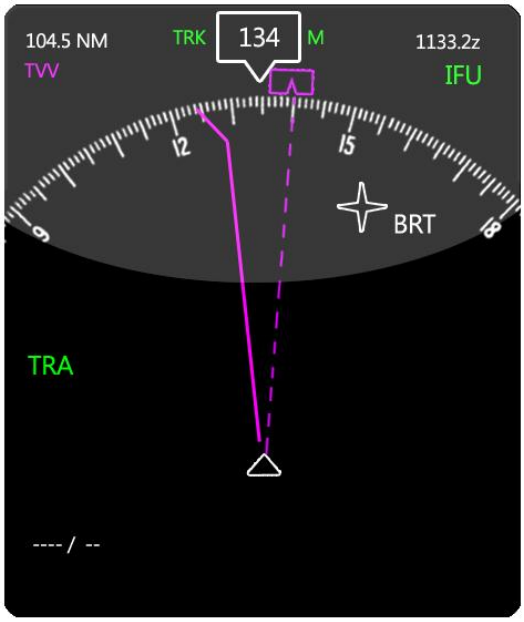
What is the meaning of the white circle with (INTC) next to it?

A) indicates a location of an intersecting airway - a mandatory reporting point
B) denotes an active waypoint on your flight plan
C) indicates a location where you will intercept a radial to the MTV VOR and track it inbound
D) TCAS indication - you are being intercepted by a military aircraft



What is the current active waypoint?

A) TVV
B) IFU
C) TRA
D) BRT



The symbol shown appears on the EHSI display. It represents:

A) selected track and track reference.
B) track orientation, current track, track reference and track pointer.
C) selected heading and heading reference.
D) heading orientation, current heading, heading reference and heading pointer.

The wind direction symbol displayed all EHSI modes except PLAN mode is oriented:

A) with respect to aircraft heading.
B) to grid north when flying at high latitudes.
C) to true north.
D) to magnetic north.

The Primary Flight Display (PFD) displays information dedicated to:

A) piloting.
B) weather situation.
C) engines and alarms.
D) systems.

Below which altitude does the radio altitude indication on an EADI appear within the circular scale as a digital readout?

A) Below 1,000ft.
B) Above 1,000ft.
C) Above 2,500ft.
D) Below 2,500ft.

Which mode is selected on the following Navigation Display (EHSI)?

A) Expanded ILS mode
B) Map mode
C) Full VOR mode
D) Expanded VOR mode

The above data shown on the (i) .... is displaying (ii) ....

A) (i) EADI (ii) 600ft RA
B) (i) EHSI (ii) 600 kt GS
C) (i) Primary Flight Display (ii) 600 kt TAS
D) (i) Navigation Display (ii) 600ft RA

Regarding Electronic Instrument System (EFIS):

1. the Navigation Display (ND) displays Flight Director Bars.
2. the altimeter setting is displayed on the PFD (Primary Flight Display).
3. the PFD is the main flying instrument.
4. the FMA (Flight Mode Annunciator) is part of the ND.

The combination regrouping all the correct statements is:

A) 1, 2.
B) 1, 4.
C) 2, 3.
D) 3, 4.

The Head Up Display (HUD) is a device allowing the pilot, while still looking outside, to have:

A) a monitoring only during CAT III precision approaches
B) a synthetic view of the instrument procedure
C) a monitoring of engine data
D) a flying and flight path control aid

In order to know in which mode the autothrottle are engaged, the crew will check the:

A) ND (Navigation Display)
B) TCC (Thrust Control Computer)
C) throttle position
D) PFD (Primary Flight Display)

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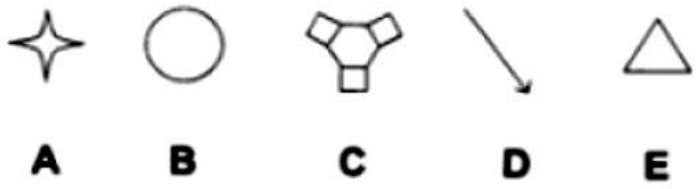
21. The above symbols A, C, and E are best described respectively as:

A) off route waypoint, navigation aid, a navigation point making up selected route
B) active waypoint aircraft currently navigating to, navigation aid, off route waypoint
C) next waypoint, navigation aid, airport
D) off route waypoint, airport navigation aid



On a HSI map mode, distance to go is displayed in the:

A) Bottom left corner
B) Bottom right corner
C) Top right corner
D) Top left corner

The EHSI mode in which the whole compass rose is not visible and upon which the relative bearing to the active waypoint is shown although the waypoints themselves are not is the:

A) Expanded NAV mode.
B) Full Rose VOR mode.
C) Expanded VOR mode.
D) Center MAP mode.

Which of the following displays are part of the Electronic Flight Instrumentation System (from Boeing)?

A) ND and Electronic Attitude Director Indicator.
B) EHSI and PFD.
C) Navigation display and Primary Flight Display.
D) Electronic Attitude Director Indicator and Electronic Horizontal Situation Indicator.

Weather Radar returns show areas of precipitation in the following colours:
A) Green, Yellow, Red and Magenta.
B) Green, Yellow, Magenta and Red.
C) Green, Orange, Yellow and Red.
D) Green, Magenta, Yellow and Red.

Command information is displayed in... on the EHSI.
A) white.
B) magenta.
C) red.
D) green.

With APP selected on the MCP below 500 ft AGL. If more than one dot for one second in glideslope deviation or more then 1/5th dot for one second in localiser deviation occurs:
A) The respective localiser or glideslope scales change colour from white to red and the pointer flashes
B) The respective localiser or glideslope scales change colour from steady white to flashing white
C) The respective localiser or glideslope scales change colour from white to amber and the pointer flashes
D) The respective localiser or glideslope scales change colour from white to magenta and the pointer flashes

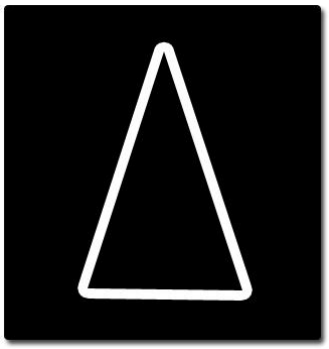
Decision height is displayed on the:
A) EADI, and below 2500 ft the display changes to a circular scale with a magenta colour marker.
B) EADI, and below 800 ft changes to a circular scale which is white with a magenta DH marker.
C) EHSI in Map mode, and below 1000 ft is shown as a circular display which is erased anti-clockwise as the aircraft descends.
D) EADI, and below 1000 ft is shown as a circular scale which is erased anti-clockwise as the aircraft descends.

Which of the following statements is true?
A) Weather radar data is only available on the PLAN MODE.
B) Weather radar display data is available on all modes of the EHSI.
C) Weather radar data is inhibited on the full and expanded NAV modes of the EHSI.
D) In PLAN mode, weather radar data is inhibited on the EHSI.

At what height does the DH, on the EADI display, starts flashing yellow?
A) At DH plus 100 ft.
B) On reaching DH.
C) On touchdown.
D) At 1000ft AGL.

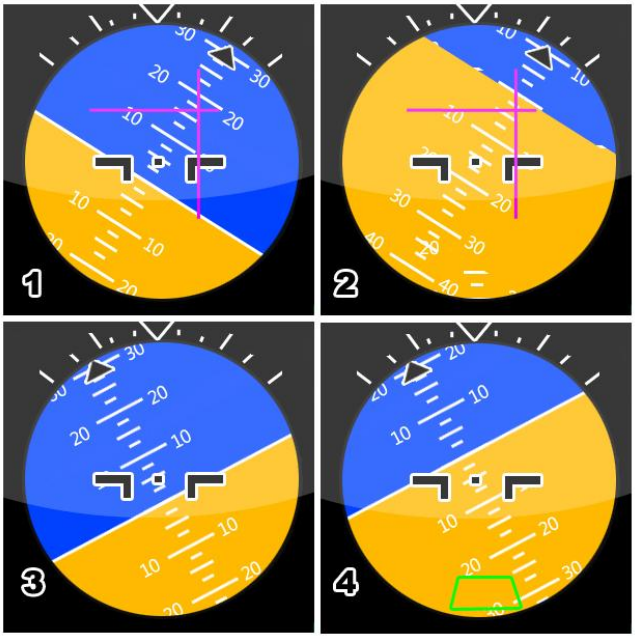
The symbol shown appears in white on the EHSI display. It represents:

A) an inactive waypoint
B) an off-route waypoint
C) the airplane
D) a VOR/DME



The diagram which shows a 40° right bank and 15° nose down attitude is:

A) 1
B) 2
C) 4
D) 3

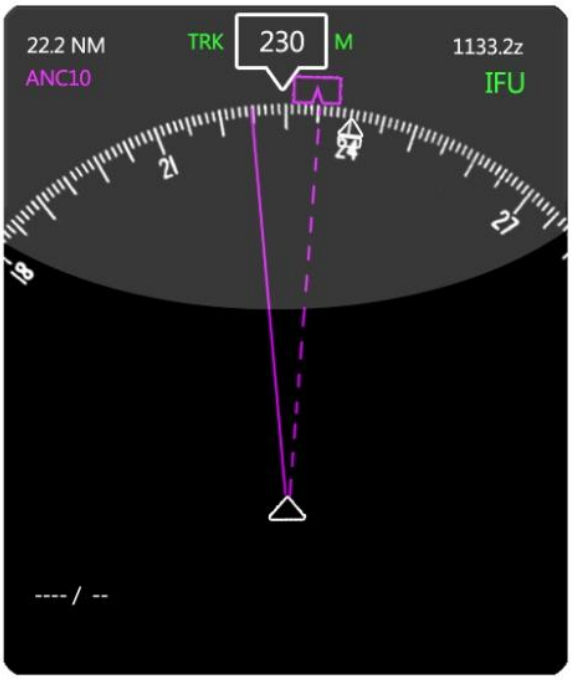


In addition to attitude and autoflight modes, what information is also typically displayed on an EADI?

A) Altitude, groundspeed, heading, and windspeed/direction.
B) Engine indications and systems information.
C) Speed, Altitude, ILS localiser and glide slope information, and sometimes also heading information.
D) Altitude, speed and sometimes also heading information.

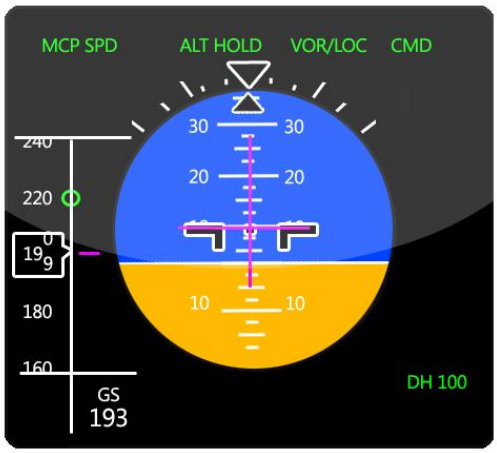
What value is selected by the heading selector (heading bug)?

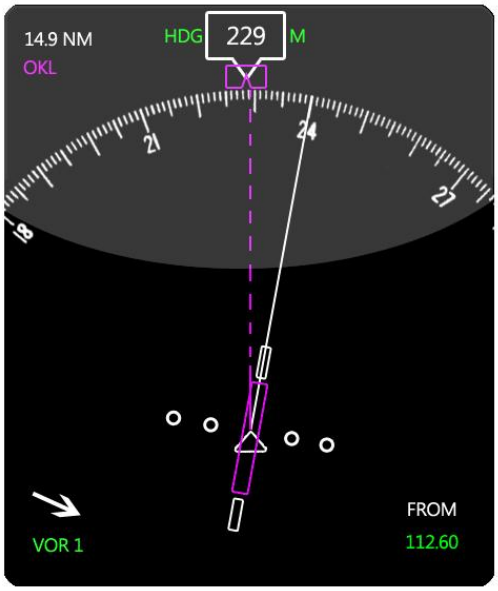
A) 230°
B) 225°
C) 235°
D) 240°



An aircraft is under guidance mode following a VOR radial. From the ADI and HSI information represented in the attached diagram, it is possible to deduce that the aircraft is:

A) experiencing a rightside wind
B) located to the leftside of the selected radial
C) located to the rightside of the selected radial
D) experiencing a leftside wind





WXR display is on:
A) on both the captains and co-pilots CRTs
B) the captains CRT only
C) a special screen
D) the co-pilots CRT only

WXR display is controlled from:
A) captains EHSJ control only
B) a special control panel
C) co-pilots EHSI control only
D) both captains and co-pilots EHSI control panels

Aircraft electronic display systems normally incorporate:
A) a single CRT for each pilot position.
B) automatic CRT brightness control.
C) LED alphanumeric displays.
D) one symbol generator for each CRT.

Airspeed is shown:
A) only on the flight management CRT
B) on both EADIs
C) on both EHSIs
D) only on the captains EHSI

The weather radar display data can be shown on:
A) the Captain's EHSI only.
B) the Captain's and First Officer's EHSI simultaneously.
C) only one EHSI at a time.
D) the First Officer's EHSI only.

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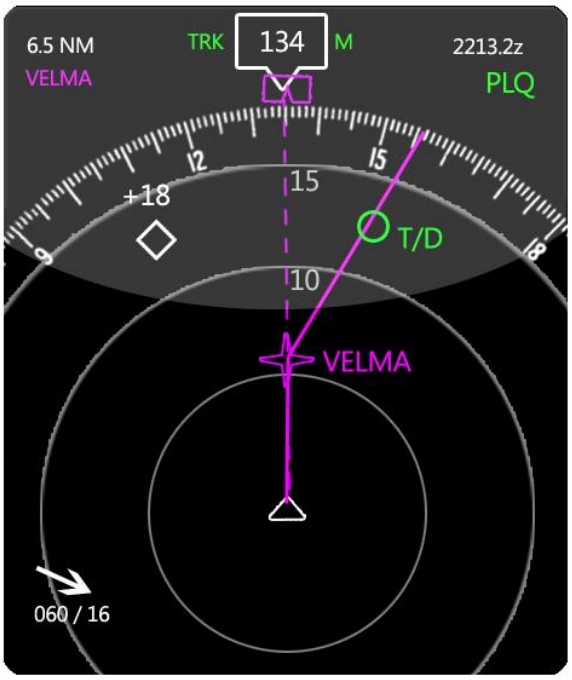
41. With an EFIS flight director using EFIS guidance, reference north can be:
A) magnetic north only
B) magnetic north between 73° N and 65° S and true north above these latitudes
C) magnetic north between 75° N and 75° S and true north above these latitudes
D) magnetic north between 65° N and 73° S and true north above these latitudes

When using EHSI, weather radar may be displayed on following settings:
A) VOR/ILS, map, expanded plan
B) expanded map, VOR/ILS, plan
C) map, expanded VOR/ILS
D) map, VOR/ILS

The green symbol of a circle with T/D appears on the EHSI display. It represents:

A) an en-route waypoint.
B) the FMC calculated top-of-climb.
C) the actual top-of-descent.
D) the FMC calculated top-of-descent.



Decision height is adjusted and set on the:

A) HSI section of the EFIS control panel
B) flight management computer
C) ADI section of the EFIS control panel
D) ADI or HSI

The heading reference used on the EHSI is:

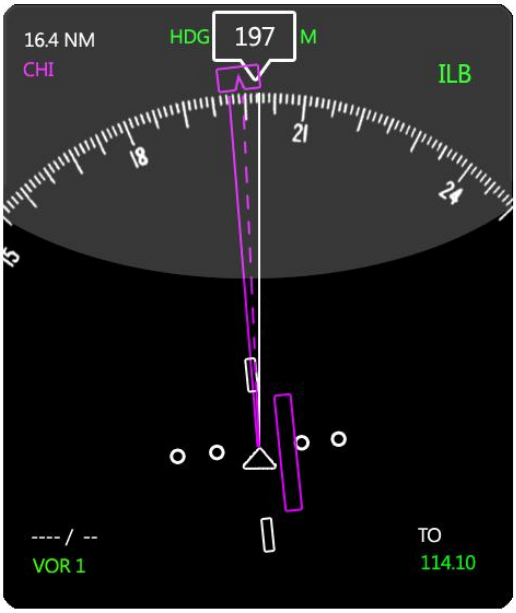
A) True or Magnetic.
B) Magnetic.
C) True.
D) Compass.

Decision height is...

A) pre-set automatically by the autoflight system.
B) calculated by the flight management computer.
C) displayed on the EADI, and set by the pilot using the EFIS control panel.
D) displayed on the EADI using FMC inputs.

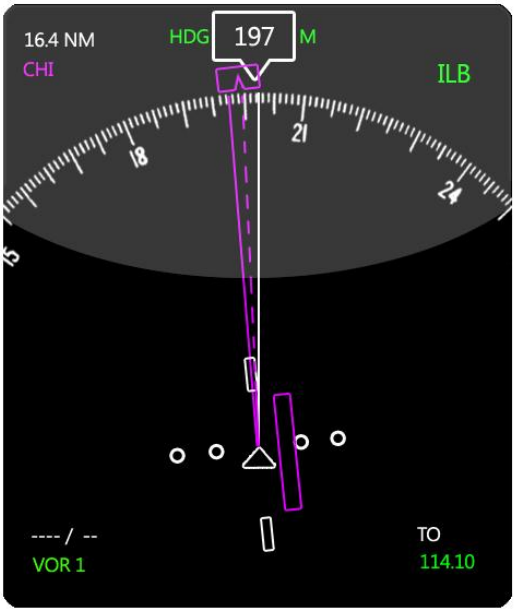
Which mode is selected on the following Navigation Display (EHSI)?

A) Expanded VOR mode
B) Full VOR mode
C) Expanded ADF mode
D) Plan mode



On what track is the aircraft currently flying?

A) 230°
B) 235°
C) 225°
D) 240°



This yellow symbol appears in place of the normal radio altitude display when:

A) the selected radio altitude has been reached
B) the aircraft has descended below 1000 ft AGL
C) there is a failure of the radio altimeter
D) the radio altitude needs re-setting on the EHSI

The EFIS control panel allows selection of:
A) Decision Height.
B) EHSI fail-operational fall back mode.
C) EADI operating mode.
D) Autopilot operating mode.

In the displayed weather modes, the intensity of returns in ascending order of intensity are:
A) yellow, green, red and magenta.
B) green, yellow, red and magenta.
C) blue, green, yellow and red.
D) yellow, green, blue and red.

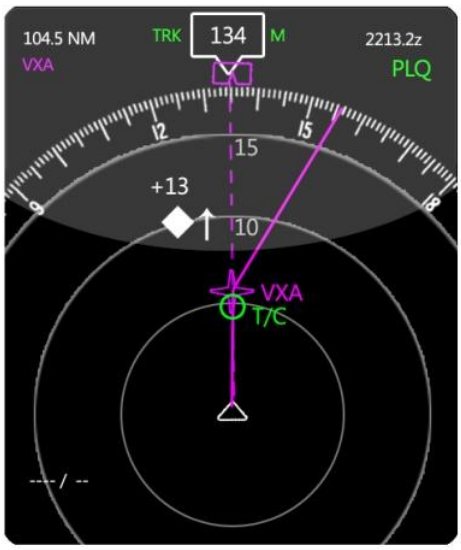
The Decision Height (DH) warning light comes on when an aircraft:
A) descends below a pre-set radio altitude.
B) descends below a pre-set barometric altitude.
C) passes over the outer marker.
D) passes over the ILS inner marker.

Radio altitude is shown on the EADI and changes from a digital display to a circular scale:
A) below 1000 ft AGL.
B) at 1000 ft and below AGL.
C) at 2500 ft.
D) at DH.

The speed tape on an EADI is located:
A) on the left hand side of the HIS.
B) at the top of the ADI.
C) on the left hand side of the EADI.
D) on the right hand side of the EADI.

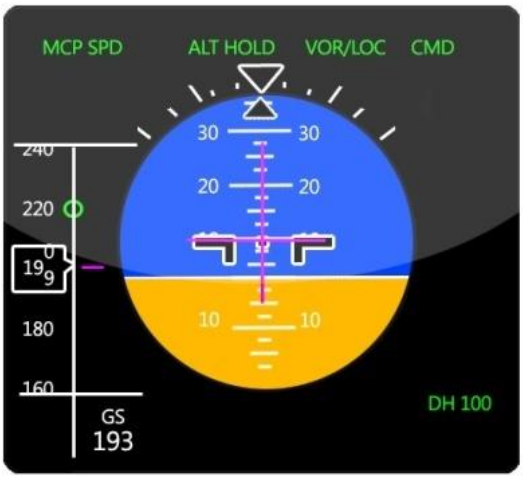
The T/C is a .... and it will be reached at approximately .... .

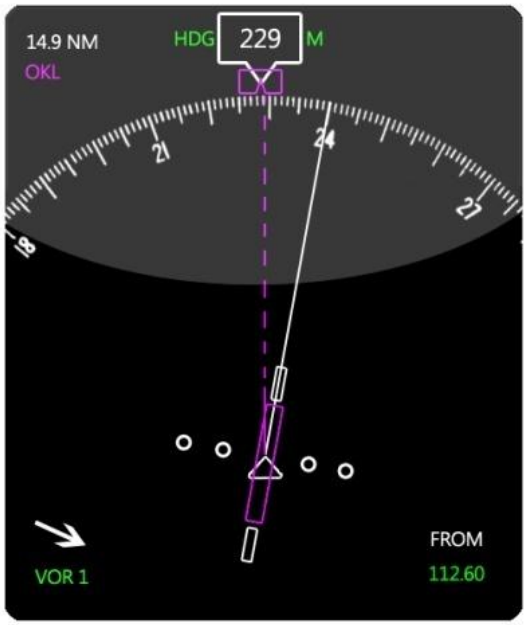
A) FMC calculated top of climb ; 5 NM from present position
B) actual top of climb ; 15:08 ZULU
C) FMC waypoint ; 15:08 ZULU
D) TCAS traffic ; 10 NM from present position



From the ADI and HSI information represented in the attached diagram, it is possible to deduce that the aircraft is:

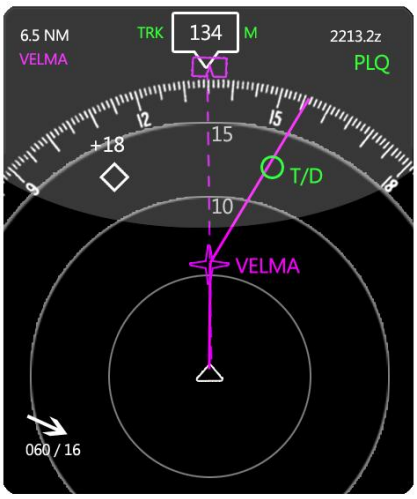
A) flying below its selected command speed, which is 220 KTS
B) following a radial 240° from OKL VOR
C) flying towards OKL VOR
D) following a radial 229° from OKL VOR





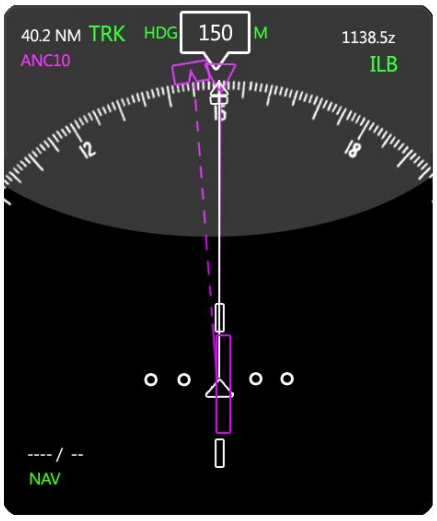
The white arrow in the lower-left corner indicates:

A) active waypoint (VELMA) is located on radial 060° and 16 NM from a VOR tuned in the active NAV receiver
B) after passing VELMA waypoint in 16 minutes the next heading will be 060°
C) active waypoint (T/D) is located on radial 060° and 16 NM from a VOR tuned in the active NAV receiver
D) current wind of 060 ° / 16 KTS is being experienced



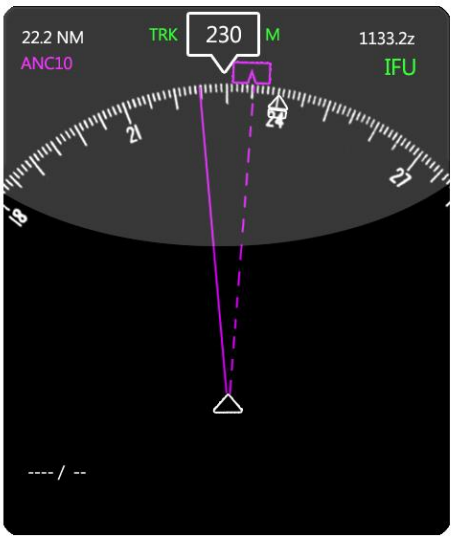
Which mode is selected on the following Navigation Display (EHSI)?

A) Full NAV mode
B) Expanded NAV mode
C) Expanded VOR mode
D) Full VOR mode



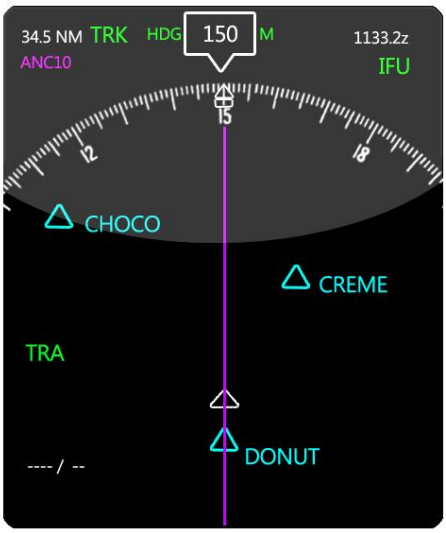
On what heading is the aircraft currently flying?

A) 230°
B) 225°
C) 235°
D) 240°



Refer to the attached Navigation Display (EHSI). What is the current active waypoint?

A) TRA
B) AMLON
C) ANC10
D) ILB



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61. Which mode is selected on the following Navigation Display (EHSI)?

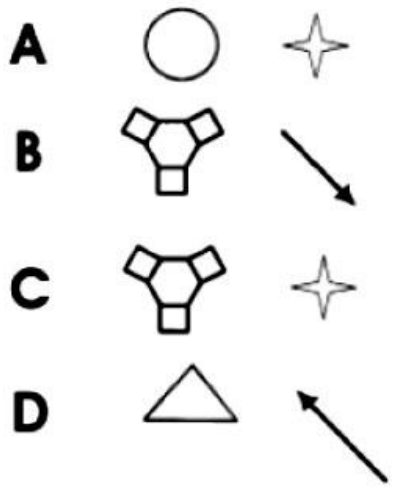
A) Expanded NAV mode.
B) Expanded VOR mode.
C) Full NAV mode.
D) Full ADF mode.

An EFIS as well as having a control panel, symbol generators and a remote light sensor also has:

A) EADIs and EICAs
B) EADI and WXR display tubes
C) EADIs and EHSIs
D) EHSIs and altitude indicator

The EFIS symbols for a navaid and enroute waypoint are:

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

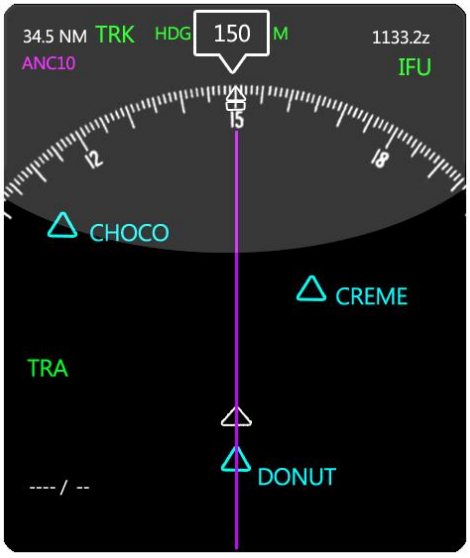


On an EHSI display, wind velocity can be displayed in which of the following modes?

A) Plan, Full ILS, Expanded VOR and Full VOR.
B) Map, Expanded ILS, Full ILS and Full VOR.
C) Map, Plan, Full ILS and Full VOR.
D) Expanded ILS, Expanded VOR, Plan and Full ILS.

Which mode is selected on the following Navigation Display (EHSI)?

A) Center Map mode
B) Center Plan mode
C) Plan mode
D) Map mode



On the FMA, engaged flight autoflight modes are displayed in...

A) blue.
B) green.
C) magenta.
D) red.

Flight management system (FMS):

A bounded error in an INS system:
A) will produce a constant track error.
B) will not increase with time.
C) will cause the ground speed to oscillate about a constant mean value, which in itself will be an error.
D) will result in all of the above being correct.

What is an FMC?
A) An autopilot/flight director system.
B) A flight management inertial reference system.
C) A flight management computer.
D) An auto throttle system.

Which of the following is the FMS normal operating condition in the cruise?
A) LNAV and VNAV
B) VNAV only
C) LNAV only
D) LNAV or VNAV

In the event inaccurate radio updating is exercised, what effect will this have on the FMS?
A) this will cause the FMS to shut down.
B) this will have no effect on the FMS.
C) this FMS will automatically update the system.
D) this may cause the FMS to deviate from the desired track.

What are the inputs to the FMS?
1. Radio Aids
2. Engine Parameters
3. Air Data
4. Route Data
5. Terminal Data
6. Operating Data

A) 1, 2, 3 & 6
B) 2, 3, 4, & 5
C) All of the above
D) 1, 3, 4 & 6

What is the correct order of modes on an INS MCU?
A) OFF, STANDBY, ALIGN, NAV.
B) OFF, STANDBY, NAV, ATT.
C) OFF, ALIGN, ATT, NAV.
D) OFF, ALIGN, NAV, ATT.

What are the primary navigation inputs used by RNAV system?

A) Nav Aids, Mapping Radar, FMC.
B) Nav Aids, INS, FMC.
C) INS, Nav Aids, TAS and Drift.
D) INS, Mapping Radar, FMC.

A rate integrating gyro is used in which of the following:

1. inertial attitude unit
2. autopilot system
3. stabiliser servo mechanism system
4. inertial navigation unit
5. rate of turn indicator

A) 2, 3, & 5
B) 1 & 4
C) 1, 2, 3, 4, & 5
D) 2, 3, & 4

An IRS is aligned in order to:

A) establish true and magnetic north.
B) establish position relative to true north and magnetic north.
C) calculate the computed trihedron with respect to the earth.
D) establish magnetic north.

In an Inertial Navigation System (INS), the main causes of Cumulative Distance errors are:

A) initial azimuth misalignment of the platform and wander of the azimuth gyro.
B) because the true value of the distance run is increasingly divergent from the apparent distance run.
C) misalignment of the accelerometers in the horizontal plane.
D) wander in the levelling gyros and integrator errors in the second stage of integration.

All the last generation aircraft use flight control systems. The Flight Management System (FMS) is the most advanced system ; it can be defined as a:

A) management system optimized in the vertical plane.
B) management system optimized in the horizontal plane.
C) global 3-D Flight Management System.
D) global 2-D Flight Management System.

The computer of a north referenced Inertial Navigation System (INS) in flight, provides compensation for:

A) aircraft manoeuvres, real wander, apparent wander, transport wander.
B) Coriolis, real wander, apparent wander, transport wander.
C) earth rotation, transport wander, Coriolis.
D) transport wander, apparent wander, Coriolis, magnetic variation.

If an alert message is generated by the flight management system:

A) it appears at the top of the CRT and an amber light flashes
B) it appears in the scratch pad and an amber light flashes
C) it appears in the middle of the CRT screen and a red light flashes
D) it appears in the scratch pad and the MSG Annunciator illuminates

In an Inertial Navigation System (INS), the main causes of Cumulative Track errors are:

A) because recorded value of the distance run is increasingly divergent from the true distance run.
B) integrator errors in the second stage of integration.
C) initial azimuth misalignment of the platform and wander of the azimuth gyro.
D) wander in the levelling gyros, which causes a Schuler oscillation.

What are the advantages of an IRS compared to an INS?

A) Reduced spin-up time and insensitivity to 'g'.
B) Increased accuracy and a dither motor to prevent 'lock-out'.
C) Insensitivity to 'g' and reduced wander of the gyroscopes.
D) Reduced spin-up time and a dither motor to prevent 'lock-out'.

Automatic flight control system

Flight Director:

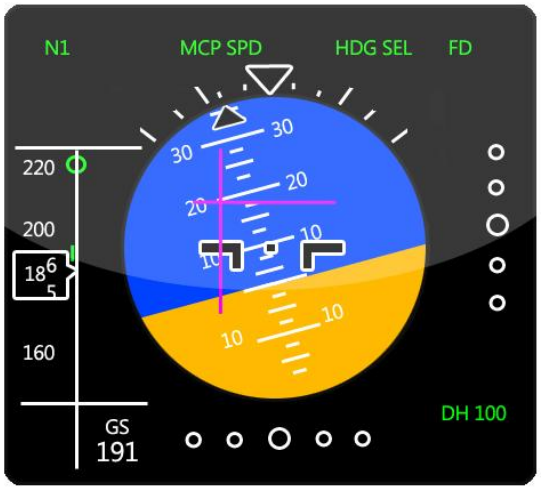
Flight Director Information supplied by an FD computer is presented in the form of command bars on the following instrument:
A) HSI Horizontal Situation Indicator.
B) BDHI Bearing Distance Heading Indicator.
C) ADI Attitude Display Indicator.
D) RMI Radio Magnetic Indicator.

When AUTO/APPR is selected on the MCP of a flight director:
A) If the roll control is being operated in HDG or VOR/LOC it is automatically cancelled when the localiser is captured
B) Both a & b are correct
C) Neither a nor b is correct
D) Lateral and vertical guidance from the ILS glide slope and localiser are inputted to the computer

The essential components of a flight director are:
1. a computer
2. an automatic pilot
3. an autothrottle
4. command bars

The combination of correct statements is:
A) 1, 2.
B) 2, 4.
C) 1, 4.
D) 2, 3.

After having programmed your flight director, you see that the indications of your ADI (Attitude Director Indicator) are as represented in diagram. On this instrument, the command bars indicate that you must bank your airplane to the left and:
A) increase the flight attitude until the command bars recentre on the symbolic airplane
B) increase the flight attitude until the command bars recentre on the symbolic horizon
C) decrease the flight attitude until the command bars recentre on the symbolic airplane
D) decrease the flight attitude until the command bars recentre on the symbolic horizon



An aeroplane is equipped with a Flight Director (with crosshair trend bars), heading 270° , in HDG mode (heading hold). A new heading, of 360° , is selected the vertical trend bar:

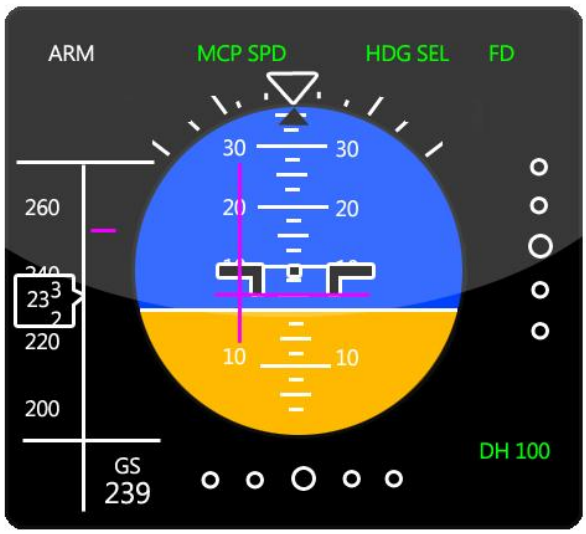
A) disappears, the new heading selection has deactivated the HDG mode.
B) deviates to its right stop as long as the aeroplane is more than 10° off the new selected heading.
C) deviates to the right and will be centred as soon as you roll the aircraft to the bank angle calculated by the flight director.
D) deviates to the right and remains in that position until the aircraft has reached heading 360° .

The auto-pilot is in heading select mode, and the aircraft is flying on a heading of 270 deg. If you change heading to 360 deg, the flight director:

A) roll command bar moves to the right and then progressively returns to the centre as the deviation from the selected heading reduces.
B) heading command bar will disappear and the heading hold will disengage.
C) roll command bar moves to right and centres when AFDS angle of bank to intercept has been achieved.
D) roll command bar goes full deflection right and then doesn't move until the aircraft heading is within 30 degrees of the selected heading.

After having programmed your flight director, you see that the indications of your ADI (Attitude Director Indicator) are as represented in the diagram of the figure. On this instrument, the command bars indicate that you must bank your airplane to the left and:

A) decrease the flight attitude until the command bars recentre on the symbolic airplane
B) decrease the flight attitude until the command bars recentre on the horizon
C) increase the flight attitude until the command bars recentre on the symbolic airplane
D) increase the flight attitude until the command bars recentre on the horizon



On which instrument are the flight director bars normally present?

A) ND
B) EHSI
C) ADI
D) Primary EICAS

Where are the flight director Command Bars displayed?
A) PFD
B) FD control panel
C) ND
D) EICAM

On a modern aircraft, the flight director modes are displayed on the:
A) upper strip of the ND (Navigation Display).
B) control panel of the flight director only.
C) upper strip of the PFD (Primary Flight Display).
D) upper strip of the ECAM (Electronic Centralized A/C Management).

The flight director indicates the:
A) path permitting reaching a selected radial over a minimum distance.
B) optimum instantaneous path to reach selected radial.
C) optimum path at the moment it is entered to reach a selected radial.
D) path permitting reaching a selected radial in minimum time.

Mode " Localizer ARM" active on Flight Director means:
A) System is armed for localizer approach and coupling will occur upon capturing center line.
B) Localizer ALARM, making localizer approach not authorized.
C) Coupling has occurred and system provides control data to capture the centerline.
D) Localizer is armed and coupling will occur when flag warning disappears.

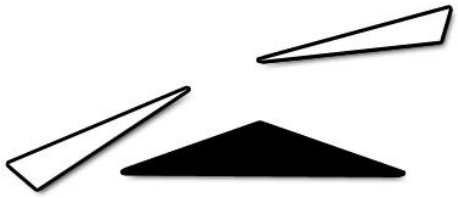
At what angle does the flight director intercept a VOR radial?
A) 20 degrees.
B) 50 degrees.
C) 40 degrees.
D) 30 degrees.

For capturing and keeping a preselected magnetic heading, the flight director computer takes into account:
1. track deviation
2. rate of track closure
3. rate of change of track closure
4. wind velocity given by the inertial reference unit

The combination regrouping all the correct statements is:
A) 1, 2, 3.
B) 1, 2, 4.
C) 1, 3, 4.
D) 2, 3, 4.

The command bars of a flight director are generally represented on an:
A) ILS.
B) RMI.
C) HIS.
D) ADI.

After having programmed your flight director, you see that the flight director indications are as represented in the diagram. This indicates that you must:



A) increase the flight attitude and bank your airplane to the right
B) decrease the flight attitude and bank your airplane to the right
C) decrease the flight attitude and bank your airplane to the left
D) increase the flight attitude and bank your airplane to the left

When an HSI is used in RNAV APR mode each dot represents a displacement of:
A) 1 NM
B) ½ NM
C) ¼ NM
D) 2 NM

The " heading hold" mode is selected on the flight director (FD) with a course to steer of 180° . Your aircraft holds a heading of 160° . The vertical bar of the FD:
A) is centered if the aircraft has a starboard drift of 20° .
B) cannot be centered.
C) is centered if the aircraft is on optimum path to join heading 180° .
D) is centered if the aircraft has a port drift of 20° .

The aim of the flight director is to provide information to the pilot:
A) allowing him to return to a desired path according to a 45° intercept angle.
B) allowing him to return to a desired path in an optimal way.
C) about his position with regard to a radioelectric axis.
D) allowing him to return to a desired path according to a 30° intercept angle.

The position of a Flight Director command bars:
A) indicates the manoeuvres to execute, to achieve or maintain a flight situation.
B) enables the measurement of deviation from a given position.
C) only displays information relating to radio-electric deviation.
D) repeats the ADI and HSI information.

---

21. Which of the following provide an input into the FDC:
    1. Air Data computer
    2. GNSS
    3. DME
    4. Marker

A) All except 4) provide an input
B) All except 2) provide an input
C) All except 1) provide an input
D) All provide inputs to the FDC

Autopilot:

During an autoland approach:
A) flare is disengaged prior to touchdown at 5 ft GA
B) glideslope is the engaged pitch mode until 5 ft GA
C) flare is engaged at 1500 ft AGL
D) localiser roll control is disengaged just prior to touchdown

The autopilot basic modes include, among other things, the following functions:
1. pitch attitude hold
2. pressure altitude hold
3. horizontal wing hold
4. heading hold

The combination regrouping all the correct statements is:
A) 1, 2, 3, 4.
B) 1, 2, 3.
C) 1, 3.
D) 1, 4.

The minimum level of redundancy required to commence an autolanding is:
A) fail passive.
B) fail safe.
C) fail redundant.
D) fail operational.

In an auto-flight system, modes for stabilising the a/c include which of the following:
1. Yaw damper.
2. Pitch attitude holding.
3. VOR axis holding.
4. ASI & Mach hold.
5. horizontal wing holding.
6. Altitude holding.

A) 1, 5 & 6.
B) 1, 2 & 4.
C) 1, 2 & 5.
D) 2, 4 & 6.

On the FMA, armed modes are displayed in...
A) red.
B) yellow.
C) green.
D) white.

What is the relationship between Alert Height and Decision Height for an automatic landing?

A) Alert height is greater than decision height.
B) Alert height is often much less than decision height.
C) There is no relationship between alert height and decision height.
D) Alert height is usually less than decision height.

To prevent servo motor runaway from producing excessive demands to the control surface:

A) A torque limiter is fitted
B) A gyro damper is fitted
C) A torque converter is fitted
D) A gyro limiter is fitted

An automatic landing system necessitating that the landing be continued manually in the case of a system failure during an automatic approach is called FAIL...

A) REDUNDANT.
B) SAFE.
C) OPERATIONAL.
D) PASSIVE.

An autopilot which will suffer a loss of autoland capability after a single failure but which will not diverge from its intended flight path is known as... If it can sustain a failure without loss of autoland capability, it is known as...

A) fail operational, fail passive
B) fail passive, fail perfect
C) fail passive, fail operational
D) fail operational, fail soft

In the automatic trim control system of an autopilot, automatic trimming is normally effected about the:

A) pitch axis only
B) pitch, roll and yaw axes
C) pitch and roll axes only
D) roll and yaw axes only

If a Go-Around is initiated from an auto-approach:

1. the auto-throttle selects GA power as soon as the TOGA switch is pressed
2. the auto-pilot carries out the climb
3. the auto-pilot retracts flap and landing gear to reduce drag
4. the pilot carries out the procedure
5. the pilot cleans up

A) 1, 2 & 4
B) 1, 4 & 5
C) 1, 2 & 5
D) 1, 2 & 3

Inputs to the rudder channels initially originate from:
A) Servomotors
B) Compass gyro and turn and slip gyro
C) AH gyro and turn and slip gyro
D) Compass gyro and gyro for AH

If the auto-pilot is selected to VOR mode, what happens if the aircraft flies over the cone of confusion?
A) VOR disengages and Heading hold engages.
B) The pilot manually flies the aircraft following flight director roll commands.
C) Temporarily follows current heading until exiting the cone of confusion.
D) The pilot must select an alternate roll mode.

Landing shall be considered as having been carried out automatically when the autopilot and the auto-throttle of an aircraft are disengaged by flight crew:
A) during ground roll.
B) during the flare.
C) at the decision height.
D) at the outer marker.

What is the purpose of the synchronisation in an auto-pilot.
1. Prevents snatch on disengagement.
2. Prevents snatch on engagement.
3. Cancels rudder control inputs.
4. May not allow the auto-pilot to engage if unserviceable.

A) 3 & 4
B) 1 & 2
C) 2 & 4
D) 1 & 3

An automatic pilot is a system which can ensure the functions of:
A) piloting only.
B) piloting from take-off to landing without any action from human pilot.
C) piloting and guidance of an aircraft in both the horizontal and vertical planes.
D) navigation.

During a Category II automatic approach, the height information is supplied by the:
A) GPS (Global Positioning System).
B) radio altimeter.
C) encoding altimeter.
D) altimeter.

In an auto-pilot slaved powered control circuit, the system which ensures synchronisation:

A) prevents uncommanded surface deflection when the automatic pilot is disengaged.
B) is inhibited when the automatic pilot is engaged.
C) intervenes only when the automatic pilot has been engaged.
D) can itself, when it fails, prevent the automatic pilot from being engaged.

In a selected axis capture mode, the autopilot gives a bank attitude input:

A) proportional to the deviation between the selected heading and the current heading but not exceeding a given value.
B) proportional to the aircraft true airspeed but not exceeding a given value.
C) of a fixed value equal to 20° .
D) of a fixed value equal to 27° .

The control law in a fly-by-wire system is a relationship between:

A) input and output at the amplifier level respectively control the deviation data.
B) computer input deviation data and flap position modification.
C) the ailerons and elevators.
D) how the pilot's control demands are translated into control surface movements.

---

21. An auto-pilot capable of altitude hold and heading hold is a minimum requirement for:

A) Aircraft over 5700kg.
B) Single pilot operation in VMC and IMC.
C) Single pilot operation under IFR and at night.
D) Dual pilot operation (in IFR).

A landing will be considered to be performed in the semi automatic mode when:

1. the autopilot maintains the airplane on the ILS beam until the decision height is reached then is disengaged automatically.
2. the auto throttle maintains a constant speed until the decision height is reached then is disengaged automatically.
3. the autopilot maintains the airplane on the ILS beam until the flare.
4. the auto throttle decreases the thrust when the height is approximately 30ft.
5. the flare and ground roll are performed automatically.

The combination regrouping all the correct statements is:

A) 3, 4 and 5.
B) 1 and 4.
C) 1 and 2.
D) 2, 3 and 5.

An autopilot is selected " ON" in mode " altitude hold," the pilot alters the barometric pressure set on the sub- scale of his altimeter the:

A) aircraft will remain at the same altitude, the autopilot takes its pressure information from the altimeter corrected to standard pressure, 1013.25 hPa.
B) mode altitude hold will disengage.
C) aircraft will remain at the same altitude, the autopilot takes its pressure information from the static source.
D) aircraft will climb or descend in the sense of the change, the autopilot takes its pressure information from the altimeter.

LNAV is an .... (i) input to the .... (ii) channel using data from the .... (iii).

A) (i) outer loop, (ii) roll, (iii) FMC
B) (i) outer loop, (ii) pitch, (iii) FMC
C) (i) inner loop, (ii) pitch, (iii) ADC
D) (i) inner loop, (ii) roll, (iii) ADC

An automatic flight control system is fitted with control wheel steering (CWS):

A) The CWS is only used for steering on the ground
B) Manoeuvring commands may be input using pitch and turn controls on the automatic flight system control panel, without first disengaging the autopilot
C) The autopilot must be disengaged before the pilot can input manoeuvring commands
D) Manoeuvring commands may be input by applying normal forces to the control yoke without first disengaging the autopilot

An automatic landing system which can keep on operating without deterioration of its performances following the failure of one of the autopilots is called:

A) Fail REDUNDANT.
B) Fail PASSIVE.
C) Fail OPERATIONAL
D) Fail SAFE.

The engagement of an autopilot is not possible when:

1. there is a fault in the electrical power supply
2. the controlled-turn knob is not set to centre-off
3. there is a synchronization fault in the pitch channel
4. there is a fault in the attitude reference unit

The combination regrouping all the correct statements is:

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

In heading select the auto-pilot delivers roll commands to the controls to bank the aircraft:

1. proportional to TAS, but not beyond a specified maximum.
2. Set bank of 27 degrees.
3. Set bank of 15 degrees.
4. Proportional to the deviation from the selected heading

A) 1& 2
B) 4& 1
C) 3& 4
D) 2& 3

Among the following functions of an autopilot, those related to the airplane guidance are:

1. pitch attitude holding
2. horizontal wing holding
3. indicated airspeed or Mach number holding
4. altitude holding
5. VOR axis holding
6. yaw damping

The combination regrouping all the correct statements is:

A) 1, 3, 4 and 5.
B) 1, 2, and 6.
C) 1, 2, 3 and 6.
D) 3, 4 and 5.

An autopilot is in ALT HOLD mode. What will happen if slight pressure is applied to the control column, assuming that the autopilot remains engaged?

A) The autopilot will trim the aircraft nose up.
B) The autopilot will trim the aircraft nose down.
C) The aircraft will pitch nose down and the autopilot will not trim the aircraft.
D) The aircraft will pitch nose up and the autopilot will not trim the aircraft.

The Altitude Select System:

A) Illuminates a light when selected altitude is attained.
B) Is annunciated by light and/or sound when airplane is approaching selected altitude.
C) Engages autopilot Auto Trim at selected altitude.
D) Disengages autopilot Auto Trim at selected altitude.

On an autopilot coupled approach, GO AROUND mode is engaged:

A) automatically in case of an autopilot or flight director alarm.
B) if the aircraft reaches the decision height selected on the radio altimeter at a higher speed than the one selected.
C) by the pilot selecting G.A. mode on the thrust computer control panel.
D) by the pilot pushing a button located on the throttles.

During an autoland at 50 ft AGL (45' GA) the pitch control of the autopilot is .... and the roll control is .... .

A) flare; localiser
B) glideslope; localiser
C) glideslope; roll out
D) flare; roll out

Auto-trim is an auto-pilot function in:

A) Pitch only.
B) Pitch, roll and yaw.
C) Pitch and roll.
D) Roll and pitch.

At 50 feet agl during an auto-land, what happens to the glideslope signal?

A) is used to flare the aircraft.
B) is factored for range.
C) is disconnected.
D) is used until the nose landing gear touches the ground.

A single axis autopilot system:

A) is unsuitable for use in powered aircraft.
B) provides control about the roll axis.
C) provides stabilisation about the normal axis.
D) provides control about the pitch axis.

Among the following functions of an autopilot, those related to the airplane stabilization are:

1. pitch attitude holding
2. horizontal wing holding
3. displayed heading or inertial track holding
4. indicated airspeed or Mach number holding
5. yaw damping
6. VOR axis holding

The combination regrouping all the correct statements is:

A) 3, 4, 5 and 6.
B) 2, 4, and 5.
C) 1, 2 and 5.
D) 1, 2, 3 and 6.

An automatic flight system which can safely continue with an automatic landing after a system failure:

A) is a fail passive system.
B) is a three-axis system.
C) is a fail redundant system.
D) is a fail operational system.

The interception of a localizer beam by the autopilot takes place:
A) according to an interception versus range and angular.
B) at a constant heading.
C) at a constant magnetic course.
D) according to an interception versus radio deviation law.

During large control inputs from an automatic flight control system (AFCS), the control stick in the cockpit is moved to inform the pilot of the action. This is:
A) achieved by the flight director.
B) achieved by a parallel actuator.
C) a false statement; the information is displayed to the pilot via the ADI, HSI and AFCS controller.
D) achieved by a series actuator.

---

41. During a CAT 2 ILS automatic approach, the source for altitude information is the:
A) radio altimeter which becomes effective below about 2,500 feet
B) radar altimeter which becomes effective below about 25,000 feet
C) basic altitude capsule stack
D) mode comparator sensor

In which modes can the autopilot intercept the localizer?
A) HDG HOLD, V/S and FMC speed.
B) CWS P, LNAV and VNAV.
C) VOR/LOC, CWS R, VNAV.
D) HDG SEL, CWS R, LNAV.

During an approach to an autoland at 1500 feet:
A) Provided both localiser and glideslope signals are valid LAND 3 will illuminate
B) Off line channels are manually engaged, flare mode is armed
C) Localiser is controlling the roll channel, stabiliser is trimmed nose up and roll out is armed
D) Localiser is controlling the roll channel, off line channels are automatically engaged and flare mode is armed

Failure of a single autoland channel in a triplicate autoland system results in a redundancy status of:
A) fail operational.
B) fail soft.
C) fail active.
D) alert.

The fundamental components of an autopilot control loop are:
A) servomotor, rate gyro, torque limiter, error signal generator.
B) rate gyro, servomotor, error signal generator.
C) torque limiter, error signal generator, servomotor.
D) rate gyro, servomotor, torque limiter.

Where are the flight director and autopilot modes displayed on?
A) On the FMS display.
B) On the Navigation Display.
C) On the ECAM screen.
D) On the PFD.

When using the autopilot, the function of the pitch channel automatic trim is to:
1. cancel the hinge moment of the elevator
2. ease as much as possible the load of the servo-actuator
3. restore to the pilot a correctly trimmed airplane during the autopilot disengagement

The combination regrouping all the correct statements is:
A) 1 and 2.
B) 1, 2 and 3.
C) 1 and 3.
D) 3.

The autoland sequence is considered to be complete when:
A) reverse thrust is engaged.
B) the aircraft touches down.
C) the aircraft reaches the end of the runway.
D) the autopilot is manually disengaged by the pilot.

What is the minimum redundancy required to complete an automatic landing?
A) Fail Passive at LAND 3.
B) Fail Operational.
C) Fail Passive.
D) Fail Operational at LAND 2.

In automatic landing mode, when the 2 autopilots are used, the system is considered:
A) " fail operational" or without failure effect with function always ensured.
B) " fail passive" or without failure effect but with disconnection.
C) " fail hard" or with failure effect and disconnection.
D) " fail soft" or with minimized failure effect.

For a modern aircraft, which of the following modes of automatic flight cannot be engaged at the same time?

A) HDG SEL and VS
B) LNAV and VNAV
C) HDG SEL and LNAV
D) HDG SEL and VNAV

When operating with the auto-pilot in ALT hold mode what happens if the Captain's barometric altimeter pressure setting is increased?

A) The aeroplane will descend.
B) Nothing.
C) ALT hold disengages.
D) The aeroplane will climb.

From a flight mechanics point of view, the " guidance" functions of a transport airplane autopilot consist in:

A) stabilizing and monitoring the movements around the aerodynamic centre
B) monitoring the movements of the centre of gravity in the three dimensions of space (path)
C) stabilizing and monitoring the movements around the centre of gravity
D) monitoring the movements of the aerodynamic centre in the three dimensions of space (path)

A landing will be considered to be performed in the SEMI-AUTOMATIC mode when:

1. the autopilot maintains the airplane on the ILS beam until the decision height is reached then is disengaged automatically.
2. the autothrottle maintains a constant speed until the decision height is reached then is disengaged automatically.
3. the autopilot maintains the airplane on the ILS beam until the flare.
4. the autothrottle decreases the thrust when the height is approximately 30 ft.
5. the flare and the ground roll are performed automatically.

The combination regrouping all the correct statements is:

A) 1 and 2.
B) 3, 4 and 5.
C) 2, 3 and 5.
D) 1 and 4.

The auto-pilot is engaged with no modes selected. What is the auto-pilot providing:

A) attitude hold with auto-trim.
B) wing levelling.
C) LNAV and VNAV.
D) altitude hold.

What does the auto-pilot pitch / rotate around?
A) Centre of gravity.
B) Neutral point.
C) Manoeuvre point.
D) Centre of pressure.

An auto-pilot system whereby if one A/P fails cannot carry out an auto-land is called fail...
A) passive.
B) operational.
C) redundant.
D) safe.

When localiser and glide slope are captured at 1,500 feet during an automatic landing sequence, two other functions will be activated at the same time, they are:
A) flare mode arm and touch down mode
B) flare mode engage and roll out mode
C) touch down mode and roll out mode
D) flare mode arm and off line channels engaged

During an automatic landing, between 50 FT AGL and touch down, the autopilot maintains:
A) a constant vertical speed of 2 feet/second.
B) a constant flight path angle with reference to the ground.
C) a vertical speed according to the GPS height.
D) a vertical speed according to the radio altimeter height.

An autopilot suffers a failure which leaves the airplane trimmed and maintaining its original flight path although the autopilot is no longer engaged. The original status of the autopilot before the failure was:
A) fail passive
B) fail hard
C) fail soft
D) fail operational

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61. Your autopilot system goes from fail operational to fail passive below alert height. What do you do?
A) Land only when visual contact has been established and can be maintained.
B) Engage VNAV mode.
C) Make a go-around.
D) Continue to land.

The synchronization of the autopilot control channel system:

1. enables the prevention of jerks during disengagement
2. enables the cancellation of rudder control signals
3. enables the prevention of jerks during engagement
4. functions in the heading, navigation, approach modes

The combination regrouping all the correct statements is:

A) 2, 4.
B) 1, 4.
C) 2, 3.
D) 3, 4.

When using an AFCS to combat cross-coupling, a balanced turn is achieved by:

A) Primary inputs from both the roll and yaw channels
B) Primary inputs from both the pitch and yaw channels
C) Secondary inputs from both the pitch and yaw channels
D) Secondary inputs from both the roll and yaw channels

You engage CWS, what happens when you let go of the control wheel after making a manoeuvre?

A) The auto-pilot will roll wings level and maintain heading.
B) The auto-pilot will hold the attitude that exists when the wheel is released.
C) The auto-pilot will hold the altitude that exists when the wheel is released.
D) The auto-pilot will return to the original auto-pilot track.

In autoflight, a system which allows aircraft control without disengagement of the autopilot servomotors is:

A) touch control steering.
B) control wheel steering.
C) manometric control steering.
D) outer loop control only.

During an automatic landing, from a height of about 50 ft the:

A) LOC and glide slope modes are disconnected and the airplane carries on its descent until landing.
B) autopilot maintains an angle of attack depending on the radio altimeter height.
C) autopilot maintains a vertical speed depending on the radio altimeter height.
D) glide slope mode is disconnected and the airplane continues its descent until landing.

A landing is considered to be Automatic when:

1. Auto-pilot flies the ILS to Decision Height, and then disengages.
2. Auto-throttle maintains speed until Decision Height, and then disengages
3. Auto-throttle disengages thrust at 50ft
4. Auto-pilot flies the approach and landing
5. Auto-pilot flares the aeroplane to touch down

A) 1 & 4
B) 2, 3 & 5
C) 4 & 5
D) 1 & 2

A semi-automatic landing system disconnects itself automatically:
A) at approximately 100 ft.
B) when going around.
C) at the decision height.
D) on ground.

What are the auto-pilot minimum requirements in order to fly single pilot operations in IFR conditions or at night?
A) Single axis auto-pilot with Heading select and VS
B) Two axis auto-pilot with altitude hold, heading hold, VOR tracking and Alt acquire
C) Single axis auto-pilot with Altitude hold only
D) Two axis auto-pilot with altitude hold and heading hold.

When an aircraft, operating in the VOR coupled mode, approaches the " cone of confusion" over a VOR station, the roll channel of the autopilot:
A) remains always coupled to the selected VOR radial.
B) is temporarily disabled
C) is damped by a trim input signal from the lateral trim system.
D) temporarily switches over to the heading mode.

VNAV and ALT hold are examples of:
A) Inner loop control in the roll axis.
B) Outer loop control in the roll axis.
C) Outer loop input to the pitch channel.
D) Inner loop input to the pitch channel.

A pilot engages the control wheel steering (CWS) of a conventional autopilot and carries out a manoeuvre in roll.
When the control wheel is released, the autopilot will:
A) roll wings level and maintain the heading obtained at that moment.
B) maintain the flight attitude obtained at that moment.
C) restore the flight attitude and the rate of turn selected on the autopilot control display unit.
D) maintain the track and the flight attitude obtained at that moment.

During autoland vertical guidance is taken from:
A) The radio altimeter and the glide path
B) The radio altimeter, the barometric altimeter and the glidepath
C) The barometric altimeter and the glidepath
D) The radio altimeter and the barometric altimeter

Auto-land 'flare' is initiated at:
A) 5 ft.
B) 50 ft.
C) 330 ft.
D) 1500 ft.

For a FDC, if VOR/LOC is selected:
A) This provides lateral guidance signals for the computer to process and pass to the roll channel
B) This provides lateral guidance signals for the computer to process and pass to the roll, pitch and yaw channels
C) This provides lateral guidance signals for the computer to process and pass to the pitch channel
D) This provides lateral guidance signals for the computer to process and pass to the yaw channel

An autopilot system:
A) must provide at least aircraft guidance functions.
B) may provide automatic take off functions.
C) must provide automatic take off functions.
D) must provide at least aircraft stabilisation functions.

The correction of the control surface deflection made by the automatic pilot calculator in order to stabilize the longitudinal attitude will be all the more significant as the:

1. difference between the reference attitude and the instantaneous attitude is high.
2. rate of change of the difference between the reference attitude and the instantaneous attitude is high.
3. temperature is low.
4. pressure altitude is high.

The combination regrouping all the correct statements is:
A) 2, 3, 4.
B) 1, 2, 3.
C) 1, 2, 3, 4.
D) 1, 2.

The functions of an autopilot (basic modes) consist of:
A) monitoring the movement of the airplane centre of gravity.
B) guiding the airplane path.
C) stabilizing and monitoring the movement around the airplane centre of gravity.
D) stabilizing and monitoring the movement around the airplane aerodynamic centre.

The auto-pilot disconnects (or the auto-land is completed) at:
A) 100 ft.
B) roll out.
C) flare.
D) decision height.

The autopilot is divided into two basic modes, what are they called?
A) Approach and Go around mode.
B) Vertical mode (VS) and NAV mode.
C) Lateral mode (HDA) and Vertical mode (VS).
D) Lateral mode (HDA) and NAV mode.

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81. What happens at 50 ft whilst carrying out an auto-landing?
A) Radio altimeter controls the angle of attack.
B) Radio altimeter controls the rate of descent.
C) Glideslope disconnects and aircraft continues descent.
D) Glideslope and localiser disconnect and aircraft continues to land.

When being engaged, and without selecting a particular mode, an automatic pilot enables:
A) a constant speed on track, wings horizontal
B) aeroplane piloting and guidance functions
C) all aeroplane piloting and guidance functions except maintaining radio-navigation course lines
D) aeroplane stabilisation with attitude hold or maintaining vertical speed and possibly automatic trim

Regarding auto-pilot and auto-throttle:
1. A/P holds IAS/MACH when climbing in LVL CHG and A/T controls thrust.
2. A/P holds altitude in cruise with ALT HOLD, A/T controls IAS/Mach No.
3. A/P holds pitch in descent in V/S mode, A/T controls thrust.
4. A/P holds altitude in climb and A/T holds Mach No.

A) 1 & 2
B) 3 & 4
C) 2, 3 & 4
D) 1, 2 & 3

Autopilot corrections affecting pitch attitude are carried out by:
A) elevators only.
B) autotrim and elevators.
C) autotrim only.
D) autothrottle.

In a closed loop system a device in which a small input operates a large output in a strictly proportional manner is called:
A) auto-pilot.
B) servomechanism.
C) amplifier.
D) servomotor.

A landing is performed automatically when the autopilot and auto-throttle ensure good performance from the final approach:
A) during the landing roll and sometimes until the aircraft comes to a complete stop
B) until the flare
C) until reaching 100 ft, height at which point the autopilot is automatically disconnected
D) until reaching decision height

The command functions of an autopilot include, among others, the holding of:
1. vertical speed
2. altitude
3. attitude
4. bank
5. heading

The combination which regroups all of the correct statements is:
A) 1 - 2 - 5.
B) 2 - 3 - 4.
C) 3 - 5.
D) 1 - 2 - 3 - 5.

An autopilot capable of holding at least altitude and heading mode is compulsory:
A) on multipilot airplanes.
B) for VFR and IFR flights with only one pilot.
C) for IFR or night flights with only one pilot.
D) on airplanes over 5.7 t.

The correction of the control surface deflection made by the auto-pilot calculator in order to keep a given altitude will be all the more significant when the:
1. difference between the attitude necessary to keep the given or reference altitude and the instantaneous attitude is high.
2. variation speed of the difference between the attitude necessary to maintain the altitude and the instantaneous attitude is high.
3. difference between the altitude of reference and the instantaneous altitude is high.
4. variation speed of the difference between the reference altitude and the instantaneous altitude is high.

The combination regrouping the correct statements is:
A) 1, 2 and 3.
B) 1, 2, 3 and 4.
C) 2 and 3.
D) 2, 3 and 4.

For an autoland system to meet fail passive criteria it must:
A) be a simplex system.
B) be capable of achieving automatic landing following a system failure.
C) withstand a system failure without excessive deviations from the intended flight path.
D) incorporate system redundancy.

What is the essential design feature of any closed loop control system?
A) Inner loop for control.
B) Feedback.
C) Inner loop for stabilisation.
D) Outer loop for stabilisation.

In automatic landing mode, in case of failure of one of the two autopilots, the system is considered:
A) " fail passive" or without failure effect but with disconnection.
B) " fail survival" or without failure effect with function always ensured.
C) " fail soft" with minimized failure effect.
D) " fail hard" or without failure effect and disconnection.

An automatic landing is carried out when the automatic pilot:
A) and the autothrottle ensure a correct final approach, at least up to flare-out.
B) and the autothrottle ensure a correct final approach, at least up to flare-out while the human pilot controls the power.
C) ensures a correct final approach, at least up to ground roll while the human pilot controls the power.
D) and the autothrottle ensure a correct final approach, at least up to ground roll.

In a transport airplane, an autopilot comprises, in addition to the mode display devices, the following fundamental elements:
1. Airflow valve
2. Sensors
3. Comparators
4. Computers
5. Amplifiers
6. Servo-actuators

The combination regrouping all the correct statements is:
A) 1, 2, 6.
B) 1, 3, 4, 6.
C) 2, 3, 4, 5, 6.
D) 2, 3, 4, 5.

Stability augmentation is required in an AFCS because:
A) Because the aeroplane controls are inherently unstable
B) All aeroplanes suffer a degree of instability
C) Some aeroplanes suffer a degree of instability
D) Of the inherent stability shown by all aircraft

For a FDC, if HDG is set on the MCP:
A) The computer roll channel responds to the heading input and the heading selected
B) None of the above
C) With ALT HOLD – ON the pitch channel can be controlled manually by using a pitch command selector
D) The roll channel can be set to heading hold by selecting ALT HOLD – ON

During a fully automatic landing, the auto-pilot:
A) controls the approach (at least) until the flare, the pilot controls the power.
B) and the auto-throttle control the approach at least until decision height.
C) and the auto-throttle control the approach at least until the flare.
D) and the auto-throttle control the approach at least until the touch down.

An auto-land system which can continue to automatically land the aircraft after a single failure is called:
A) Fail Safe.
B) Fail active.
C) Fail Soft.
D) Fail passive.

In autoland at 1000 feet A.G.L. with two autopilots engaged:
A) the engaged pitch mode would be FLARE.
B) the engaged roll mode would be LOCALISER.
C) the engaged roll mode would be GLIDESLOPE.
D) the armed roll mode would be LOCALISER.

What is the wavelength of an ILS signal?
A) Hectometric.
B) Metric.
C) Decimetric.
D) Centimetric.

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101. For each control channel (pitch, roll and yaw) of an autopilot system the piloting law is the relationship between the deflection of the control surface commanded by the computer and the:
A) offset at the computer's input
B) real deflection of the control surface (control surface feedback)
C) pilot command
D) aircraft response

If only a single A/P is used to climb, cruise and approach; following a failure of an inner loop component:

A) it is fail soft and will not disconnect.
B) it is fail operational and will not disconnect.
C) it is fail safe and will disconnect.
D) it is fail passive with redundancy.

A single axis autopilot can also be sometimes called:

A) Pitch control loop
B) Wing leveller
C) Auto stabilisation loop
D) Altitude hold

When is an auto-land procedure complete?

A) At the beginning of the ground roll.
B) At decision height.
C) At the inner marker.
D) At the flare.

If a rate gyro is used in an AFCS for the pitch channel its sensitive axis is aligned parallel to:

A) None of the above
B) The yaw axis
C) The pitch axis
D) The roll axis

An aircraft has yaw damping included in its auto-stabilisation system. An essential requirement of such a system is:

A) a three axis autopilot system.
B) parallel connected servo motors.
C) a split rudder.
D) automatic maintenance of centre of gravity position.

A landing will be considered to be performed in the AUTOMATIC mode when:

1. the autopilot maintains the airplane on the ILS beam until the decision height is reached then is disengaged automatically.
2. the autothrottle maintains a constant speed until the decision height is reached then is disengaged automatically.
3. the autopilot maintains the airplane on the ILS beam until the flare.
4. the autothrottle decreases the thrust when the height is approximately 30 ft.
5. the flare and the ground roll are performed automatically.

The combination regrouping all the correct statements is:

A) 1 and 4.
B) 2, 3 and 5.
C) 3, 4 and 5.
D) 1 and 2.

What are the most basic functions of auto-stabilisation?

1. Maintain pitch attitude.
2. Maintain wings level.
3. Altitude hold.
4. Heading hold.
5. Speed hold

A) 1 & 2.
B) 1& 5.
C) 1, 2 & 3.
D) 1, 2, 3, & 4.

When only one autopilot is used for climbing, cruising and approach, the system is considered:

A) " fail survival" or without failure effect with function always ensured.
B) " fail passive" or without failure effect but with disconnection.
C) " fail safe" with failure effect without disconnection.
D) " fail soft" or with minimized failure effect.

After localizer and glide slope capture, how can the APP mode still be disengaged?

A) All answers are correct.
B) By pushing the TO/GA switches.
C) By retuning the VHF NAV receiver.
D) During a single autopilot approach, by overriding pitch or roll into CWS.

In a triplex system AFCS if one lane shuts down:

A) The remaining lanes carry the additional load if the pilot manually adjusts the gain of the system so that a given disturbance requires a greater movement from the remaining actuators
B) The remaining lanes carry the additional load by automatically adjusting the gain of the system so that a given disturbance requires a greater movement from the remaining actuators
C) The remaining lanes do not carry the additional load on the system so that a given disturbance requires a greater movement from the remaining actuators
D) The remaining lanes carry the additional load by automatically adjusting the gain of the system so that a given disturbance requires a smaller movement from the remaining actuators

Inner loop stability is obtained by:

A) manometric locks
B) raw data feed to the data control bus bar
C) inputs from the Air Data Computer
D) I-bar displacement

If a fault develops in a Triplex autopilot system during an approach, the system will revert to:

A) fail passive and the landing may continue
B) fail operational
C) fail control wheel mode
D) a manual disconnect

The control law of a transport airplane autopilot control channel may be defined as the relationship between the:

A) computer input deviation data and the output control deflection signals.
B) computer input deviation data and the signals received by the servoactuators.
C) input and output signals at the amplifier level respectively control deviation data and control deflection signals.
D) crew inputs to the computer and the detector responses (returned to the airplane).

JAR 25 operational requirements for the installation of automatic pilot states that the system must have:

a. Automatic synchronisation
b. Quick release controls on both control wheels.

A) Only statement a is correct.
B) Both statements are correct.
C) Only statement b is correct.
D) Neither statement is correct.

Heading hold mode relates to control in :

A) the manometer mode of the CADC
B) the roll channel via the outer loop control source
C) the pitch channel via the inner loop
D) the height lock via the CADC

Automatic flight systems may be capable of controlling the aircraft flight in:

A) Azimuth and velocity only
B) Azimuth and elevation only
C) Azimuth, elevation and velocity
D) Azimuth only

In an auto pilot system, the purpose of the inner loop is... and the purpose of the outer loop is...

A) control, stabilisation.
B) stabilisation, stabilisation.
C) stabilisation, control.
D) control, control.

In which of the autopilot control loops would manometric data be introduced?
A) In all loops, depending on the mode of operation.
B) In the inner control loop.
C) In the middle control loop.
D) In the outer control loop.

The computers of the electrical flight controls system comply with programs defined by attitude control laws such as:
1. on the longitudinal axis, the law may combine the load factor and the changes in the pitch rate as control data sources
2. the trimming is automatic and ensures neutral stability
3. the protections apply to pitch and bank attitudes depending on the speed
4. these laws do not apply to the whole flight envelope

The combination regrouping all the correct statements is:
A) 1, 2, 3, 4.
B) 1, 3, 4.
C) 2, 3.
D) 1, 2, 3.

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121. A pilot has to carry out a single pilot IFR flight on a light twin aircraft for cargo transport. The purpose of the automatic pilot should be at least to hold:
A) heading.
B) heading and altitude.
C) heading and altitude, and to have a radio axis tracing function.
D) altitude.

An automatic flight control system in which the application of normal forces on the control column allows the pilot to input demands to the autopilot is a:
A) touch control steering
B) parallel connected system
C) control wheel steering
D) series connected system

LOC ARMED' lights up on the Annunciator, this means:
A) ILS is captured.
B) localiser beam captured.
C) localiser alarm is on.
D) localiser armed and awaiting capture.

During a CAT2 approach, what is providing the height information to the auto-pilot?
A) Central Air Data Computer.
B) Radio Altimeter.
C) Capsule stack.
D) Captain's barometric altimeter.

In an auto-pilot system, a/c flight path modes include which of the following:

1. Pitch attitude holding.
2. Horizontal wing holding.
3. VOR axis holding.
4. Inertial heading holding.
5. ASI & Mach hold.
6. Yaw damper.

A) 2, 4 & 6
B) 3, 4 & 5
C) 1, 2 & 5
D) 1, 2 & 4

During autoland the caption LAND 2 is displayed. The system is:
A) fail passive
B) fail current
C) fail soft
D) fail operational

When an automatic landing is interrupted by a go-around:

1. the autothrottle reacts immediately upon the pilot action on the TO/GA (Take-off/Go-around) switch in order to recover the maximum thrust
2. the autopilot monitors the climb and the rotation of the airplane
3. the autopilot retracts the landing gear and reduces the flap deflection in order to reduce the drag
4. the pilot performs the climb and the rotation of the airplane
5. the pilot retracts the landing gear and reduces the flap deflection in order to reduce the drag

The combination regrouping all the correct statements is:
A) 1, 2 and 3.
B) 1, 3 and 4.
C) 1, 2 and 5.
D) 1, 4 and 5.

Flight envelope protection:

Mach Trim is a device to compensate for:

A) weight reduction resulting from fuel consumption during the cruise.
B) the moving forward of the aerodynamic center of pressure at high Mach numbers by moving the elevator to nose-up.
C) the effects of fuel transfer between the main tanks and the tank located in the horizontal tail.
D) the effects of temperature variation during a climb or descent at constant Mach.

Yaw Damper:

The Yaw Damper signal for a given rate of oscillation, is:

A) increased proportional with the square of the airspeed.
B) varied proportional according to the airspeed.
C) varied inversely according to the airspeed.
D) constant regardless of airspeed.

An aircraft has yaw damping induced in its auto-stabilisation system. An essential requirement of such a system is:

A) automatic maintenance of cg position.
B) a three-axis autopilot system.
C) parallel-connected servomotors.
D) INS inputs to the CADC.

The yaw damper, which suppresses Dutch roll:

A) controls the ailerons, with the angular rate about the vertical axis as the input signal.
B) controls the rudder, with Mach Number as the input signal.
C) controls the ailerons, with Mach Number as the input signal.
D) controls the rudder, with the angular rate about the vertical axis as the input signal.

The yaw damper indicator supplies the pilot with information regarding the:

A) yaw damper action only on the ground.
B) rudder displacement by the rudder pedals.
C) rudder position.
D) yaw damper action on the rudder.

Automatic Pitch Trim:

A mach trimming system:
A) is only operational at high subsonic speeds, whether or not the autopilot is engaged.
B) is only operational at low subsonic speeds.
C) is operational at all speeds.
D) is only operational at high subsonic speeds and when the autopilot is engaged.

Which one of the following statements is true with regard to the operation of a Mach trim system:
A) It only operates when the autopilot is engaged.
B) It operates over the full aircraft speed range.
C) It operates to counteract the larger than normal forward movements of the wing centre of pressure at high subsonic airspeeds.
D) It only operates above a pre-determined Mach number.

The purpose of an airplane automatic trim system is to trim out the hinge moment of the:
A) rudder.
B) elevator.
C) elevator and rudder.
D) elevator, rudder and ailerons.

The automatic trim is a component of the autopilot pitch channel. Its function is to:
A) reset the attitude, after engaging (the autopilot).
B) transfer a stabilized aeroplane to the pilot during autopilot disengagement.
C) set the attitude to an instantaneous value before engaging the autopilot.
D) automatically disengage the autopilot in the case of an excessive pitch up.

When the auto-pilot is engaged; the role of the automatic trim is to:
A) relieve the A.P. servo motor and return the aircraft in-trim at A.P. disconnect.
B) relieve the pressure on the control column and return, the aircraft in-trim at A.P. disconnect.
C) react to altitude changes in Altitude Hold mode.
D) synchronize the longitudinal loop.

The purpose of Auto Trim function in autopilot is to:
A) help Auto Pilot compensate for crosswind influence.
B) trim throttles to obtain smooth engine power variation.
C) tell the pilot when elevator trimming is required.
D) control elevator trim tab in order to relieve elevator load.

To counter TUCK UNDER:
A) The stabiliser is moved in such a way that the elevators are driven up
B) The stabiliser is moved in such a way that the rudder is driven down
C) The stabiliser is moved in such a way that the elevators are driven down
D) The stabiliser is moved in such a way that the rudder is driven up

Auto trim is functional:
A) in the pitch channel only with the autopilot disengaged.
B) in the pitch and roll channel with the autopilot disengaged.
C) in the pitch channel only with the autopilot engaged.
D) in the pitch and roll channel with the autopilot engaged.

In automatic flight, automatic trim control is usually provided around the following airplane axes:
A) roll only.
B) pitch only.
C) yaw only.
D) roll, pitch and yaw.

The purpose of the automatic trim is to:
1. reduce to zero the hinge moment of the entire control surface in order to relieve the load on the servo- actuator
2. ensure the aeroplane is properly trimmed when the autopilot is disengaged
3. maintain the same stability/manoeuvrability trade-off within the whole flight envelope

The combination regrouping all the correct statements is:
A) 1, 2, 3.
B) 2 and 3
C) 1 and 3
D) 1 and 2

The automatic pitch trim:
1. ensures the aeroplane is properly trimmed when the autopilot is engaged.
2. permits the elevator to always be in neutral position with respect to horizontal stabiliser.
3. ensures the aeroplane is properly trimmed when the autopilot is disengaged.

The combination regrouping all the correct statements is:
A) 1, 2, 3.
B) 1, 2.
C) 2, 3.
D) 1, 3.

Thrust computation:

The two main sources of information used to calculate turbojet thrust are the:

A) high pressure turbine rotation speed or the EPR (Engine Pressure Ratio).
B) fan rotation speed (or N1) or the total pressure at the high pressure compressor outlet.
C) fan rotation speed (or N1) or the EPR (Engine Pressure Ratio).
D) fan rotation speed (or N1) or the total pressure at the low pressure turbine outlet.

From the following parameters:
The ones that can be used to monitor a gas turbine thrust setting are:

1. EGT
2. EPR
3. FF
4. N1
5. N2
6. Oil pressure
7. Fuel pressure

A) EGT, EPR, FF, High-pressure fuel.
B) fuel pressure, N1, N2, oil pressure.
C) EGT, N1, FF, EPR.
D) EGT, N1, N2, oil pressure.

The most significant parameters and the most important that express the thrust of a gas turbine engine are:

A) FF and EGT.
B) N1 and EPR.
C) EGT or N2.
D) N2 and FF.

Auto Thrust:

An aeroplane is in steady cruise at flight level 270. The autothrottle maintains a constant calibrated airspeed. If the total temperature decreases, the Mach number:
A) increases.
B) decreases.
C) increases if the outside temperature is higher than the standard temperature, decreases if lower.
D) remains constant.

Auto-throttle engaged mode can be checked by the pilot, using:
A) thrust control computer.
B) navigation display.
C) primary flight display.
D) position of throttles.

Where can the pilot look to see the auto-throttle engaged mode?
A) overhead panel
B) PFD
C) throttle control panel
D) EICAS

The calibrated airspeed (CAS) or Mach holding mode is carried out by:
1. the autopilot pitch channel in the climb mode at a constant calibrated airspeed (CAS) or Mach number
2. the autothrottles in the climb mode at a constant calibrated airspeed (CAS) or Mach number
3. the autopilot pitch channel in the altitude or glide path holding mode
4. the autothrottles in the altitude or glide path holding mode

The combination regrouping all the correct statements is:
A) 1 and 4.
B) 1 and 3.
C) 2 and 3.
D) 2 and 4.

The automatic power control system (autothrottle) of a transport airplane has the following mode(s):
1. capture and holding of speeds
2. capture and holding of Mach number
3. capture and holding of flight angle of attack
4. capture and holding of N1 or EPR (Engine Power Ratio)
5. capture and holding of flight paths

The combination regrouping all the correct statements is:
A) 1, 4, 5.
B) 1, 2, 3, 5.
C) 1, 2, 4.
D) 2, 4.

An aeroplane is in a steady climb. The auto-throttle maintains a constant Mach number. If the total temperature remains constant, the calibrated airspeed:

A) increases.
B) decreases.
C) decreases if the static temperature is lower than the standard temperature, increases if higher.
D) remains constant.

The auto throttle system is:

1. able to catch and maintain the N1 RPM.
2. able to catch and maintain the N2 RPM.
3. able to catch and maintain an airplane indicated airspeed IAS.
4. always engaged automatically at the same time as the autopilot.

The combination regrouping all the correct statements is:

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

The autothrottle:

1. enable to catch and to maintain the N1 RPM
2. enable to catch and to maintain the N2 RPM
3. enable to catch and to maintain an airplane indicated airspeed (IAS)
4. is always engaged automatically at the same time as the autopilot

The combination regrouping all the correct statements is:

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

At the missed approach point the TOGA switch on the throttles is depressed. Which of the following statements are correct:

1. Pilot selects maximum power.
2. Auto-throttle selects GA power.
3. Aircraft automatically cleans up.
4. Auto-pilot flies the GA
5. Pilot flies the GA manoeuvre

A) 2 & 4
B) 1 & 5
C) 2 & 5
D) 1 & 4

The purpose of Auto Throttle is:

A) automatic shut down of one engine at too high temperature.
B) to deactivate manual throttles and transfer engine control to Auto Pilot.
C) to synchronize engines to avoid " yawing" .
D) to maintain constant engine power or airplane speed.

An aeroplane is in steady cruise at flight level 270. The autothrottle maintains a constant calibrated airspeed. If the total temperature increases, the Mach number:
A) increases.
B) decreases.
C) remains constant.
D) decreases if the outside temperature is higher than the standard temperature, increases if lower.

An airplane is in steady cruise at flight level 290. The autothrottle maintains a constant Mach number. If the total temperature decreases, the calibrated airspeed:
A) increases.
B) remains constant.
C) decreases if the outside temperature is lower than the standard temperature, increases if higher.
D) decreases.

An airplane is in steady cruise at flight level 290. The autothrottle maintains a constant Mach number. If the total temperature increases, the calibrated airspeed:
A) increases if the static temperature is higher than the standard temperature, decreases if lower.
B) remains constant.
C) decreases.
D) increases.

An aeroplane is in steady climb. The autothrottle maintains a constant calibrated airspeed. If the total temperature remains constant, the Mach number:
A) increases.
B) decreases if the static temperature is lower than the standard temperature.
C) remains constant.
D) decreases.

In order to know in which mode the autothrottles are engaged, the crew will check the:
A) SFD (secondary flight display)
B) MCP (mode control panel)
C) TMD (thrust mode display)
D) PFD (primary flight display)

The autothrottle maintains a specific value of thrust in terms of:
A) EPR, N1, Mach and airspeed
B) N1, Mach and airspeed
C) N2, Mach and airspeed
D) EPR, N2, Mach and airspeed

Which factors are controlled by the autothrottle system?
A) VNAV, MACH and EPR.
B) IAS, EPR and ALT HOLD.
C) IAS, VNAV and ALT HOLD.
D) EPR, MACH and IAS.

Auto throttle can hold
1. speed
2. flight path
3. altitude
4. Mach
5. EPR / N1
6. Attitude

A) 3, 4, 5
B) 1, 4, 5
C) 1, 2, 3, 4
D) 1, 2, 6

Auto-throttle can hold which of the following:
1. IAS
2. Mach No
3. Altitude.
4. N1/EPR.
5. VOR capture.
6. Vertical profile.

A) 1, 2 & 6
B) 1, 2 & 3
C) 1, 3 & 5
D) 1, 2 & 4

The auto-throttle is set to climb at a constant mach number. If the temperature does not change, what happens to the CAS?
A) Decreases.
B) Increases.
C) Stays the same.
D) Increases, but only if the outside air temperature decreases.

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21. An airplane is in steady descent. The autothrottle maintains a constant Mach number. If the total temperature remains constant, the calibrated airspeed:
A) decreases if the static temperature is lower than the standard temperature, increases if above.
B) remains constant.
C) decreases.
D) increases.

Warning and recording equipment

Warnings general:

Alarms are standardised and follow a code of colours. Those requiring action but not immediately, are signalled by the colour:

A) flashing red.
B) red.
C) amber.
D) green.

Altitude Alert system:

The Altitude Alert system alerts the pilot:
A) at the selected altitude.
B) when deviating from the selected altitude.
C) when reference altitude equals the selected altitude.
D) at decision height.

A transport airplane has to be equipped with an altitude warning device. This system will warn the crew about:

1. getting close to the preselected altitude, during both climb and descent.
2. getting close to the preselected altitude, during climb only.
3. the loss of altitude during take-off or missed approach.
4. a wrong landing configuration.
5. a variation higher or lower than a preselected altitude.

The combination regrouping the correct statements is:
A) 1, 3, 4.
B) 1, 5.
C) 2.
D) 3, 4.

The Altitude Alert system:
A) may alert by visual signals when approaching the selected altitude.
B) activates a warning light on reaching selected altitude.
C) disengages auto-trim on reaching selected altitude.
D) engages auto-trim on reaching selected altitude.

An " altitude warning system" must at least warn the crew:

1. when approaching the pre-selected altitude
2. when the airplane is approaching the ground too fast
3. in case of a given deviation above or below the pre-selected altitude (at least by an aural warning)
4. in case of excessive vertical speed
5. when approaching the ground with the gear retracted

The combination regrouping all the correct statements is:

A) 1, 3, 4.
B) 2, 4, 5.
C) 1, 2, 3, 4, 5.
D) 1, 3.

The purpose of the altitude alert system is to generate a visual and aural warning to the pilot when the:

A) proximity to the ground becomes dangerous.
B) altimeter setting differs from the standard setting above the transition altitude.
C) airplane altitude differs from a selected altitude.
D) airplane altitude is equal to the decision altitude.

An altitude alerting system must at least be capable of alerting the crew on:

1. Approaching selected altitude.
2. Excessive deviation from selected altitude.
3. Excessive vertical speed.
4. Excessive terrain closure.
5. Abnormal gear/flap combination

A) 1,2,3& 4.
B) 1,2,3,4& 5.
C) 1,2& 3.
D) 1& 2.

Ground proximity warning system:

The GPWS calculator is able to operate in the following modes:

1. excessive descent rate
2. excessive rate of terrain closure
3. excessive angle of attack
4. too high descent attitude
5. loss of altitude after take-off
6. abnormal gear/flaps configuration
7. excessive glidepath deviation

The combination regrouping all the correct statements is:

A) 2, 3, 5, 7.
B) 1 ,2, 5, 6, 7.
C) 1, 2, 4, 6, 7.
D) 3 ,4, 5, 6.

The Ground Proximity Warning Systems (GWPS) Mode 5 is activated when:

A) when the aircraft is significantly below the ILS glidepath.
B) an excessive height loss is experienced after take-off or during go-around.
C) an unsafe terrain clearance situation is experienced, with the aircraft not in the landing configuration.
D) the aircraft is flying into rising terrain.

The Ground Proximity Warning System (GPWS) is a system working according to a height span ranging from:

A) the ground to 500 ft.
B) 50 ft to 2 500 ft.
C) 30 ft to 5 000 ft.
D) the ground to 1 000 ft.

GPWS Mode One gives warning of:

A) unsafe terrain clearance when not in the landing configuration.
B) excessive descent rate.
C) height loss after take-off/missed approach.
D) excessive terrain closure rate.

The GPWS (Ground Proximity Warning System) is active for a height range from:

A) 50 ft to 2 500 ft measured by the radio altimeter.
B) 0 ft to 2 500 ft measured by the radio altimeter.
C) 50 ft to 5 000 ft measured by the radio altimeter.
D) 0 ft to 5 000 ft measured by the radio altimeter.

GPWS mode 3 will operate if altitude loss occurred before you have acquired:

A) 700 ft barometric altitude gain
B) 500 ft terrain clearance
C) 200 ft barometric altitude gain
D) 700 ft terrain clearance

A transport airplane is compelled to carry on board a Ground Proximity Warning System (GPWS). This system will warn the crew in case of:

1. keeping the altitude at a lower level than the one shown in the flight plan entered in the FMS.
2. dangerous ground proximity.
3. loss of altitude during take-off or missed approach.
4. wrong landing configuration.
5. descent below glidepath, within limits.

The combination regrouping all the correct statements is:

A) 2, 5.
B) 2.
C) 1, 3, 4.
D) 2, 3, 4, 5.

The GPWS would provide visual and audible warning to a pilot if the aircraft descended:

A) to below 500' radio altitude with flaps not in the landing position and speed below Mach .28
B) to below 200' radio altitude with flap not in the landing position and speed below Mach .28
C) to below 200' barometric altitude with flap not in the landing position and speed below Mach .28
D) to below 500' radio altitude with flaps not in the landing position and speed below Mach .35

The GPWS uses inputs from:

A) the radio altimeter and the ILS receiver.
B) the radio altimeter, the ILS receiver, the Air Data Computers and the landing gear position indicators.
C) the radio altimeter, the Air Data Computers, the landing gear position indicators and the flap position indicators.
D) the radio altimeter, the Air Data Computers, the Captain's ILS receiver, the landing gear position indicators and the flap position indicators.

The operation of the GPWS (Ground Proximity Warning System) is governed by laws taking the aircraft height into account as well as:

1. the descent rate
2. the climb rate
3. the aircraft configuration
4. the selected engine rpm

The combination of correct statements is:

A) 1, 2, 4.
B) 1, 3, 4.
C) 1, 2, 3.
D) 1, 3.

An aircraft goes around after descending to a radio alt of 190 feet. As power is applied an engine fails and some height is lost. The GPWS would provide an alert when the aircraft had lost about:

A) 100 feet
B) 50 feet
C) 10 feet
D) 20 feet

GPWS mode three gives warning of:

A) excessive descent rate.
B) excessive terrain closure rate.
C) height loss after take-off/missed approach.
D) unsafe terrain clearance when not in the landing configuration.

Which of the following are modes of the GPWS?

1. Excessive sink rate.
2. Altitude loss after T/O or go-around.
3. Excessive Glideslope deviation.
4. High climb rate.
5. Flaps in incorrect position.
6. High altitude descent
7. Stall

A) All 7
B) 1, 2 & 3
C) 1, 2, 3, & 5
D) 1, 3, 5 & 7

What is the GPWS Mode 3 audible alert?

A) 'DON'T SINK, DON'T SINK' continuously.
B) 'DON'T SINK, DON'T SINK' followed by 'WHOOP WHOOP, PULL UP' if the sink rate exceeds a certain value.
C) 'SINK RATE' repeated each 1.5 seconds. Penetrating the second boundary generates an aural alert of 'WHOOP, WHOOP PULL UP'.
D) 'DON'T SINK, DON'T SINK' followed immediately by 'WHOOP WHOOP, PULL UP'.

The requirement to carry a GPWS (Ground Proximity Warning System) concerns aeroplanes which are, depending on their age, weight and passenger capacity:

1. turboprop-powered
2. piston-powered
3. jet-powered

The combination regrouping all the correct statements is:

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

The Ground Proximity Warning Systems (GWPS) Mode 3 is activated when:

A) when the aircraft is significantly below the ILS glidepath.
B) the barometric descent rate is excessive with respect to the aircraft height above the terrain.
C) the aircraft is flying into rising terrain.
D) an excessive height loss is experienced after take-off or during go-around.

A GPWS system requires:

A) Aural signals only.
B) Aural, tactile and visual signals or a combination thereof.
C) Light & bell.
D) Aural signals which may be supplemented by visual signals.

The Ground Proximity Warning mode 5 provides a visual and audible warning to the pilot if the aircraft:

A) descends below 500ft radio altitude with gear retracted
B) sinks more than approximately 10% of accumulated altitude
C) is below 1000 ft radio altitude and more than 1.3 dots below the ILS glidepath
D) descend below 200 ft radio altitude with flaps retracted

Operating range of the GPWS is:

A) 0' to 5000'
B) 0' to 2500'
C) 50' to 5000'
D) 50' to 2500'

The Ground Proximity Warning System (GWPS) Mode 3 is activated when:

A) the barometric descent rate is excessive with respect to the aircraft height above the terrain.
B) when the aircraft is significantly below the ILS glidepath.
C) the aircraft is flying into rising terrain.
D) an excessive height loss is experienced after take-off or during go-around.

21. A ground proximity warning system (GPWS), when mandatory installed on board an aircraft, must in all cases generate:

A) a visual alarm to which a sound alarm can be.
B) at least one sound alarm to which a visual alarm can be added.
C) a sound and visual alarm.
D) a sound alarm or a visual alarm.

With reference to GPWS Mode 4. At or below what radio altimeter altitude is mode 4 activated if not in the landing configuration?

A) 500 ft
B) 790 ft
C) 200 ft
D) 700 ft

If an aircraft is flying (with flaps and landing gear retracted) in proximity to terrain and its GPWS (Ground Proximity Warning System) get activated, because it is detecting that the aeroplane has an excessive rate of descent, the system provides the following aural warning signals:

A) ... TOO LOW, TERRAIN ... (twice) followed by ... TOO LOW GEAR ... (twice).
B) ... DON'T SINK, DON'T SINK ...
C) ... TERRAIN, TERRAIN ... followed by ... WHOOP WHOOP PULL UP ... (twice).
D) ...SINK RATE, SINK RATE ... followed by ... WHOOP WHOOP PULL UP ... (twice).

A Ground Proximity Warning System (GPWS) generates automatically a distinct warning to the flight crew with aural and/or light warning signals in the case of:

1. an excessive rate of descent with respect to terrain
2. a dangerous proximity to the ground
3. a loss of altitude following take-off or go-around
4. an abnormal flight attitude
5. an abnormal landing configuration
6. an abnormal deviation below ILS glide slope

The combination regrouping all the correct statements is:

A) 1, 2, 3, 5 and 6.
B) 1,2 and 4.
C) 3, 4, 5 and 6.
D) 1, 2, 3, 4 and 5.

The Ground Proximity Warning Systems (GWPS) Mode 2 is activated when:

A) the aircraft is flying into rising terrain.
B) when the aircraft is significantly below the ILS glidepath.
C) an excessive height loss is experienced after take-off or during go-around.
D) the barometric descent rate is excessive with respect to the aircraft height above the terrain.

The GPWS (Ground Proximity Warning System) releases a warning in the following cases:

1. excessive rate of descent
2. excessive ground proximity rate
3. loss of altitude after take-off or go-around
4. abnormal gear/flaps configuration
5. excessive deviation under the glidepath
6. abnormal airbrakes configuration

The combination regrouping all the correct statements is:

A) 1, 2, 3, 4, 5, 6.
B) 1, 2, 3, 4, 5.
C) 2, 4, 5, 6.
D) 3, 4, 5, 6.

GPWS mode 2 operates between:

A) 50 ft and 2450 ft AGL
B) 50 ft and 500 ft AGL
C) 50 ft and 1800 ft AGL
D) 50 ft and 700 ft AGL

With reference to GPWS:

A) Mode 4A activates when the aircraft descends below 500 ft barometric altitude at a speed less than .28 Mach with the landing gear retracted
B) In all six modes the audible alerts and warnings are accompanied by the red flashing PULL-UP light
C) Mode 6 re-arms when the aircraft leaves the hard alerting area
D) Mode 4A activates when the aircraft descends below 500 ft radio altitude at a speed less than .35 Mach with the landing gear retracted

The Ground Proximity Warning mode 4A provides a visual and audible warning TOO LOW GEAR to the pilot if the aircraft descends below with landing gear retracted.

A) 500 feet barometric altitude with speed below M 0.35
B) 200 feet radio altitude with speed below M 0.28
C) 500 feet radio altitude with speed below M 0.35
D) 200 feet barometric altitude with speed below M 0.28

The GPWS the alert/warning information is provided by a radio altimeter with:

A) a forward transmitting beam.
B) a downward transmitting beam whose dimensions are in the order of 60° and 30° in the fore/aft and the athwartship axes.
C) a downward transmitting beam whose dimensions are in the order of 30° and 60° in the fore/aft and the athwartship axes.
D) a downwards transmitting radio beam.

GPWS may indicate (list):

1. Excessive sink rate after T/O
2. Excessive descent rate
3. Excessive closure with terrain
4. Ground proximity not in the landing configuration
5. Excessive glide-slope deviation
6. Altitude call-outs
7. Bank Angle alerting

A) 1, 2 & 3
B) 1, 3, 6 & 7
C) 1, 4, 5 & 7
D) All 7

The Ground Proximity Warning Systems (GWPS) Mode 4 is activated when:
A) an unsafe terrain clearance situation is experienced, with the aircraft not in the landing configuration.
B) when the aircraft is significantly below the ILS glidepath.
C) an excessive height loss is experienced after take-off or during go-around.
D) the aircraft is flying into rising terrain.

The following GPWS mode... aural alert will be generated when passing the... boundary: " ... SINK RATE..."
A) I, second.
B) III, second.
C) I, first.
D) IV, first.

The Ground Proximity Warning System (GPWS) generates the following sound signal or signals when the aircraft is sinking after a take-off or a go-around:
A) DON'T SINK always followed by WHOOP WHOOP PULL UP.
B) DON'T SINK repetitive only.
C) DON'T SINK followed by WHOOP WHOOP PULL UP if the sink rate overshoots a second level.
D) WHOOP WHOOP PULL UP repetitive only.

The GPWS calculator receives the following signals:

1. vertical speed
2. radio altimeter height
3. pressure altitude
4. glidepath deviation
5. gear and flaps position
6. angle of attack

The combination regrouping all the correct statements is:
A) 1,3,4,5,6.
B) 1,2,5,6.
C) 2,3,4,6.
D) 1,2,4,5.

If the GPWS (Ground Proximity Warning System) activates, and alerts the pilot with an aural warning " DON'T SINK" (two times), it is because:

A) the aircraft experiences an unexpected proximity to terrain, without landing-flap selected.
B) at too low altitude, the aircraft has an excessive rate of descent.
C) the aircraft experiences an unexpected proximity to the terrain, with landing gear retracted.
D) during take-off or missed approach manoeuvre, the aircraft has started to loose altitude.

The inputs to the GPWS (Ground Proximity Warning System), are:

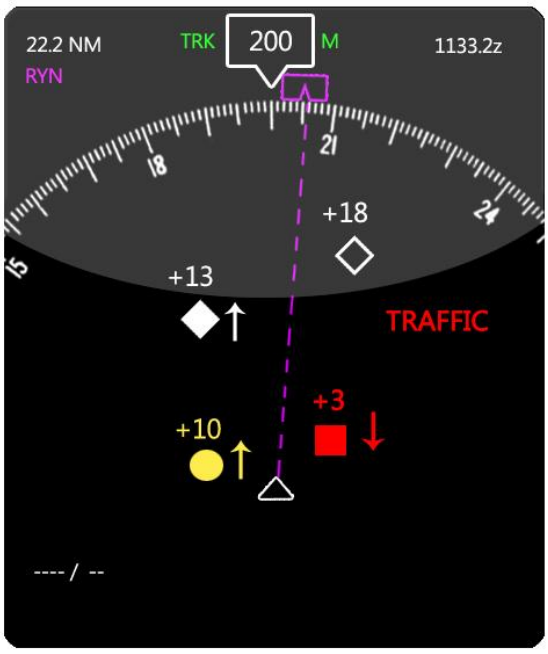
1. Air Data Computer - (Mach number and Vertical Speed)
2. Radio Altimeter
3. NAV/ILS (Glide Slope)
4. NAV/VOR
5. Flap (position)
6. Angle of Attack
7. Landing Gear (position)

The combination of correct statement is:

A) 1,2,3,5,7.
B) 1,2,5,6,7.
C) 1,3,5,6,7.
D) 2,3,4,5,7.

Traffic collision avoidance system TCAS II:

On the following display, the ... is indicated by a white empty diamond.
A) RA intruder
B) TA intruder
C) other intruder
D) proximate intruder



TCAS 2 (Traffic Collision Avoidance System) uses for its operation:
A) the echoes from the ground air traffic control radar system.
B) the echoes of collision avoidance radar system especially installed on board.
C) the replies from the transponders of other aircraft.
D) both the replies from the transponders of other aircraft and the ground-based radar echoes.

On a TCAS2 (Traffic Collision Avoidance System) the preventive " resolution advisory" (RA) is a " resolution advisory" :
A) that advises the pilot to avoid certain deviations from the current vertical rate but does not require any change to be made to that rate
B) asking the pilot to modify the heading of his aircraft
C) asking the pilot to modify the speed of his aircraft
D) asking the pilot to modify effectively the vertical speed of his aircraft

The TCAS (Traffic Collision Avoidance System) is a proximity alarm system which detects a " traffic" when the conflicting traffic is equipped with a:
A) serviceable weather radar.
B) DME system.
C) serviceable SSR transponder.
D) SELCAL system.

In the event of a conflict, the TCAS (Traffic Collision Avoidance System) will give information such as:
A) climb/descent.
B) turn left/turn right.
C) too low terrain.
D) glide slope.

On the display of a TCAS 2 (Traffic alert and Collision Avoidance System), a resolution advisory (RA) is represented by:
A) a white or cyan solid lozenge.
B) an amber solid circle.
C) a red full square.
D) a white or cyan empty lozenge.

Where is TCAS resolution information displayed?
A) On the EADI
B) On a separate TCAS display
C) On the VSI
D) All these solutions are possible

TCAS 2 when fitted with mode S transponder may give:
A) RA only.
B) TA and RA in horizontal plane.
C) TA and RA in vertical plane.
D) TA only.

TCAS II obtains information from:
1. Pressure encoding from mode S transponder
2. Radio altimeter
3. Aircraft specific configurations
4. Inertial reference unit (IRU)

A) 1, 2, & 3
B) 1, & 2
C) 1, 2, & 4
D) 1, 2, 3, & 4

The TCAS II data display devices can be in the form of:
1. a specific dedicated screen
2. a screen combined with the weather radar
3. a variometer represented on a liquid crystal screen which allows the display of Traffic Advisory (TA) and Resolution Advisory (RA)
4. an EFIS (Electronic Flight Instrument System) screen

The combination regrouping all the correct statements is:
A) 1, 2 and 3.
B) 1, 2, 3 and 4.
C) 1 and 3.
D) 3 and 4.

On a TCAS2 (Traffic Collision Avoidance System), a corrective " resolution advisory" (RA) is a " resolution advisory" :

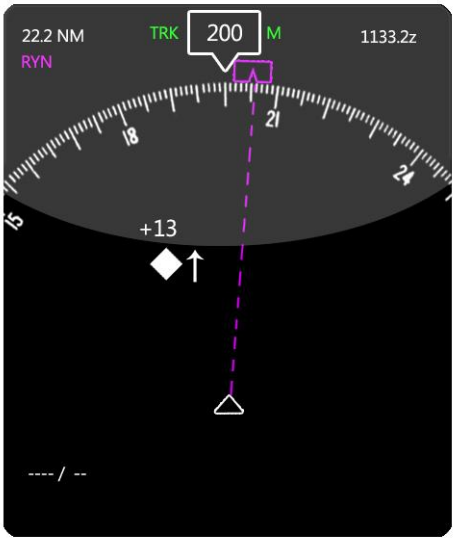
A) asking the pilot to modify the speed of his aircraft
B) asking the pilot to modify the heading of his aircraft
C) asking the pilot to modify effectively the vertical speed of his aircraft
D) which does not require any action from the pilot but on the contrary asks him not to modify his current vertical speed rate

The principle of the TCAS (Traffic Collision Avoidance Systems) is based on the use of:

A) air traffic control radar systems
B) airborne weather radar system
C) transponders fitted in the aircraft
D) FMS (Flight Management System)

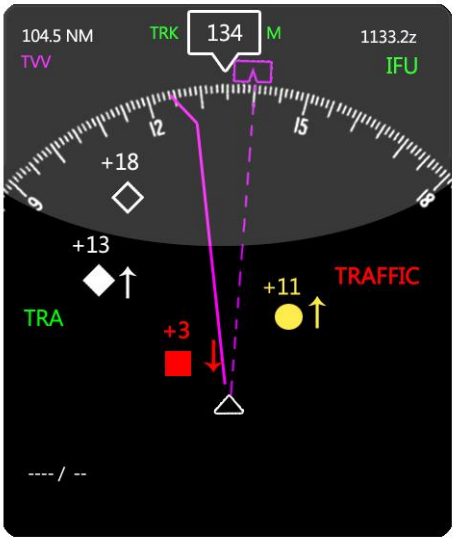
On the following display, the ... is indicated by a white filled diamond.

A) proximate intruder
B) TA intruder
C) RA intruder
D) other intruder



The relative altitude of the TA intruder is... and the TA intruder is...

A) 1100ft above your airplane, climbing at a vertical speed of at least 500ft/min.
B) 500ft below your airplane, descending at a vertical speed of at least 500ft/min.
C) above your airplane, climbing at a vertical speed of 1100ft/min.
D) 1100ft above your airplane, climbing at a vertical speed of at least 1000ft/min.



The principle that TCAS uses is:
A) Transponders in the aircraft.
B) ATC radar.
C) RT communications.
D) Primary radar.

What is the correct response to a TCAS RA?
A) Follow ATC instructions as these override TCAS RA's.
B) Request permission to manoeuvre from ATC.
C) Smoothly and immediately follow the climb or descent commands.
D) Turn 900 and smoothly and immediately follow the climb or descent commands.

The use of TCAS (Traffic Collision Avoidance System) for avoiding an aircraft in flight is now general. TCAS uses for its operation:
A) both the replies from the transponders of other aircraft and the ground-based radar echoes
B) the echoes from the ground air traffic control radar system
C) the replies from the transponders of other aircraft
D) the echoes of collision avoidance radar system especially installed on board

The aural messages provided by TCAS II are:
A) Climb; Descend; Increase climb; Increase Descent
B) Turn left, Turn Right, Increase Turn, Decrease Turn
C) Climb left; Climb right; Descend left; Descend right
D) Threat, Climb; Threat, Descend

On receipt of a TCAS RA your action is to:
A) initiate the required manoeuvre immediately.
B) make a note of the details.
C) request a flight clearance deviation from ATC.
D) do nothing until a TA is received.

With reference to Traffic Collision Avoidance Systems. The difference between TCAS I and II is that:
A) TCAS II can provide 'Traffic Advisories' and 'Resolution Advisories' while TCAS I can only provide 'Traffic Advisories'
B) TCAS II can only be fitted to aircraft which are equipped with EFIS
C) TCAS I can be fitted to aircraft which carry transponders with Mode A only while TCAS II can only be fitted to aircraft whose transponders include either Mode C or Mode S
D) TCAS II can only be fitted to large aircraft which carry more than 30 passengers. While TCAS I can be fitted to any aircraft

21.An " intruding traffic advisory" is represented on the display system of the TCAS 2 (Traffic Collision Avoidance System) by displaying:

A) a red full square.
B) a blue or white full lozenge.
C) a blue or white empty lozenge.
D) a yellow full circle.

A " close traffic advisory" is displayed on the display device of the TCAS 2 (Traffic Collision Avoidance System) by:

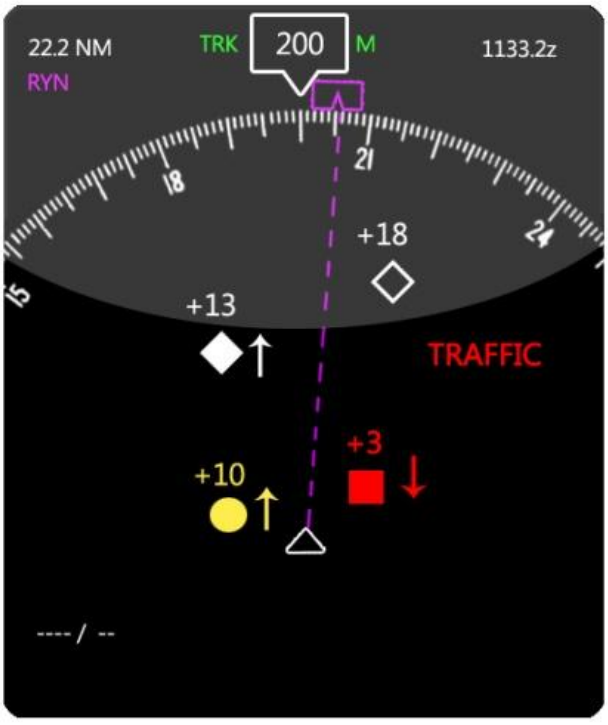
A) a blue or white full lozenge.
B) a red full square.
C) a blue or white empty lozenge.
D) an orange full circle.

What corrective action is given by TCAS?

A) Climb or descend.
B) Turn left or right.
C) Contact ATC.
D) Turn then climb or descend.

Regarding the RA on the following EADI, the intruder is:

A) below your aircraft and descending at 1100 feet per minute or more.
B) 300 feet above your aircraft and descending at 500ft/min or more.
C) 1100 ft above your aircraft and climbing at 500 feet per minute or more.
D) there is no RA at this time.



The TCAS 1 (Traffic Collision Avoidance System) provides:

1. traffic information
2. horizontal resolution (RA: Resolution Advisory)
3. vertical resolution (RA: Resolution Advisory)
4. ground proximity warning

The combination regrouping all the correct statements is:

A) 1.
B) 1, 2, 3, 4.
C) 1, 2.
D) 1, 2, 3.

Which is the correct input to TCAS 2?

A) Mode 'A' transponder which gives TA and RA's.
B) Mode 'C' transponder which co-ordinates avoidance manoeuvres.
C) Mode 'C' and 'S' transponders which co-ordinate avoidance manoeuvres.
D) Mode 'S' transponder which co-ordinates avoidance manoeuvres.

When the intruding aircraft is equipped with a serviceable mode C transponder, the TCAS II (Traffic Collision Avoidance System) generates a:

A) " traffic advisory" and horizontal " resolution advisory" .
B) " traffic advisory" and vertical " resolution advisory" .
C) " traffic advisory" , vertical and horizontal " resolution advisory" .
D) " traffic advisory" only.

When an intruder aircraft has no Altitude Reporting facility (Mode A transponder only). TCAS 2 can give:

A) a corrective RA only.
B) TA followed by preventative and corrective RA's.
C) no useful information.
D) TA only.

When the intruding aircraft is equipped with a transponder without altitude reporting capability, the TCAS (Traffic Collision Avoidance System) issues a:

A) " traffic advisory" and vertical " resolution advisory" .
B) " traffic advisory" , vertical and horizontal " resolution advisory" .
C) " traffic advisory" and horizontal " resolution advisory" .
D) " traffic advisory" only.

A resolution advisory is represented on the display system of the TCAS 2 by a:

A) blue or white empty lozenge.
B) blue or white full lozenge.
C) red full circle.
D) red full square.

Which of the following is a preventative RA?
A) Traffic, traffic.
B) Monitor vertical speed.
C) Climb, climb now.
D) Turn left.

The TCAS (Traffic Collision Avoidance System) computer receives information:
1. about the pressure altitude through the mode S transponder
2. from the radio-altimeter
3. specific to the airplane configuration
4. from the inertial units

The combination regrouping all the correct statements is:
A) 1, 2, 4.
B) 1, 2, 3, 4.
C) 1, 2.
D) 1, 2, 3.

When an intruder aircraft has no Altitude Reporting facility, i.e. Mode equipped with 'A' transponder only, TCAS can only give:
A) TA only.
B) corrective RA only.
C) TA followed by a Preventative RA.
D) preventative RA only.

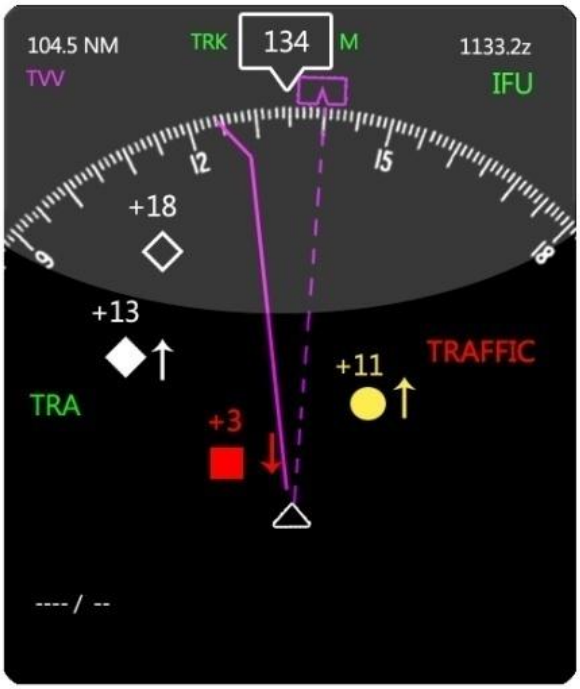
Which of the following statements concerning TCAS is correct?
A) TCAS 2 provides avoidance instructions in the vertical and horizontal planes.
B) TCAS 2 requires Mode S to be fitted to other aircraft.
C) TCAS 2 provides advice on which way to turn.
D) TCAS 2 cannot provide information on non-SSR equipped intruders.

A " TCAS II" (Traffic Collision Avoidance System) provides:
A) the intruder relative position and possibly an indication of a collision avoidance manoeuvre within both the vertical and horizontal planes.
B) a simple intruding airplane proximity warning.
C) the intruder relative position and possibly an indication of a collision avoidance manoeuvre within the horizontal plane only.
D) the intruder relative position and possibly an indication of a collision avoidance manoeuvre within the vertical plane only.

The TCAS (Traffic Collision Avoidance System) gives avoidance resolutions:
A) based on speed control.
B) only in the vertical plane.
C) in horizontal and vertical planes.
D) only in the horizontal plane.

On the following display, the ... is indicated by a yellow circle.

A) RA intruder
B) proximate intruder
C) TA intruder
D) other intruder



The TCAS 2 (Traffic Collision Avoidance System) provides:

1. traffic information (TA: Traffic Advisory)
2. horizontal resolution (RA: Resolution Advisory)
3. vertical resolution (RA: Resolution Advisory)
4. ground proximity warning

The combination regrouping all the correct statements is:

A) 1, 2, 3.
B) 1, 2, 3, 4.
C) 1, 2.
D) 1, 3.

With reference to Traffic Collision Avoidance Systems:

A) RAs must never be disregarded.
B) RAs may be disregarded only when the pilot visually identifies the potentially conflicting traffic and decides that no deviation is necessary.
C) RAs may be disregarded only when the pilot visually identifies the potentially conflicting traffic and decides that no deviation is necessary and has the clearance confirmed by ATC.
D) RAs may be disregarded only when the pilot visually identifies the potentially conflicting traffic and decides that no deviation is necessary and has advised ATC of the other aircraft's proximity.

Concerning the TCAS (Traffic Collision Avoidance System):

A) In one of the system modes, the warning : " TOO LOW TERRAIN" is generated
B) No protection is available against aircraft not equipped with a serviceable SSR transponder
C) In one of the system modes, the warning : " PULL UP" is generated
D) Resolution advisor (RA) must not be followed without obtaining a clearance from ATC

Over speed Warning:

Alarms are standardised and follow a code of colours. Those requiring action but not immediately, are signalled by the colour:

A) green.
B) flashing red.
C) amber.
D) red.

Stall Warning System:

The angle of attack transmitters placed laterally on the forward part of the fuselage supply an electrical signal indicating:

1. the angular position of a wind vane
2. a differential pressure in a probe, depending on the variation of the angle of attack
3. a differential pressure in a probe, depending on the variation of the speed

The combination regrouping all the correct statements is:

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

The main input data to the Stall Warning Annunciator System are:

1. Mach Meter indication
2. Angle of Attack
3. Indicate Airspeed (IAS)
4. Aircraft configuration (Flaps/Slats)

The combination regrouping all the correct statements is:

A) 1, 2.
B) 2, 4.
C) 2, 3.
D) 1, 4.

The stick shaker calculator receives the following information:

1. mass of the airplane
2. angle of attack
3. wing flap deflection
4. position of the landing gear
5. total air temperature
6. pressure altitude

The combination regrouping all the correct statements is:

A) 1, 2, 3, 4, 5, 6.
B) 1, 2, 3, 4.
C) 2, 3, 5.
D) 2, 3.

A stall warning system fitted to a large aircraft will always include:

A) Various inputs including landing gear micro switch, a warning module and an aural warning.
B) Stick shakers and/or stick push.
C) Various inputs including EGT, a warning module and an aural warning.
D) Various inputs including speed brake position, a warning module and a visual or aural warning.

The calculator combined with the stick shaker system of a modern transport airplane receives information about the:

1. angle of attack
2. engine R.P.M.
3. configuration
4. pitch and bank attitude
5. sideslip

The combination regrouping all the correct statements is:

A) 1 and 3.
B) 1, 2, 3 and 4.
C) 1, 2, 3, 4 and 5.
D) 1 and 5.

What are the inputs to a modern jet transport aeroplanes stall warning system?

1. Angle of Attack
2. Engine RPM
3. Configuration
4. Pitch and bank information
5. Control surface position
6. Airspeed vector

A) 1, 2, 3 & 4
B) 2, 4, 5, & 6
C) 2, 3, 4 & 5
D) 1, 2, 3 & 6

The aerodynamic angle of incidence (angle of attack) is:

A) the angle between the wing and the chord line
B) the angle between the longitudinal axis and the relative air flow
C) the angle between the chord line of the wing and the lateral axis
D) the angle between the chord line of the wing of an aircraft and the direction of the relative air flow

In some configurations, modern aircraft do not respect the regulatory margins between stall and natural buffet.
The warning system supplies the corresponding alarm. The required margin related to the stall speed is:

A) 3%.
B) 5%.
C) 7%.
D) 10%.

The angle of attack transmitter provides an electric signal varying with:

1. the angular position of a wind vane
2. the deviation between the airplane flight attitude and the path calculated by the inertial unit
3. a probe differential pressure depending on the variation of the angle of attack

The combination regrouping all the correct statements is:

A) 1 and 3.
B) 2 and 3
C) 1 and 2
D) 1 only

The angle of attack sensor system gives accurate outputs:

A) At speeds above approximately 200 kt RAS only
B) At low altitudes only
C) At angles of attack from zero to +8° only
D) Virtually down to stalling speeds

The oncoming stall of a large transport airplane appears in the form of:

A) a natural buffeting which occurs prior to the simulated buffeting.
B) an orange light on the warning display.
C) control stick vibrations simulating natural buffeting.
D) a bell type warning.

Inputs to the stall warning system of an airliner are:

A) IAS only.
B) angle of attack, IAS and flap/slat position.
C) Mach number and IAS.
D) slat/flap position only.

The stall warning system of a large transport airplane includes:

1. an angle of attack sensor
2. a computer
3. a transmitter originating from the anemometer
4. an independent pitot probe
5. a transmitter of the flap/slat position indicating system

The combination regrouping all the correct statements is:

A) 1, 3, 4, 5
B) 1, 2, 4, 5
C) 1, 2, 5.
D) 2, 3, 4

The inputs to the stall warning system are:

A) angle of attack
B) IAS
C) slat/flap position
D) all of the above

The input to a basic stall warning system is:

A) Angle of attack.
B) Mno.
C) Slat/flap position.
D) IAS.

A stall warning system is based on a measure of:

A) groundspeed.
B) attitude.
C) airspeed.
D) aerodynamic incidence.

The stall warning system receives information about the:

1. airplane angle of attack
2. airplane speed
3. airplane bank angle
4. airplane configuration
5. load factor on the airplane

The combination regrouping all the correct statements is:

A) 2, 3, 4, 5
B) 1, 3, 5
C) 1, 4
D) 1, 2, 3, 4, 5

Which of these signals are inputs, at least, in the stall warning computers?

A) Angle of attack and flaps and slats deflection.
B) Angle of attack, flaps deflection and EPR.
C) Angle of attack and flaps and spoilers deflection.
D) Angle of attack, flaps deflection, EPR and N1.

Flight Data Recorder:

A FDR fitted to an aircraft of over 5700 kg after the 1st of April 1998 must record and store data during:

A) at least the last 15 hours.
B) at least the last 10 hours.
C) at least the last 25 hours.
D) at least the last 30 minutes.

Flight recorder duration must be such that flight data, cockpit voice and sound warnings may respectively be recorded during at least:

A) 24 hours for flight data, 60 minutes for cockpit voices and warnings horns.
B) 48 hours for flight data, 60 minutes for cockpit voices and warnings horns.
C) 20 hours for flight data, 15 minutes for cockpit voices and warnings horns.
D) 25 hours for flight data, 30 minutes for cockpit voices and warnings horns

What does a FDR record when combined with a CVR?

1. Cockpit voice
2. Radio
3. Public addresses from the cockpit
4. Cabin voice

A) All 4
B) 1, 2 & 3
C) 1 & 2
D) 2 & 4

Except for airplanes under 5,7 t airworthiness certificate of which is subsequent to 31 march 1998, a flight data recording system must be able to store the recorded data for a minimum of the last:

A) 60 minutes.
B) 30 minutes.
C) 10 hours.
D) 25 hours.

The flight data recorder must start data recording automatically:

A) when taking-off.
B) when lining up.
C) when the landing gear is retracted.
D) before the airplane is able to move by under its own power.

In accordance with (ICAO) Annex 6 part I, the flight data recorder is to be located in the aircraft:

A) as far forward as practicable.
B) as far to the rear as practicable.
C) at the right or left wing tip.
D) as near to the landing gear as practicable.

Where in the aircraft does JAR require the FDR to be fitted?
A) In the undercarriage bay.
B) In the wings.
C) At the front.
D) At the back.

According to JAR-OPS, when must the DFDR on a 12 seat turbo prop a/c begin recording?
A) At commencement of the taxi to turning off the runway
B) From before the aircraft is capable of moving under its own power to after the a/c is no longer capable of moving under its own power
C) Switch on until switch off
D) From lift off until the weight on wheels switch is made on landing

Where in the aircraft should the FDR be fitted according to the JAA regulations?
A) At the rear of the aircraft.
B) In the nose landing gear bay.
C) In the wings.
D) In the main undercarriage bay.

A FDR fitted to an aircraft of over 5700kgs after April 98 must record for:
A) 25 hours.
B) 30 minutes.
C) 60 minutes.
D) 10 hours.

The Flight Data Recorder actually starts running:
A) at the beginning of the T/O run.
B) when a/c lines up on runway.
C) when the gear is retracted.
D) before the a/c starts moving under its own power.

The flight data recorder must automatically stop data recording when the:
A) landing gear is extended and locked.
B) airplane clears the runway.
C) airplane cannot any longer move by its own power.
D) main gear shock strut compresses when touching the runway.

The flight data recorders must preserve the required data of the last:
A) 25 hours of operation.
B) 30 minutes of operation.
C) 48 hours of operation.
D) flight.

Cockpit Voice Recorder:

According to the JAR-OPS regulations, the Cockpit Voice Recorder of a 50 seat multi-engined aircraft having been granted the airworthiness certificate after 1st April 1998 will record:

1. the radiotelephonic communications transmitted or received by the cockpit crew
2. the audio environment of the cockpit
3. the cabin attendants communications in the cabin via the interphone
4. the flight crew members communications in the cockpit via the interphone
5. the flight crew members communications in the cockpit via the public address system
6. the audio signals identifying the navigation or approach aids

The combination regrouping the correct statements is:

A) 1.
B) 1,2,4,5,6.
C) 1,3,4,5.
D) 1,2,3,4,5,6.

An aircraft that weights more than 5,700 kg and was registered after 1 April 1998, the FDR and CVR must record respectively:

A) 10 hr. and 2 hr.
B) 25 hr. and 2 hr.
C) 10 hr. and 1hr.
D) 25 hr. and 1 hr.

The voice recorder records on four different channels the following information:

1. aural warnings
2. radio communications
3. conversations between the crew members through the cockpit interphone
4. announcements to the passengers

The combination regrouping all the correct statements is:

A) 1, 2, 3, 4.
B) 1, 2, 3.
C) 1, 3.
D) 1, 4.

Cockpit voice recorders shall record the following:

A) All speech and sound in cockpit.
B) Only the communication on the public address installation.
C) All air to ground communication.
D) All speech and sound in cockpit, signals from radio navigation aids and radio communication.

According to JAR OPS when must the CVR on a 50 seat turbo prop a/c begin recording?

A) Switch on to switch off.
B) From lift off to when the weight on wheels switch is made on landing.
C) At commencement of the taxi to turning off the runway.
D) From before the a/c is capable of moving under its own power to after the a/c is no longer capable of moving under its own power.

What are the JAR OPS requirements for the CVR to start and stop recording?

A) From the time when the aircraft is first able to move under its own power until 5 minutes after it is no longer able to do so.
B) From the time when the aircraft is first able to move under its own power until it is no longer able to do so.
C) From the time the first engine is started and stops 5 minutes after the last engine is shutdown.
D) From the time when the first engine is started and stops 5 minutes after the APU is shutdown.

The CVR (Cockpit Voice Recorder) includes:

1. a microphone
2. a recorder in compliance with the shock and fire resistance standards
3. an independent battery
4. a flight data recorder

The combination regrouping all the correct statements is:

A) 1, 2, 3.
B) 1, 2.
C) 1, 2, 4.
D) 1, 3.

A cockpit voice recorder (CVR) will record:

1. the information exchanged by the cabin crew
2. the conversations between the crew members and voice communications transmitted from or received on the flight deck by radio
3. the announcements made via the public address even if it has not been selected
4. the conversations and alarms audible in the cockpit
5. the captain conversations only

The combination regrouping all the correct statements is:

A) 2, 4.
B) 3, 4.
C) 1, 2.
D) 1, 5.

What are the components of a CVR?

1. Microphone
2. Crash/Fire resistant construction
3. Independent battery
4. A Flight data recorder

A) 1,2,3& 4
B) 1& 2
C) 1& 4
D) 1,2& 4

According to the JAR-OPS regulations, the Cockpit Voice Recorder of a 50 seat multi-engined aircraft, having been granted an airworthiness certificate after 1st April 1998, shall start recording:

A) Automatically prior to the aircraft moving under its own power until flight completion when the aircraft is no longer able to move under its own power.
B) When the pilot selects the " CVR: ON" during engine start until the pilot selects the " CVR: OFF" during the engine shut down.
C) From the first radio contact with Air Traffic Control until radio shutdown after the flight.
D) Automatically when the wheels leave the ground until the moment when the wheels touch the ground again.

Power plant and system monitoring

Pressure gauges:

The engine pressure ratio (EPR) is computed by:
A) dividing compressor discharge pressure by turbine discharge pressure.
B) multiplying compressor discharge pressure by turbine inlet pressure.
C) multiplying compressor inlet pressure by turbine discharge pressure.
D) dividing turbine discharge pressure by compressor inlet pressure.

If a manifold pressure gauge consistently registers atmospheric pressure, the cause is probably:
A) ice in induction system.
B) fuel of too low volatility.
C) too high float level.
D) leak in pressure gauge line.

The " Bourdon tube" is used to measure:
A) pressure
B) vibrations
C) temperature
D) fuel flow

A manifold pressure gauge of a piston engine measures:
A) absolute air pressure entering the carburettor
B) vacuum in the carburettor
C) fuel pressure leaving the carburettor
D) absolute pressure in intake system near the inlet valve

If the intake probe of an EPR system becomes blocked with ice this will cause the EPR gauge to:
A) be unaffected.
B) under-read during takeoff.
C) over-read during takeoff.
D) read zero.

Among these instruments, which one uses aneroid capsules?
A) oil thermometer.
B) fuel pressure sensor.
C) oil pressure sensor.
D) air intake pressure sensor.

Among the following engine instruments, the one operating with an aneroid pressure diaphragm is the:
A) manifold pressure gauge.
B) oil pressure gauge.
C) oil thermometer.
D) fuel pressure gauge.

In a mechanical oil pressure gauge the sensing element is:
A) a bourdon tube.
B) a liquid capillary.
C) an aneroid wafer.
D) a helical bimetallic spring.

During the take-off run , the effect of increasing airspeed is to cause the EPR indication to:
A) increase and subsequently decrease.
B) decrease.
C) remain constant.
D) increase.

What type of sensor is used to measure the output of a low pressure booster pump?
A) Bourdon tube.
B) Aneroid capsule.
C) Bellows.
D) Differential capsule.

Different pressure sensors are used according to the intensity of the pressure measured (low, medium or high).
Classify the following sensors by order of increasing pressure for which they are suitable:

1. bellows type
2. Bourdon tube type
3. aneroid capsule type

A) 1,2,3
B) 2,1,3
C) 3,1,2
D) 3,2,1

The probe used to measure the air intake pressure of a gas turbine engined power plant is:
A) a bellows sensor.
B) an aneroid capsule.
C) a differential capsule.
D) a Bourdon tube.

A " Bourdon Tube" is used in:
A) turbine temperature probes.
B) pressure sensors.
C) vibration detectors.
D) smoke detectors.

In a Manifold Air Pressure Gauge:
A) Two bellows are used, one is open to the induction manifold and the other is evacuated and sealed
B) One bellow is used and is open to the induction manifold
C) Two bellows are used, one is evacuated and sealed and connected to the induction manifold and the other is open
D) Two bellows are used, one is open to the induction manifold and the other is open to the atmosphere

The pressure probe used to measure the pressure of a low pressure fuel pump is:
A) an aneroid capsule.
B) a Bourdon tube.
C) a differential capsule.
D) a bellows sensor.

The manifold pressure gauge measures:
A) absolute pressure.
B) relative pressure.
C) differential pressure.
D) gauge pressure.

Zero boost is indicated on a Manifold Air Pressure Gauge By:
A) 29.92 inches of mercury
B) 29.92%
C) 0 inches of mercury
D) 0%

Absolute pressure is:
A) the difference between two pressures.
B) measured from zero pressure (vacuum).
C) the amount the pressure has been raised with reference to a initial level.
D) pressure in a confined area.

Temperature gauges:

The main advantage of a ratiometer type temperature indicator is that it:
A) can operate without an electrical power supply.
B) carries out an independent measurement of the supply voltage.
C) is very simple.
D) is very accurate.

A millivoltmeter measuring the electromotive force between the " hot junction" and the " cold junction" of a thermocouple can be directly graduated in temperature values provided that the temperature of the:
A) cold junction is maintained at 15 ° C.
B) cold junction is maintained constant.
C) hot junction is maintained constant.
D) hot junction is maintained at 15 ° C.

The temperature measured by the CHT (Cylinder Head temperature) probe is the:
A) temperature of the exhaust gases.
B) temperature of the carburettor to be monitored when the outside air temperature is between -5° C and 10° C.
C) temperature within the hottest cylinder, depending on its position in the engine block.
D) average temperature within the whole set of cylinders.

The white sector of the arc of a temperature gauge corresponds to:
A) a forbidden operating range.
B) a normal operating range.
C) an exceptional operating range.
D) a special operating range.

Given:
1. M is the Mach number
2. Ts is the static temperature
3. Tt is the total temperature.

A) $Ts = Tt.(1+0.2.\ M^2)$
B) $Ts = Tt\ /(1+0.2.\ M^2)$
C) $Ts = Tt.(0.2.\ M^2)$
D) $Ts = Tt/(\ 0.2\ M^2)$

The measurement of the turbine temperature or of the EGT (Exhaust Gas Temperature) is carried out at the:
A) combustion chamber outlet.
B) high pressure turbine outlet.
C) high pressure chamber intake.
D) combustion chamber intake.

Iron and brass are commonly used in bimetallic thermometers, because:
A) they have two different values of flexional strength.
B) they have two different electrical resistance's when the temperature changes.
C) they have two different coefficients of linear expansion.
D) they have two different weights.

To obtain total air temp. (TAT) the airflow to the sensor:
A) must be laminar without any turbulence or vortex.
B) must be brought to rest with the removal of the ram rise.
C) must be brought to rest without addition or removal of heat.
D) must not be submitted to adiabatic compression and friction.

Where very accurate temperature indication is required the indicator used will be:
A) moving coil.
B) direct reading.
C) ratiometer.
D) galvanometer.

Which of these statements is true?
A) The probes used for SAT measurements have a recovery factor of around 1.00.
B) The probes used for SAT measurements have a recovery factor ranging from 75 to 90 percent.
C) The probes used for TAT measurements are directly connected to the temperature indicator instruments.
D) The probes used for SAT measurements have a recovery factor of 0.75 to 0.90, while the probes used for TAT measurements have a recovery factor of around 1.00.

Converted into degrees Celsius -40° F is:
A) 40° C.
B) 56.5° C.
C) 108° C.
D) 20° C.

The yellow sector of the temperature gauge corresponds to:
A) an exceptional operating range.
B) a frequent operating range.
C) a normal operating range.
D) a forbidden operating range.

Cylinder head temperature measurement works on the principle of:
A) wheatstone bridge.
B) differential expansion.
C) thermocouple.
D) ratiometer.

A direct reading aircraft thermometer usually consists of a bimetallic element protruding into the airstream.
Movement of the pointer over the temperature scale will depend on:
A) different coefficients of expansion of the two metals.
B) increase in adiabatic cooling as airspeed increases.
C) increase in pressure as airspeed increases.
D) difference in electrical resistance of the two metals.

Total Air Temperature (TAT) is:
A) higher or equal to Static Air Temperature (SAT), depending on mach number and SAT.
B) higher or equal to Static Air Temperature (SAT), depending on altitude and SAT.
C) lower than Static Air Temperature (SAT), depending on altitude and SAT.
D) lower than Static Air Temperature (SAT), depending on mach number and SAT.

The ram air temperature (RAT) is defined as:
A) TAT plus the ram rise
B) TAT minus the ram rise
C) SAT plus the ram rise
D) SAT minus the ram rise

The measurement of SAT (static air temperature) by direct means is not possible on some (fast) aircraft because:
A) of the effects from adiabatic compression and friction
B) the statement is not true
C) of the effects from adiabatic friction
D) of the effects from adiabatic compression

The sensors used to measure the exhaust gas temperature on an airplane equipped with turbojets are:
A) thermocouples.
B) based on metallic parts whose expansion/contraction is measured.
C) based on metallic conductors whose resistance increases linearly with temperature.
D) capacitors whose capacity varies proportionally with temperature.

Total Air Temperature (TAT) is equal to:
A) RAT + ram
B) SAT + ram rise.
C) RAT + friction rise.
D) SAT - RAT.

The measurement of exhaust gas temperature (EGT) is normally based upon the principle of:
A) voltage generation in a thermocouple.
B) expansion of a liquid in a capillary.
C) the tension in a helical bimetallic spring.
D) expansion of a solid.

21. Non-electrical temperature measurements may be done by:

A) expansion of a gas.
B) expansion of a liquid.
C) expansion of a solid.
D) all of the above.

In transport category airplanes, the temperatures are generally measured with:

1. resistance thermometers
2. thermocouple thermometers
3. reactance thermometers
4. capacitance thermometers
5. mercury thermometers

The combination regrouping all the correct statements is:

A) 1, 2
B) 1, 2, 5
C) 1, 3, 4, 5
D) 2, 3

Which of the following are used to measure temperature in a modern passenger aircraft:

1. Thermocouple
2. Resistance
3. Reactance
4. Mercury

A) 3 & 4
B) 1 & 2
C) 1,2,3,4
D) 1,2 & 4

Remote indicating electrical thermometers work on the principle of:

A) Expansion of metal with increase in temperature
B) Change of induced current with change in temperature
C) Change in electrical resistance with change in temperature
D) Reduction in temperature due to lapse rate

EGT is:

A) Engine gas turbine
B) Exhaust gas temperature
C) Exhaust gas turbine
D) Engine gas temperature

The recovery factor of a " flush bulb" temperature sensor generally varies from:

A) 0.75 to 0.90.
B) 0.35 to 0.50.
C) 0.50 to 0.75.
D) 0.90 to 1.00.

The red pointer which is normally on the red line on the EGT (Exhaust Gas Temperature) indicators:
A) moves when the corresponding value is exceeded and remains positioned at the maximum value that has been reached.
B) allows the display of the parameter value to be adopted during take-off.
C) shows the vibration level of the engine under consideration.
D) shows the limit value not to be exceeded.

To permit turbine exit temperatures to be measured, gas turbines are equipped with thermometers which work on the following principle:
A) liquid expansion.
B) bi-metallic strip.
C) gas pressure.
D) thermocouple.

The airplane outside air temperature " probe" measures the:
A) "static" air temperature minus kinetic heating effects in order to obtain the total temperature.
B) "static" air temperature minus compressibility effects in order to obtain the total temperature.
C) "total" air temperature minus kinetic heating effects in order to obtain the static temperature.
D) "total" air temperature minus compressibility effects in order to obtain the static temperature.

The static air temperature (SAT) is:
A) a differential temperature expressed in degrees Kelvin.
B) a relative temperature expressed in degrees Kelvin.
C) an absolute temperature expressed in degrees Celsius.
D) a relative temperature expressed in degrees Celsius.

If one probe of a multi-sensor T.G.T. system failed , the reading would:
A) fall to zero.
B) decrease by 20 - 30 degrees C.
C) be practically unaffected.
D) increase by 20 - 30 degrees C.

A thermocouple can be made of:
A) two metal conductors of the same nature fixed together at two points.
B) two metal conductors of different nature fixed together at two points.
C) a three wire coil.
D) a single wire coil.

The total air temperature (TAT) is always:
A) lower than Static Air Temperature (SAT) depending on the altitude.
B) higher than Static Air Temperature (SAT) depending on the altitude.
C) lower than Static Air Temperature (SAT) depending on the Calibrated Air Speed (CAS).
D) higher than Static Air Temperature (SAT) depending on the Calibrated Air Speed (CAS).

The errors of remote indicating electrical thermometers are:
A) instrument, icing, position
B) instrument, heating, position
C) instrument, icing, pressure
D) instrument, environmental, heating

The electromotive force of a thermocouple is not modified if one or several intermediate metals are inserted in the circuit provided that:
A) these metals are maintained at a temperature higher than that of the cold source.
B) these metals are not the same as those constituting the thermocouple.
C) contact points are maintained at equal temperature between these different metals.
D) these metals are maintained at a temperature lower than that of the cold source.

A thermocouple type thermometer consists of:
A) two metal conductors of different type connected at one point.
B) two metal conductors of the same type connected at two points.
C) a Wheatstone bridge connected to a voltage indicator.
D) a single-wire metal winding.

A cylinder head temperature measuring system in a piston engine has a sensor:
A) One in the coolest running cylinder.
B) One in each cylinder head to average the temperature.
C) One in each of the two banks of cylinders in a horizontally opposed engine.
D) One in the hottest running cylinder.

The advantage of a ratiometer is:
A) is calibrated at sea level and will be inaccurate at high altitudes.
B) does not suffer from errors due to variations of supply voltage.
C) it requires an ac voltage and therefore has no commutator.
D) doesn't require an electrical supply.

In order to measure temperature the cylinder head temperature (CHT) gauge utilises a:
A) thermocouple consisting of two dissimilar metals.
B) bourdon tube.
C) ratiometer circuit.
D) wheatstone bridge circuit.

RPM Indicator:

The operating principle of the " induction" type of tachometer is to measure the:

A) frequency of the electric impulse created by a notched wheel rotating in a magnetic field.
B) magnetic field produced by a dynamo or an alternator.
C) rotation speed of an asynchronous motor energized by an alternator.
D) electromotive force (EMF) produced by a dynamo or an alternator.

The signal supplied by a transmitter fitted with a magnetic sensor, connected to an RPM indicator is :

A) a DC voltage varying with the RPM ; the indicator is a simple voltmeter with a rev/min. scale
B) an AC voltage, the frequency of which varies with the RPM; the indicator converts the signal into square pulses which are then counted
C) an AC voltage varying with the RPM ; the indicator rectifies the signal via a diode bridge and is provided with a voltmeter
D) a three-phase voltage frequency varies with the RPM; the indicator is provided with a motor which drives a magnetic tachometer

The operating principle of the INDUCTION type of tachometer is to measure the:

A) frequency of the electric impulse created by a notched wheel rotating in a magnetic field
B) rotation speed of an asynchronous motor energized by an alternator
C) electromotive force (EMF) produced by a dynamo or an alternator
D) magnetic field produced by a dynamo or an alternator

On an aeroplane equipped with a constant speed propeller, the RPM indicator enables:

A) selection of engine RPM.
B) on a twin-engine aeroplane, automatic engine synchronisation.
C) control of power.
D) control of the propeller regulator and the display of propeller RPM.

A synchroscope is used on aircraft to:

A) reduce the vibration of each engine.
B) reduce the rpm of each engine.
C) set several engines to the same speed.
D) achieve optimum control of on-board voltages.

An RPM gauge has a red line at the upper end of the green arc, in the middle of the green arc is a smaller red arc. What is the significance of this smaller red arc?

A) It is maximum continuous RPM.
B) It indicates an RPM that must not be used continuously because of the increased vibration level from the engine/propeller.
C) It is the RPM at which there is an increased likelihood of oil leakage.
D) It indicates an RPM that must not be used continuously because there is insufficient cooling air for the engine.

The electrical tacho-generator system uses:

A) A tacho probe and phonic wheel measuring speed and sending information to a squirrel cage motor and drag cup.
B) Single phase DC whose frequency varies with speed of the engine converted to a square wave pulse delivered to a servo driven instrument.
C) single phase AC whose frequency varies with the speed of the engine delivered to a single phase synchronous motor and drag cup.
D) three phase AC whose frequency varies with the speed of the engine delivered to a three phase synchronous motor (squirrel cage) and drag cup.

The signal supplied by a transmitter fitted with a 3-phase AC generator, connected to RPM indicator, is:

A) an AC voltage varying with the RPM; the indicator rectifies the signal via a diode bridge and is provided with a voltmeter.
B) a three-phase voltage, the frequency of which varies with the RPM; the indicator is provided with a motor which drives a magnetic tachometer.
C) a DC voltage varying with the RPM; the indicator is a plain voltmeter with a rev/min. scale.
D) an AC voltage, the frequency of which varies with the RPM; the indicator converts the signal into square pulses which are then counted.

On a modern twin spool turbofan, the main handling parameter is:

A) a rotational speed and a temperature.
B) the temperature upstream the turbine or EGT.
C) the rotational speed of the low-pressure compressor.
D) the rotational speed of the high-pressure compressor.

The advantages of an electrical induction tachometer are:

1. The display is not sensitive to line resistance
2. The measurement is independent of aircraft power supply
3. The measurement is independent of temperature variations
4. The option to use without restriction several indicators connected in parallel to a single transmitter

The combination regrouping all the correct statements is:

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

Two main indications used to evaluate a turbojet thrust are:
A) high pressure turbine rotational speed or EPR.
B) fan rotational speed (N1) or total pressure at the high-pressure compressor outlet.
C) fan rotational speed (N1) or EPR.
D) rotational speed of the fan (N1) or the total pressure at the outlet of the low-pressure turbine.

In a 3-phase synchronous motor type tachometer indicator:
1. the transmitter is a direct current generator
2. the voltage is proportional to the transmitter drive speed
3. the frequency is proportional to the transmitter drive speed
4. the speed indicating element is a galvanometer
5. the speed indicating element is an asynchronous motor driving a magnetic tachometer

The combination regrouping all the correct statements is:
A) 2, 5.
B) 3, 5.
C) 1, 2.
D) 1, 4.

The disadvantages of a single-phase A.C. generator tachometer are:
1. the presence of spurious signals due to a D.C. generator commutator
2. the importance of line resistance on the information value
3. the influence of temperature on the tachometer information

The combination regrouping all the correct statements is:
A) 2.
B) 1, 3.
C) 1, 2, 3.
D) 1, 2.

The advantages of a D.C. generator tachometer are:
1. easy transmission of the information
2. independence of the information relative to the airborne electrical power supply
3. freedom from any spurious current due to the commutator

The combination regrouping all the correct statements is:
A) 1, 2.
B) 1, 3.
C) 2, 3.
D) 1, 2, 3.

The electronic tachometer sensor is composed of:
A) a notched wheel rotating in front of an electro-magnet.
B) a circular magnet with four poles.
C) the rotor of a three-phase A.C. generator.
D) the rotor of a single phase A.C. generator.

The transmitter of RPM indicator may consist of:

1. a magnetic sensor supplying an induced AC voltage
2. a DC generator supplying a DC voltage
3. a single-phase AC generator supplying an AC voltage
4. a three-phase AC generator supplying a three-phase voltage

The combination of correct statements is:

A) 1, 2, 3, 4.
B) 1, 4.
C) 2, 3, 4.
D) 1, 2, 3.

What is a synchroscope used for?

A) Allowing the pilot to adjust several engines to the same RPM.
B) Putting the propellers in phase.
C) Viewing the underside of the aircraft during flight.
D) Reducing vibration.

The advantages of single-phase A.C. generator tachometer are:

1. the suppression of spurious signals due to a D.C. generator commutator
2. the importance of line resistance on the information value
3. the independence of the information in relation to the airborne electrical power supply
4. the ease of transmission of the information

The combination regrouping all the correct statements is:

A) 2, 3, 4.
B) 1, 2, 3, 4.
C) 1, 3.
D) 2, 4.

In a three phase tachometer installation:

1. the transmitter is a DC generator
2. we measure an EMF proportional to the driving speed of the transmitter
3. we measure a frequency proportional to the driving speed of the transmitter
4. the receiver is a galvanometer
5. the receiver is a synchronised motor driving a magnetic tachometer

A) 1 & 4
B) 3 & 5
C) 1 & 2
D) 2 & 5

The RPM indicator (or tachometer) of a piston engine can include a small red arc within the arc normally used (green arc). In the RPM range corresponding to this small red arc the:

A) propeller generates vibration, continuous rating is forbidden.
B) rating is the maximum possible in continuous mode.
C) propeller efficiency is minimum at this rating.
D) rating is the minimum usable in cruise.

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21. The disadvantage of an electronic rpm indicator is the:

A) generation of spurious signals at the commutator.
B) necessity of providing a power supply source.
C) influence of temperature on the indication.
D) high influence of line resistance on the indication.

Consumption gauge:

When compared with the volumetric fuel flowmeter, the mass fuel flowmeter takes into account the fuel:
A) temperature.
B) dielectrical constant.
C) pressure.
D) density.

A paddle-wheel placed in a the fuel circuit of a gas turbine engine initially measures:
A) mass flow by a tally of the impulses.
B) volumetric flow by a tally of the impulses.
C) mass flow by measure of a voltage proportional to the rotational speed.
D) volumetric flow by measure of a voltage proportional to the rotational speed.

A volumetric fuel flow meter is different to a mass flow meter because the mass flow meter compensates for:
A) volume.
B) pressure.
C) dielectric.
D) density.

The operating principle of Flowmeters, or " unit flow meters," the most commonly used at the present time, is to measure across their system the:
A) pressure and temperature of the fuel.
B) volumetric mass and di-electric resistance of the fuel.
C) quantity of fuel movement.
D) volume and viscosity of the fuel.

The principle of the fuel-monitoring device giving the fuel burnt is:
A) integration of instantaneous flow.
B) multiplying flight time by fuel consumption.
C) difference of indication according to departure value.
D) capacitance variation of a capacitor.

Fuel flow is measured at:
A) All of the above
B) The fuel intake of each engine
C) The fuel tank exit point to allow for loss due to leakage
D) The combustion chamber entry for each engine

Fuel gauge:

The advantages of an electric float gauge are:

1. ease of manufacture
2. independence of the indication relative to the variations of the aircraft power system if the measurement is made by a ratiometer
3. independence of the indication relative to the variations of the aircraft power system if the measurement is made by a galvanometer
4. independence of the indication relative to temperature variations

The combination regrouping all the correct statements is:

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

The gauge indicating the quantity of fuel measured by a capacity gauging system can be graduated directly in weight units because the dielectric constant of fuel is:

A) twice that of air and varies inversely with density
B) twice that of air and varies directly with density
C) the same as that of air and varies directly with density
D) the same as that of air and varies inversely with density

To measure the fuel quantity on a heavy aircraft we use:

1. capacitor gauges
2. electric gauges with round floats
3. the indication can directly be indicated as a mass
4. the indication can not be indicated as a mass

A) 1, 3
B) 2, 3
C) 2, 4
D) 1, 4

The principle of capacitor gauges is based on:

A) the variation of capacity by volumetric measurement exercised on the sensor.
B) the current variation in a Wheatstone bridge.
C) the variation of flow and torque exercised in a supply line.
D) the variation in capacity of a condenser with the nature of the dielectric.

A capacitive type gauging system may measure mass due to:

A) fuel dielectric constant being twice that of air and proportional to density
B) fuel dielectric constant being twice that of air and proportional to 1/ density
C) fuel dielectric constant being equal to that of air and proportional to density
D) fuel dielectric constant being equal to that of air and proportional to1/ density

Where fuel quantity is measured by a capacitance probe:

A) A number of probes, depending on the size of tank, are used in each tank and the sum of their resistance is a measure of the quantity of fuel in the tank

B) A number of probes, depending on the size of tank, are used in each tank and the sum of their capacitance is a measure of the quantity of fuel in the tank

C) A single probe is used in each tank and the capacitance is a measure of the quantity of fuel in the tank

D) A number of probes, depending on the size of tank, are used in each tank and the geometric mean of their capacitance is a measure of the quantity of fuel in the tank

The working principle of a capacitive fuel contents gauging system is based upon:

A) dielectric value.

B) volume of fuel.

C) changes in capacitance.

D) height of fuel.

The quantity of fuel in the tanks is measured by capacitor type contents gauges. The working principle of these sensors is to measure the:

A) charge of condensers

B) height of the fuel

C) volume of the fuel

D) di-electric resistivity of the fuel

An aircraft has a compensated capacitance fuel contents gauging system and is refuelled so that the total fuel contents are 76000kg at a temperature of 18 degrees C and an S.G. of 0.81. Whilst the aircraft is parked the temperature increases to 26 degree. Total fuel contents:

A) decreased by 5%.

B) remained the same.

C) increased by 5%.

D) increased by 10%.

The capacity fuel gauges provide information:

A) on mass whose indication is independent of the temperature of the fuel.

B) which varies with the temperature of the fuel.

C) which is independent of the temperature of the fuel.

D) on mass whose indication varies with the temperature of the fuel.

The advantages of an " electric" fuel (float) gauge are:

1. easy construction
2. independence of indications with regard to airplane attitude
3. independence of indications with regard to the accelerations
4. independence of indications with regard to temperature variations
5. independence of indications with regard to vibrations

The combination regrouping all the correct statements is:
A) 1, 3, 4 and 5.
B) 1.
C) 1, 2, 4 and 5.
D) 4 and 5.

The indication of a fuel float gauge varies with:

1. aircraft attitude
2. accelerations
3. atmospheric pressure
4. temperature

The combination of correct statements is:
A) 4.
B) 1, 2.
C) 1, 2, 3, 4.
D) 1, 2, 4.

The disadvantages of an " electric" fuel (float) gauge are:

1. the design is complex
2. the indications are influenced by the airplane attitude variations
3. the indications are influenced by the accelerations
4. the indications are influenced by temperature variations
5. that an alternative current supply is necessary

The combination regrouping all the correct statements is:
A) 2, 3, 4, 5.
B) 1, 2, 3, 4.
C) 1.
D) 2, 3, 4.

The principle of capacity gauges is based on the:
A) capacitance variation by the volume measurement carried out on the sensor.
B) current variation in the Wheatstone bridge.
C) capacitance variation of a given capacitor with the type of dielectric.
D) flow rate and torque variation occurring in a supply line.

In an average or heavy weight transport airplane, generally, the fuel quantity is measured by " capacitor" gauges because these give:

1. indications partly independent of fuel temperature variations
2. indications almost independent of the airplane's attitude and accelerations
3. indications expressed in density

The combination regrouping all the correct statements is:

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

The basic principle used for measuring a quantity of fuel in a transport airplane equipped with " capacitor" gauges is that the:

A) internal resistance of a capacity depends on the nature of the dielectric in which it is immersed.
B) electromotive force of a capacity depends on the nature of the dielectric in which it is immersed.
C) capacity of a capacitor depends on the distance between its plates.
D) capacity of a capacitor depends on the nature of the dielectric in which it is immersed.

If the tanks of your airplane only contain water, the capacitor gauges indicate:

A) a mass of water different from zero, but inaccurate.
B) a mass equal to zero.
C) the exact mass of water contained in the tanks.
D) a mass equal to the mass of a same volume of fuel.

The capacitor gauge principle is based on:

A) variation of outflow and couple in the system.
B) variation of capacitance by volume measure at the probe.
C) variation of capacitance of a capacitor with the nature of the dielectric.
D) variation of the EMF in a wheatstone bridge.

The float type fuel gauges provide information on:

A) volume whose indication varies with the temperature of the fuel.
B) mass whose indication is independent of the temperature of the fuel.
C) volume whose indication is independent of the temperature of the fuel.
D) mass whose indication varies with the temperature of the fuel.

Torque Meter:

An advantage of an engine torque measurement system is that it can be used:

A) It can be used to operate a propeller feathering device if torque meter oil pressure falls due to a power failure
B) It can be used to automatically operate a water boost system on take-off at high altitude if the required thrust is not achieved
C) All of the above
D) To measure engine RPM as well

The power output of a turbo-propeller aircraft is measured by the amount of torque being produced. The indication can be in which of the following units.

1. Newton metres
2. PSI
3. Percentage
4. lbs ft
5. EPR

A) 1,2,3,4
B) 2,3,4,5
C) 1,2,3,5
D) 1,2,3,4,5

The measure of a torque can be made by measuring:

A) the amount of light through a gear linked to a transmission shaft.
B) the frequency difference between two phonic wheels linked to a transmission shaft.
C) the frequency of a phonic wheel linked to a transmission shaft.
D) oil pressure at a fixed crown of an epicyclical reduction gear of the transmission box.

Vibration Monitoring:

The principle of detection of a vibration monitoring system is based on the use of:

A) 2 high and low frequency amplifiers
B) 2 high and low frequency filters
C) a frequency converter
D) 2 accelerometers

A vibration indicator receives a signal from different sensors (accelerometers). It indicates the:

A) vibration amplitude at a given frequency.
B) acceleration measured by the sensors, expressed in g.
C) vibration period expressed in seconds.
D) vibration frequency expressed in Hz.

A vibration meter measures:
A) acceleration in g.
B) period in seconds.
C) amplitude at a given frequency.
D) frequency in Hz.

In an engine vibration monitoring system for a turbojet any vibration produced by the engine is:
A) inversely proportional to engine speed
B) fed directly to the cockpit indicator without amplification or filtering
C) directly proportional to engine speed
D) amplified and filtered before being fed to the cockpit indicator.

Remote (Signal) Transmission Signal:

A remote reading thermometer depends upon... to indicate changes in temperature.
A) change of electrical capacitance with change in temperature.
B) change of electrical resistance with change in pressure.
C) change of electrical resistance of the two metals.
D) change of electrical resistance with temperature.

Transmission systems fall into three categories, they are:
A) Mechanical, electro-mechanical and analogue
B) Mechanical, electrical and digital
C) Mechanical, electro-mechanical and digital
D) Electrical, electro-mechanical and digital

A stator is:
A) Three fixed coils 120° apart and made up of electrically conducting material
B) Three fixed coils 120° apart and made up of electrically non-conducting material
C) Three fixed coils 60° apart and made up of electrically non-conducting material
D) Three fixed coils 60° apart and made up of electrically conducting material

Electronic Flight Display (ECAM, EICAS):

The function of EICAS is to:

A) show check lists on the upper display and systems diagrams on the lower display.
B) show engine primary indications on the upper display and engine secondary indications on the lower display.
C) show check lists on the left display and systems diagrams on the right display.
D) show engine primary indications on the left display and engine secondary indications on the right display.

Which of the following would be an EICAS caution:

A) Engine overheat
B) Engine fire
C) Both b & c
D) Yaw damper fault

In an ECAM system if a caution message appears the system will:

A) display a diagrammatic view of the affected system.
B) will alert the pilot by an audible warning only.
C) will cause the relevant buttons to light up.
D) illuminate the page number that requires to be selected.

The EICAS is usually in the... mode during flight.

A) status
B) advisory
C) operational
D) Flight Phase Related

On the Airbus ECAM system, what information is displayed?

A) Checklists on the left hand display, and system diagrams on the right hand display.
B) Engine primary instruments on the upper ECAM display and engine secondary instruments on the lower ECAM display.
C) Engine parameters on the upper ECAM display, and system/status information on the lower ECAM display.
D) Engine primary instruments on the upper ECAM display and status page on the lower ECAM display.

For EICAS a warning is indicated in:

A) Green
B) White
C) Red
D) Amber

The status portion of EICAS is used to:
A) Determine the aircraft readiness for dispatch
B) Determine the aircraft readiness to start
C) Determine the aircraft readiness for that portion of flight
D) Determine the aircraft readiness for take-off

For EICAS, flight control positions appear in:
A) The bottom right corner of the status display
B) The top left corner of the status display
C) The bottom left corner of the status display
D) The top right corner of the status display

The ECAM display modes are:
A) Manual, Flight Phase Related, Failure Related, Advisory.
B) Manual, Operational, Advisory.
C) Operational, Flight Phase Related, Failure Related, Advisory.
D) Operational Mode, Status Mode, Maintenance Mode.

The display modes for the Engine Indicating and Crew Alerting System are:
A) operational, flight phase related and status.
B) operational, status and maintenance.
C) operational, status and maintenance of which status and maintenance are automatic.
D) flight phase related, advisory and failure related.

With an EICAS, how are the computers normally used to drive the displays?
A) The right computer drives both displays.
B) The left computer drives the left display, the right computer drives the right display, the centre computer is on standby.
C) The left computer drives both displays.
D) The left computer drives the left display, and the right computer drives the right display.

EICAS is:
A) Engine information and crew alerting system
B) Electrical indication and crew alerting system
C) Engine indication and crew alerting system
D) Engine indication and cabin alerting system

A crew alerting message for EICAS will be displayed on:
A) The lower CRT
B) The upper CRT
C) Both CRTs
D) The Central Warning Panel on the combing of the aircraft

Which of the following will not terminate an EICAS BIT (Built In Test)?

A) Pressing the BIT button
B) A successful test
C) An unsuccessful test
D) Applying the parking brake

What does ECAM mean?

A) Engine control and monitoring.
B) Electronic centralised aircraft monitoring.
C) Electronic computerised aircraft monitoring.
D) Engine computer aided monitoring.

In a modern airplane equipped with an ECAM (Electronic centralized aircraft monitor), when a failure occurs in a circuit, the centralized flight management system:

1. releases an aural warning
2. lights up the appropriate push-buttons on the overhead panel
3. displays the relevant circuit on the system display
4. processes the failure automatically

The combination regrouping all the correct statements is:

A) 1, 3, 4.
B) 3, 4.
C) 1, 2, 3.
D) 1, 2.

On an EICAS display what does the yellow arc on the temperature gauge signify?

A) Normal operating range.
B) Forbidden operating range.
C) Exceptional operating range.
D) Frequent operating range.

Three types of electronic display are used in aircraft, they are:

A) LED, LCD and CRT
B) LED, GPS and AWR
C) CRT, AWR and GPS
D) LED, LCD and AWR

An advisory message on the EICAS system screen would be:

A) displayed in amber, normally on the upper screen, indented one space to the right.
B) displayed in amber, normally on the upper screen with aural warnings.
C) displayed in amber on the lower screen with associated caution lights and aural tones.
D) displayed in red, normally on the upper screen , and requiring immediate corrective action.

EICAS Recall messages appear:
A) On the CRT screen in green
B) On the CRT screen in amber
C) On the CRT screen in cyan
D) On the CRT screen in white

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21. In an EICAS system, if both displays fail then the following information is displayed on the standby engine indicator:
A) N2, EGT, and EPR.
B) CHT, EGT and EPR.
C) N1, EGT, and N2.
D) N1, EGT and EPR.