3. PLANE RECTANGULAR COORDINATE SYSTEMS

<previous - next>

Home | Self study : Reference sytems | Contents | Intro | 1.Graticule / topographic grid | 2.Projection Systems (a/b/c/d) | 3.Plane rectangular coordinate systems (a/b) | 4.Coordinate transfor-mations | 5.Satellite-based positioning (a/b)

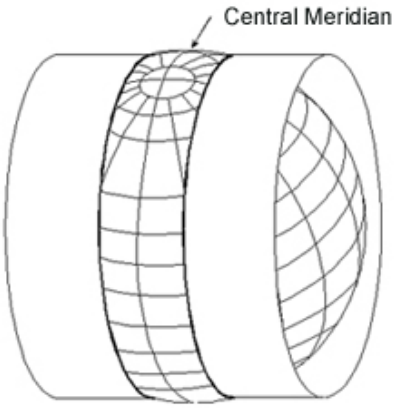
Rectangular coordinate systems for national use, also called national grid systems, are always based on a particular map projection.

A map projection by itself isn't enough to define a national grid system. One has to define e.g.:

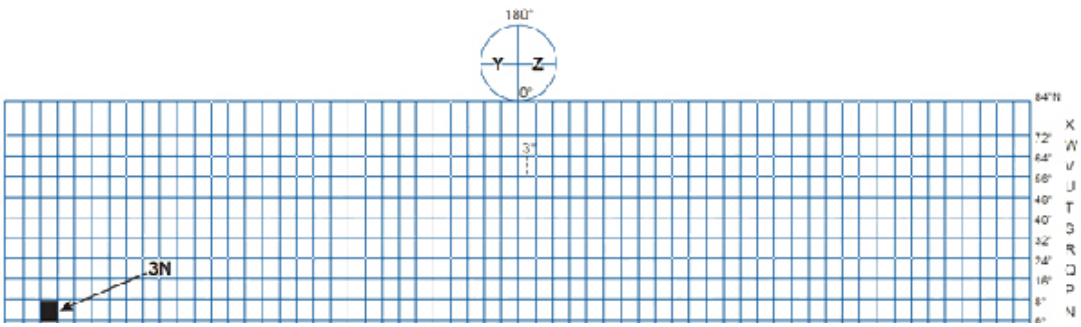
A) the ***ellipsoid*** / ***geoïd*** and
B) ***horizontal datum***,
C) the ***center*** of the projection,
D) the ***scale factor***,
E) and the ***origin*** of the rectangular coordinate system.
F) *False* ***Easting*** and False ***Northing***
G) ***Central Meridian*** (λ_0) or the standard parallels

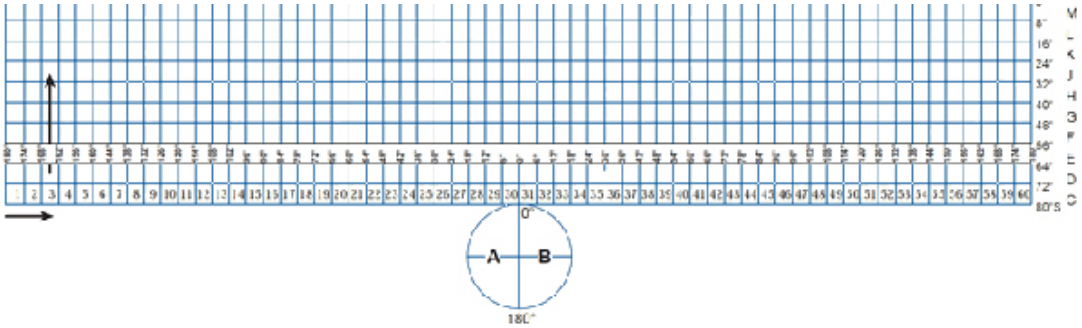
The above points A) and B) are described in seperate paragraphs on the following pages.

The most widely used grid system is the so-called UTM system. UTM stands for Universal Tranversal Mercator, this being the name of the cartographic projection on which it is based. The UTM system is designed to cover the whole world (excluding the Artic and Antartic regions). It is a version of the Transverse Mercator projection, see figure below.



The UTM grid too is a square kilometric grid. To keep scale distortians in acceptable limits, the grid is "cut up' into 60 zones with a width of 61 of longitude each, numbered from 1-60 in a west-east direction starting from the international date line (long. 1801) with zone 1.





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X-values, in km, are measured in the northern hemisphere northward from the equator, whose value again is 0 km; in the southern hemisphere kilometric measurements are, again, northwards but so that the equator is assigned the value of 10,000 km. Y-values are always measured in a west-east direction: the central meridian of each zone is assigned the value 500 km. This system ensures that there can be no negative UTM values and there never is a need for + or - signs, which is convenient.

<previous - next>

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