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Construction Grids in HYPACK®

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HYPACK® has a robust geodetic library which includes a hundred different predefined grids, but did you know that you can configure HYPACK® to operate on a custom local grid? This can be used to define a grid that HYPACK® has not yet predefined—such as a grid zone from the Military Grid Reference System (MGRS), for construction grids, archeological grids or grids for other specialized purposes.

GEODETIC PARAMETERS AND LOCAL GRIDS

FIGURE 1. How a WGS84 latitude and longitude is translated into local grid coordinates

Most positioning systems like GPS typically report positions as latitude and longitude relative to the WGS-84 ellipsoid. The HYPACK® software receives this data and translates it into grid coordinates according to the geodesy settings of the active HYPACK® project.

As you probably know, the geodesy of a HYPACK® project is configured in the GEODETIC PARAMETERS program. This module is accessible from the main SHELL menu by clicking on the globe icon.

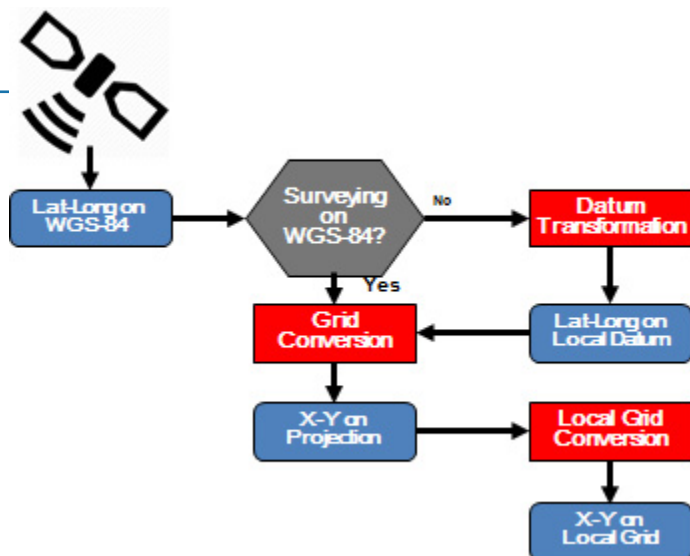


FIGURE 2. *Geodetic Parameters Dialog*

The screenshot shows the 'Geodetic Parameters' dialog box. The 'Predefined' section has 'Grids' set to 'UTM North' and 'Zone' set to 'Zone 18(78W-72W)'. The 'Distance Unit' is 'Meter' and 'Depth Unit' is 'same as horizontal'. 'Elevation Mode' is unchecked. The 'Ellipsoid' is 'WGS-84' with 'Semi-Major Axis' 6378137 and 'Flattening' 298.257223563. 'Datum transformation parameters' are all 0.00000. 'Datum shift file' is empty. 'Projection' is 'Transverse Mercator' with 'Central Meridian' 075 00 0 W, 'Reference Latitude' 00 00 0 N, 'Scale Factor' 0.9996000000, 'False Easting' 500000, and 'False Northing' 0. 'Local Grid Adjustment' is unchecked. 'RTK Tide Method' has '(K-N) from user value' selected. 'Height of ellipsoid above chart datum' is 0.00. 'OK' and 'Cancel' buttons are at the bottom right.

Figure 2 shows the typical configuration for a project on the UTM grid in Connecticut where the HYPACK® offices are.

DEFINING THE LOCAL GRID

1. Select the projection grid against which your local grid is referenced.

Local grids are often referenced to a particular projection grid such as UTM or State Plane. If this is the case for your local grid, the first step is to select the projection grid against which your local grid is referenced. Although this is not strictly necessary, since you can manually enter the relevant ellipsoid and projection parameters manually, it is a convenient timesaver and avoids error.

2. Change the grid selection to “User Defined.” “User Defined” mode allows you to edit the ellipsoid and projection parameters further, should you need to do so.

3. Define the Local Grid.

To configure the local grid, you must have the following parameters for your local grid:

- Grid origin relative to the projection
- X & Y translation
- Rotation

- Scale

If you do not have these parameters HYPACK® can derive them. To do this, you need to have both the projection grid coordinates and the local grid coordinates for two known points.

FIGURE 3. *The Local Grid Definition Dialog*

- a. **Check the “Local Grid Adjustment” box** to enable the local grid calculation.
 - b. **Enter the parameters into the Local Grid Definition dialog window.** If you are using known points, click [Calculate] to calculate the needed parameters before clicking [OK].
4. **Save your custom grid.** Select TOOLS-SAVE CUSTOM GRID from the menu. HYPACK® saves custom grids in the C:\HYPACK®\datum\ folder with the “CGEO” extension. Custom grids are listed at the end of the drop-down list, below the “User Defined” entry.

Local Grid Definition

To define local grid parameters you can enter world and local coordinates for two points and press the "calculate" button
Or you can enter defining parameters if known

World coordinates of point 1		Local coordinates of point 1	
East		East	
North		North	

World coordinates of point 2		Local coordinates of point 2	
East		East	
North		North	

Coordinates of grid origin

East	600000.00	☐ Reverse direction of X axis
North	4517000.00	☐ Reverse direction of Y axis

Grid Parameters

Translation X	0.00	Rotation	000 00 0 E
Translation Y	17000.00	Scale	1.0000000