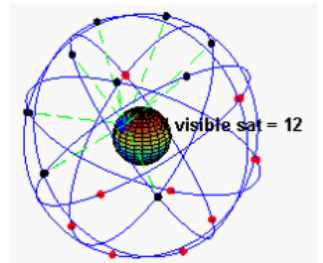


How to understand GPS Coordinates. 25° 30' 15" S, 28° 10' 30" E



The **Global Positioning System** is a satellite-based navigation system, made up of at least 24 (up to 30) satellites, about 19,300Km above the earth's surface. It is a way of pointing/reference within a few meters to any place in the world.

Latitude

Lines parallel with the equator line around the world. The distance between all latitudes lines are the same on all longitudes. One Latitude minute is about 1852 meter. Each latitude second is about 30.8m (N/S value) (1852/60). Ranging from -90° (degrees) (at the South pole), 0 to +90° (degrees) (at the North pole). 0° latitude is on the earth's equator. There are 60 minutes in a degree. There are 60 seconds in a minute.

The latitude is always written first. e.g. 28° 45' 51" S or 34° 23' 58" N thereafter the longitude.

25° 30' 15" S 25° 30' 15.00" S S25° 30.25' 30.25' S S25.504167° -25.5041

Longitude

Imaginary Lines parallel with the line from the south pole, through Greenwich, London, UK to the North pole.

Ranging from -180° (degrees) (west of Greenwich) to +180° (degrees) (East of Greenwich).

0° is at the Royal Observatory in Greenwich, England. The distance between the Longitude lines varies, depending on what Latitude line you are. One longitude minute at the equator is 1852 meter, one longitude second, about 30.8 meter. At the Equator the distance is the greatest. All the longitude lines comes together at the poles to 0m.

25° 30' 15" S 25° 30' 15.00" S S25° 30.25' 25° 30.25' S 25.504167° -25.5041

Different Formats of showing the Latitude and Longitudes. All pointing to the same place on earth.				
Latitude				
DMS	Degrees, Minutes, Seconds.	DD MM SS.sss H	25° 30' 15" S 25° 30' 15.00" S	The symbols ° ' and " are sometimes not used.
DMM	Degrees, Minutes.	DD MM.mmmmm H	25° 30.25' S 25° 30.2500' S	30'+(15"/60=0.25') =30.25'
D	Degrees	DD.dddddd H	25.504167°S S 25.504167°	25°+(30'/60=0.5°)+ (15"/60/60=0.004167°) =25.504167°
DD	Decimal Degree (numerical) format.	S DD.dddddd	-25.504167	-(South) +(North)
Longitude				
DMS	Degrees, Minutes, Seconds.	DDD MM SS.sss h	28° 10' 30" E 28° 10' 30.00" E	The symbols ° ' and " are sometimes not used.
DMM	Degrees, Minutes.	DDD MM.mmmmm h	28° 10.5' E 28° 10.5000' E	10'+(30"/60=0.5') =10.5'
D	Degrees	DDD.dddddd h	28.175° E 28.175000° E	28°+(10'/60=0.1666)+(30"/60/60=0.0083)=28.175°
DD	Decimal Degree (numerical) format.	S DDD.dddddd	+28.175 +28.175000	+(East) -(West)

Where H-Hemisphere, (The Northern and Southern hemisphere are divided by the Equator)
h-Hemisphere, (The Eastern and Western hemisphere are divided by the Prime meridian, a arbitrary line at Greenwich, London)

S-Signed.

DD-Degrees, ddd-decimal degrees. The symbol for degrees is ° (to type, [alt] 167 on the computer).

MM-Minutes, mmm-decimal minutes. The symbol for minutes is ' (single quote)

SS-Seconds(""), sss-decimal seconds. The symbol for seconds is " (double quote)

Conversions (How to):

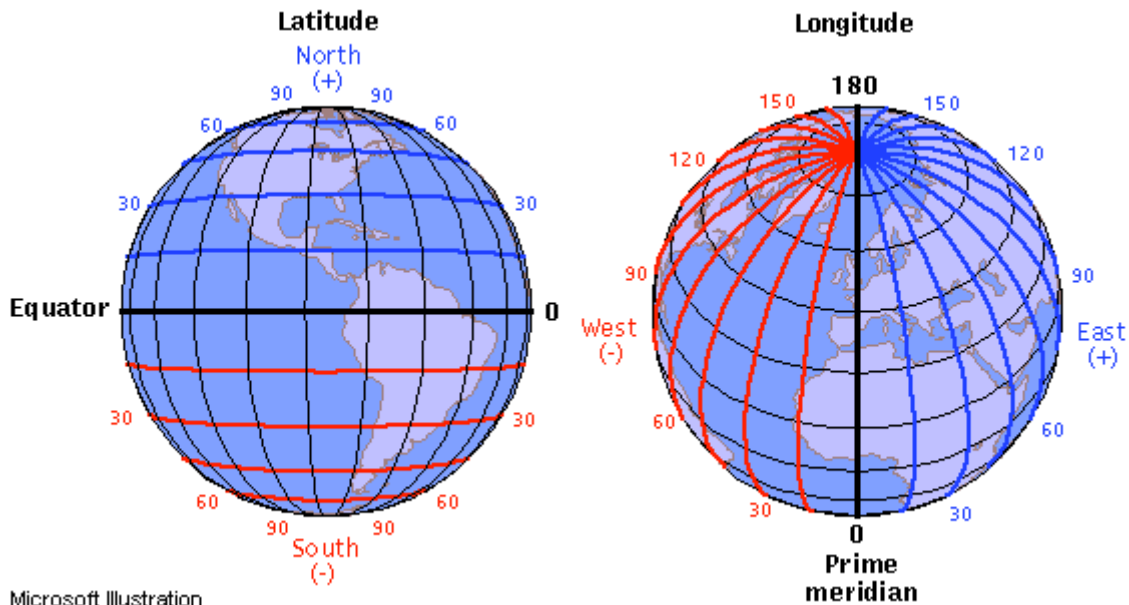
DMS to D : DMM = Degrees + Minutes/60(as there are 60 minute in a degree) + Seconds/60/60 (as there are 60 second in a minute) eg 25° 30' 15" > (25 + (30/60) + (15/60/60)) = 25.504167°

D to DMM : D = Degrees + Minutes/60 (eg 25.5° > 25° (0.5*60)=30') = 25° 30' 00"

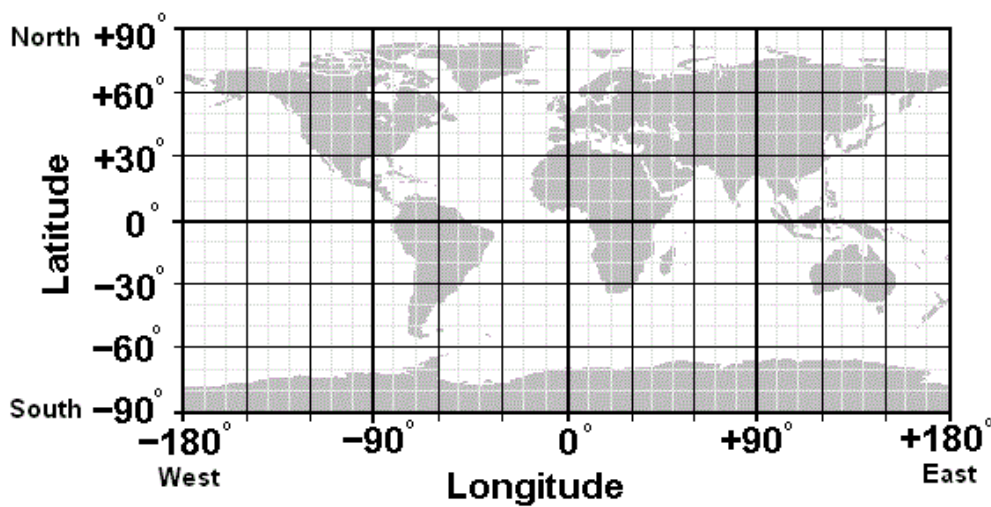
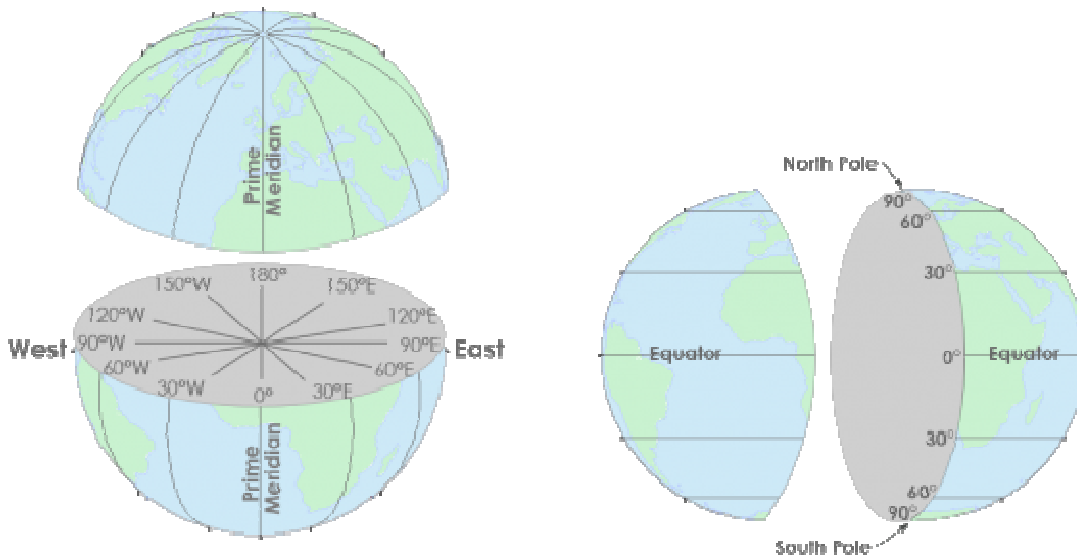
DMM to DMS : D=Degrees M=Minutes (eg 25° 30.25 > (30.25-30=0.25*60=15") 25° 30' 15")

D to DMS : D = Whole number MM=Fraction * 60 (eg 25.504167° > Truncate(25.504167) > 25° (25.504167-25)=0.504167*60=30.25002, Truncate(30.25)=30' (30.25-30=0.25*60)=15" > 25° 30' 15")





Microsoft Illustration
Credit: Illinois State University



www.satsig.net

More reading :

https://simple.wikipedia.org/wiki/Geographic_coordinate_system

<https://www.worldatlas.com/aatlas/imageeg.htm>

https://en.wikipedia.org/wiki/Global_Positioning_System

<https://www.geotab.com/blog/what-is-gps/>

<https://www.ja-gps.com.au/what-is-gps.aspx>