

## 5 Coordinate Reference Systems (CRS)

To define the location of features using the S-100 Framework, one first needs to define a Coordinate Reference System (CRS). A Coordinate Reference System in two dimensions uses a coordinate pair, either X and Y for a Cartesian system or latitude and longitude for a geodetic/geographic system to define the location of a feature on a 2-D grid. However, if one wants to plot features in a 3-dimensional Coordinate Reference System, where we now want to include depths on a nautical chart or elevations on a map, one needs to assign the depth or elevation as the third component. For Cartesian systems, one would use X, Y, Z as the triplet or for geodetic/geographic systems, one would use latitude, longitude and height. The height can be the ellipsoid height or any of the other vertical references (see Vertical Reference System below). Geodetic/geographic coordinates are more intuitive for positioning and navigation applications on or near the Earth's surface while Cartesian coordinates are more appropriate if vectors are needed to accurately illustrate a graphical relationship between two or more points. The full reference to EPSG can be found at <https://epsg.org>

### 5.1 Horizontal reference system

Allowed coordinate reference systems are listed below.

#### Coordinate Reference System:

**EPSG:**4326 (WGS 84)

WGS 84 / UTM Zone 1N to Zone 60N EPSG:32601 - EPSG:32660

WGS 84 / UTM Zone 1S to Zone 60S EPSG:32701 - EPSG:32760

WGS 84 / UPS North (E,N) EPSG:5041

WGS 84 / UPS South (E,N) EPSG:5042

**Datum:** WGS 84 defined by NGA

**Projection:** None / UTM / UPS

**Horizontal Units:** Decimal degrees / Easting and northing

**Coordinate Reference System Registry:** EPSG Geodetic Parameter Registry

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