World Geodetic System

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The World Geodetic System (WGS) is a standard for use in cartography, geodesy, and satellite navigation including GPS. This standard includes the definition of the coordinate system's fundamental and derived constants, the ellipsoidal (normal) Earth Gravitational Model (EGM), a description of the associated World Magnetic Model (WMM), and a current list of local datum transformations.
The latest revision is WGS 84 (also known as WGS 1984, EPSG:4326), established and maintained by the National Geospatial-Intelligence Agency since 1984, and last revised in 2004. Earlier schemes included WGS 72, WGS 66, and WGS 60. WGS 84 is the reference coordinate system used by the Global Positioning System.

Defining Parameters

The coordinate origin of WGS 84 is meant to be located at the Earth's centre of mass; the uncertainty is believed to be less than 2 cm.

The WGS 84 meridian of zero longitude is the IERS Reference Meridian, 5.3 arc seconds or 102 metres (335 ft) east of the Greenwich meridian at the latitude of the Royal Observatory.

The WGS 84 datum surface is an oblate spheroid with equatorial radius a = 6378137 m at the equator and flattening f = 1/298.257223563. The refined value of the WGS 84 gravitational constant (mass of Earth’s atmosphere included) is GM = 3986004.418×108 m^3/s^2. The angular velocity of the Earth is defined to be ω = 72.92115×10−6 rad/s.

This leads to several computed parameters such as the polar semi-minor axis b which equals a × (1 − f) = 6356752.3142 m, and the first eccentricity squared, e^2 = 6.69437999014×10−3.

Currently, WGS 84 uses the Earth Gravitational Model 2008.[8] This geoid defines the nominal sea level surface by means of a spherical harmonics series of degree 360 (which provides about 100 km latitudinal resolution near the Equator).[9] The deviations of the EGM96 geoid from the WGS 84 reference ellipsoid range from about −105 m to about +85 m.[10] EGM96 differs from the original WGS 84 geoid, referred to as EGM84.

WGS 84 currently uses the World Magnetic Model 2015v2.[11] The new version of WMM 2015 became necessary due to extraordinarily large and erratic movements of the north magnetic pole. The next regular update (WMM2020) will occur in late 2019.