



Fact Sheet: Navigation

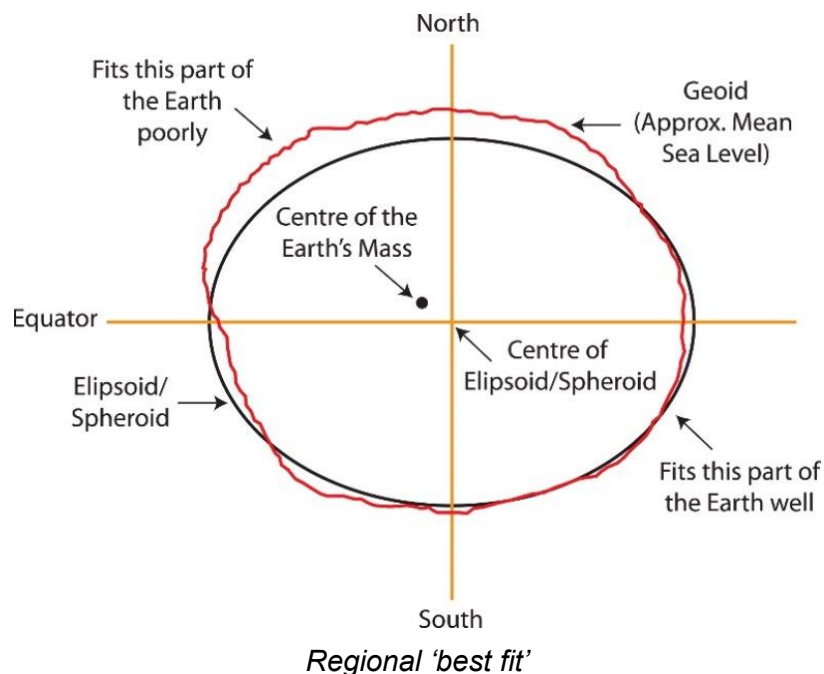
GPS Receivers And Chart Datums

Why do datums affect me?

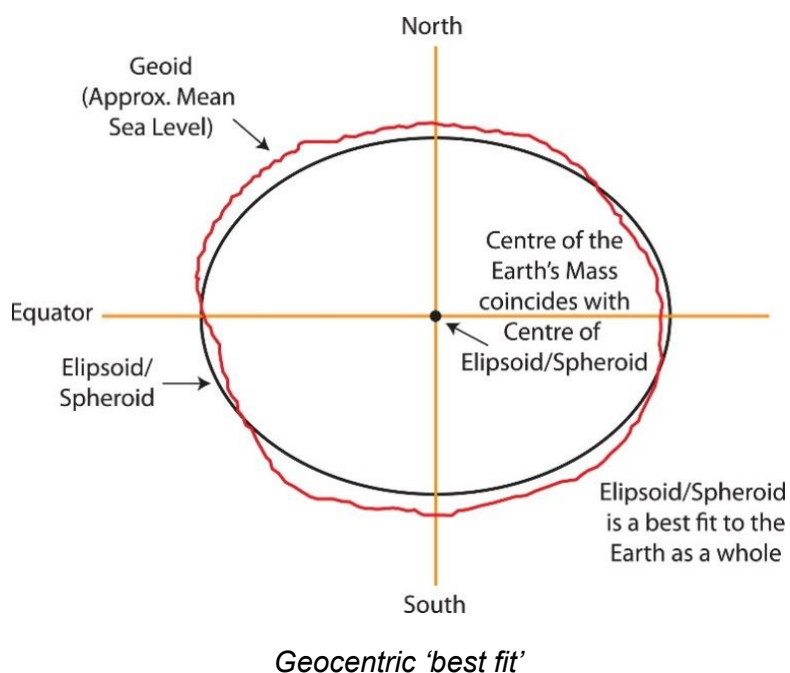
Positioning systems, and the chart or map on which that position is being displayed, need to be in harmony. If they are not working harmoniously, a danger that you think you will pass well clear of, may actually be directly ahead. Conversely, the narrow channel you are approaching at night may not be where your vessel is aimed. Ensuring your satellite positioning system, such as GPS, is working in harmony with your chart, or knowing and understanding the difference, can therefore be the difference between a good day and a not-so-good one.

Understanding datums

The latitude and longitude of places on a chart or map depend on what mathematical model is used to represent the Earth. The challenge is that the Earth is a roughly ellipsoidal, 3-dimensional surface with high peaks and deep trenches, while the chart or map is a flat, 2-dimensional surface. All charts, whether electronic or paper, are built upon a mathematical model of the Earth. However, the shape of the Earth is not a perfect sphere, so a model optimised for one country may not suit another.



However, the World Geodetic Spheroid 1984 (WGS84), as used by GPS and other Global Navigation Satellite Systems, is a mathematical model of the Earth intended as a compromise that reasonably represents the world for practical navigation purposes.



As nautical charts, and particularly Electronic Navigational Charts (ENC), are primarily used by vessels undertaking international voyages, international specifications dictate that they are therefore referenced to WGS84. WGS84 is also typically the default datum used in most satellite positioning receivers. Using WGS84 for both navigation and charting ensures that ships on international voyages do not need to change datum settings as they pass from one country's charting area to the next.

Australian charts

All ENC and Paper Nautical Charts (PNC) published by the Australian Hydrographic Office are compiled on WGS84 in accordance with international specifications. Your satellite positioning system should be set to give positions referenced to WGS84 when using any official Australian ENC or PNC.

Other charts

While ENC are all compiled using WGS84, not all other nations' paper charts have been modernised to this international standard. Additionally, but to a lesser extent, some of their older local datums may have carried over from their paper charts into the apparently modern electronic ones. The differences can occasionally be as much as several hundred metres. If in doubt, check your position by range and bearing to charted features.

Satellite positioning system datum settings for marine use

CHECK YOUR DATUMS CAREFULLY – all latitudes and longitudes which you use for navigation must relate to the SAME datum. If they don't, then you will need to apply a correction or change the datum used on your positioning device to match the chart datum.

When you buy a satellite positioning system receiver from your local store to track your position, the first thing you need to check is: "What datum is it set to?" The majority of manufacturers use WGS84 as their default datum and do simple transformations to other datums. WGS84 is entirely suitable for most marine applications.

Satellite positioning system datum settings for land use

If you use the same satellite positioning receiver for land navigation as well as your marine activity, you should note that Australia's National Datum is the Geocentric Datum of Australia 1994 (GDA94). GDA94 is similar to, but not quite the same as WGS84 when you need accuracy of position to better than 1 metre.

The release of Geocentric Datum of Australia 2020 (GDA2020) as the new National Datum will bring the land mapping datum closer to WGS84 and the International Terrestrial Reference Framework (ITRF 2008), with differences less than 0.5 metres.

GDA2020 has been released but is running concurrently with GDA94. The requirement to transform to GDA2020 depends upon legislation and policy relating to individual business and jurisdiction needs.

More information

The ANZLIC Committee on Surveying and Mapping can provide more detailed information on datums. This can be found at: <http://icsm.gov.au/education>