Technical paper 4

Correction matrices

Last amended: 27th January 2001

A correction matrix is a spatial database that can be used to improve the translation of latitude and longitude co-ordinates to a projection system. It is a mechanism to use high quality data that corrects for local gravitational distortion and the like in an empirical way. The matrix is a grid, or a set of grids, that record at each grid intersection how far off the computed co-ordinate is from the "actual" co-ordinate. Using these empirical values Map Maker interpolates intervening points to determine a better guess as the co-ordinate.

A correction matrix is stored in a file with an extension *.mtx.

File header

Offset	Size	Data type	Description
0	4	integer	Size of the header, currently 213 bytes
4	4	integer	The number of grids
8	4	integer	The precision 2 = cms 3 = mms
12	4	integer	The record size, currently always equal to 12
16	8	double	Reference latitude
24	8	double	Reference longitude
32	8	double	Scale factor
40	123	Datum record	Datum parameters, see below
163	4	integer	Reference easting
167	4	Integer	Reference northing
171	42	unassigned	reserved

Datum record

Offset	Size	Data type	Description
0	8	double	Earth's semi-axis major (a)
8	8	Double	Earths's semi-axis minor (b)
16	8	double	$e^2 = (a^2-b^2) / a^2$
24	8	double	$N = (a-b) / (a+b)$
32	10	extended	X component of geocentric shift relative to WGS84

42	10	extended	Y component of geocentric shift relative to WGS84
52	10	extended	Z component of geocentric shift relative to WGS84
62	10	extended	Molondenski parameter – dA
72	10	extended	Molondenski parameter – dF
82	10	extended	X component of Helmert parameters (Bursa-Wolf)
92	10	extended	Y component of Helmert parameters (Bursa-Wolf)
102	10	extended	Z component of Helmert parameters (Bursa-Wolf)
112	10	extended	Scale factor as parts per million
122	1	byte	Transformation system used 0 = Molondenski 1 = Helmert

Grid header

Offset	Size	Data type	Description
0	4	integer	Size of grid header, currently 50 bytes
4	8	Double	Left x ordinate
12	8	Double	Bottom Y ordinate
20	8	Double	Grid width (equal for x and y)
28	4	Integer	Columns
32	4	Integer	Rows
36	4	Integer	Address in file of start of data
40	10	unassigned	reserved

Grid intersection record

For each grid there are columns x rows of these grid intersection records.

Offset	Size	Data type	Description
0	4	integer	X component in millimetres
4	4	integer	Y component in millimetres
8	4	integer	Z component in millimetres

For each grid intersection the X,Y and Z components record how far off the co-ordinate calculated from datum described in the datum record is off from what is deemed to be the correct co-ordinate.