

# Topcon GPS Pocket 3D Localization

In Setting up the GPS you must consider whether you are going to set up on a point that is on a predefined datum (Known Co-ordinate System such as MGA, PCG) or you are setting up on a job that needs a localization (Local Co-ordinate System). The GPS units accept signals from satellites and processes them into a position. The GPS receivers always work in Latitude and Longitude with ellipsoidal heights. Pocket 3D the controller software converts the Latitude and Longitude readings from the GPS into a Known System (MGA) or Local Co-ordinate system (Project or Mine grid). Note only Version 6.11 or later of Pocket 3D has the ability to use a defined grid system such as MGA.

**NB: Remember that if you have a fixed position and your HRMS and VRMS are good then your GPS system is working fine. If you are a long way out of position with your co-ordinates it is because you haven't defined the correct settings for the system you are working in or you have configured your base wrong with the wrong point or reference file**

## Localization (Local Co-ordinate System)

A localization is performed on a site where you wish to work with the existing local control and co-ordinate structure. (Example: Mine grid, Construction site grid) A localization will compare the GPS Latitude and Longitude results with the co-ordinates of the known local points and perform a transformation based on these points. To ensure an accurate localization you need at least 4 known points. 3 is enough to define it but you will not know the vertical residual in your network of points until you survey 4. More than 4 points gives you redundancy which allows you to turn the vertical or horizontal components on or off of points that may look suspect.

It is best to have points that surround the project and some points within the project. The software internally creates a triangulated model to solve the vertical corrections thus the better the triangulated network the better. Care needs to be taken when localizing on for instance a road project where the control will tend to be in a straight line. A localization file is stored as a **.GC3 file** and only needs to be done once for that site. The **.GC3 file** can be loaded into any subsequent job after that. When performing a localization the Datum should be set back to UTM WGS84 Local Zone (Example 50 or 51 in WA) with no geoid model loaded.

## Performing a localization - Base setup

If not already setup select a position for your base that will give the best radio range for your project. This may be a known point or you may wish to create a new station a more suitable location. This point does not need to be part of your current survey network. Setup the base over the point, connect the controller Topcon FC100, FC200 to the base and start Pocket 3D. Select - Setup – Equipment then the Base, if not setup select new and define the base equipment. After selecting base select ok. Pocket 3D will tell you it is changing to Base as the current equipment.

Select Data – Control and your control file. Then select Data – Control – Control points. You need to have all the points you want entered in for your localization including a point number for your Base station. If the Base point has not been surveyed just create a point, to do this you will need to enter a Northing, Easting and Elevation, just enter anything such as 10, 10, 10 as these co-ords will not be used, the information required will be stored under point GPS tab after we start the base.

Select Setup – Base Station, select the control point and your connection method, then select next. Select Antenna type, Antenna height, this is very important if the antenna height is going to change as apposed to when the antenna is in a permanent fixed location. Select next, the radio parameters are displayed then next and finish. Depending on your connection type (Cable or Bluetooth) the FC100 will connect to the Base and read the latitude, Longitude and Elevation and store them in the point you choose and start transmitting to the rovers. After the first time you start the base it will just read the co-ords you stored the first time and start transmitting.

### **Performing a localization - Rover setup**

Select Setup – Equipment, select your Rover file or create a new one that matches your Rover equipment setup, select OK and Pocket 3D will change to the Rover setup.

Go to the first point you want to use in the localization, setup the rover over the point it is best to use a tripod if possible otherwise care must be taken to hold the Rover pole still over the point. Select Data – Control – Control Points and select the point you are setup on then Edit, select the GPS Tab then Measure, the Rover will take a number of readings and store the result, select the Use Horizontal and Use Vertical tick boxes then OK then OK again to return to the main screen.

Continue to each local control point and survey as above. Once you have more than 4 points surveyed the Localization screen gives you the ability to turn on or off the Horz or Vert component of each control point this can be helpful if one of the readings is poor, the Control points screen displays the Horizontal and Vertical residuals (errors) for each point you can see which points may not be good.

It is best to have as many as possible points in the localization and if possible spread out around the outside of the project area.

Refer to the Pocket 3D manual for further details.

### **Future setups**

The next time you survey if the base is a permanent setup just turn it on as it will continue as it was before. If you need to set it up on a tripod, position it over the point. Select - Setup – Equipment then the Base file, select ok. Pocket 3D will tell you it is changing to Base as the current equipment. Select Setup – Base Station, select the control point and your connection method, then select next. Select Antenna type, Antenna height,

this is very important as the antenna height is likely to have changed. Select next, the radio parameters are displayed then next and finish. The Base is now started, select Setup – Equipment – Rover and continue with your survey.