LONGITUDE AND LATITUDE

MERIDIANS OF LONGITUDE

- Semi great circles joining the true or geographic poles of the earth (true meridians).
- They are measured from 0 to 180 degrees East and West of the PRIME MERIDIAN, which runs through Greenwich, England.
- The meridian opposite the prime meridian (180) is called the INTERNATIONAL DATE LINE and here time changes a day.
- Meridians are measured in degrees, minutes and seconds.

There are 60 minutes in a degree and 60 seconds in a minute.

PARALLELS OF LATITUDE

- Circles on the earth's surface whose planes lie parallel to the equator.
- Equator is a great circle on the surface of the earth lying equidistant from the poles.
- Latitude is measured from 0 to 90 degrees North and South of the EQUATOR , which is
- numbered 0 degrees.
- Parallels of Latitude are also expressed in degrees, minutes and seconds.

DETERMINING GEOGRAPHICAL COORDINATES

- Intersection of the lines of latitude and longitude marking a position on a map.
- Used to locate a fixed object on the earth's surface.
- Change of latitude and the change of longitude between two places relate one postion on the surface with another.

TIME AND LONGITUDE

SOLAR DAY

interval between two successive transits of the sun. It is divided into 24 hours.

The sun travels once around the earth every day. It travels 360 degrees of longitude in one day. So, time can be expressed in terms of longitude.

24 hours	=	360 degrees longitude
1 hours	=	15 degrees longitude
1 min	=	15 minutes longitude
1 sec	=	15 seconds longitude

360 degrees longitude	=	24 hours
1 degree longitude	=	4 min
1 minute longitude	=	4 sec
1 second longitude	=	1/15 sec

COORDINATED UNIVERSAL TIME

- Used so that a universal standard time exists for reference at any point on the earth.
  - ♦ based upon measurements of time in a number of places on the earth.
  - ♦ It is also referred to as Z or zulu time.
  - ♦ UTC replaced Greenwich mean time (GMT), which was once the universally accepted standard.
  - ♦ UTC is the local mean time for the prime meridian.
  - ♦ Winter time is the same as Daylight Savings Time.

EARTH'S MAGNETISM

- True North is the north pole of the earth.
- Magnetic north is the direction the compass needle lies without considering deviation and is not at a fixed position.
- The magnetic field of the earth changes as the magnetic north moves about in a circle.

MAGNETIC VARIATION

- The angle between the true meridian and the magnetic meridian in which the compass needles lies.

- It is also known as magnetic declination in other disciplines.

To convert from True to Magnetic Heading:

- Add Westerly Variation
- Subtract Easterly Variation

True Heading	-	East Variation	=	Magnetic Heading
True Heading	+	West Variation	=	Magnetic Heading

***__Helpful Reminder__:

EAST IS LEAST WEST IS BEST

To convert from Magnetic to True Heading:

- Add Easterly Variation
- Subtract Westerly Variation

__COMPASS DEVIATION__

The angle between the magnetic heading and the compass heading, which is the magnetic heading corrected for deviation.

To convert from Magnetic to Compass:

- Add Westerly Deviation
- Subtract Easterly Deviation

Magnetic Heading	-	East Deviation	=	Compass Heading
Magnetic Heading	+	West Deviation	=	Compass Heading

To convert from Compass to Magnetic:

- Add Easterly Deviation
- Subtract Westerly Deviation

All variation and deviation can be remembered by:

T true track
V variation
M magnetic heading
D deviation
C compass heading

Compass Errors

- A compass has several errors which cause the compass to not point directly to magnetic north.
- Knowledge of their presence will assist the pilot in correcting for them.

Magnetic Dip

- The earth's lines of force are horizontal at the equator but become vertical towards the poles.
- Causes the compass to tend to dip in higher latitudes.

Northerly Turning Error

- The compass will misread when the aircraft is in a banked attitude and turning.
- Error is most apparent on headings of north and south and is greatest over the poles.
- Always make sure the wings are level while reading the compass on north or south headings.
- On turns from NORTH northerly turning error causes the compass to LAG.
- On turns from SOUTH northerly turning error causes the compass to LEAD.

Acceleration and Deceleration Error

- On east and west headings, acceleration causes a turning moment, tending to rotate the magnet system and so causing deflection of the compass card.

- When the airplane decelerates, a similar effect is seen but the deflection will be in the opposite direction.

- The effect of acceleration and deceleration compass errors is nil on north and south headings.

- When reading the compass on east or west headings, always make sure the airspeed is constant.

***ON EAST OR WEST HEADINGS*:**

ACCELERATION makes the compass turn NORTH.

DECELERATION makes the compass turn SOUTH.

***Helpful Reminder:**

A acceleration
N north
D deceleration
S south