

SurvNet Lesson Two

- Processing a 3D Network With Both Total Station Data and GPS Vectors

In this lesson we will process a project that contains both GPS vectors and total station measurements.

1 Following is the opening SurvNET window. The first step is to open the project for lesson two. Choose the File/Open Project.. option. Navigate to the \Carlson2007\Data\ subdirectory and open the SurvNetTut02 project.

2 Let's review the project settings. Go to Settings/Project.

In order process GPS vectors, the coordinate system must be set to 'SPC 1983' with the appropriate state plane zone. The 'Coordinate System Adjustment Model' must be set to the 3D Model. With the 3D model, horizontal units and vertical units must be the same in regards to output and total station raw data. Geoid modeling may or may not be important depending on the extent of the project and the accuracies required. The most accurate results are typically obtained by using a 'Geoid File' set to GEOID03.

The project raw data is defined from the 'Input Files' settings screen. Notice that the units need to be specified for both the GPS vector data and the total station raw data. Typically, but not always, GPS vectors are in meters while the total station and the final output may need to be in feet. Also make sure that the correct GPS vector format is correct. Some GPS formats are binary and cannot be edited easily. Sometimes it is needed to edit the GPS vectors usually in terms of point numbers.

Note: The sample tutorial project has the input raw file in the default data folder of C:\Carlson2007\Data. If you have a different data directory, then set the correct data file by highlighting the default file, pick Delete and then pick Add and select GPSAndTS.cgr (C&G format raw file) from your data folder. Do the same for the GPS Vector files of GPSAndTS1.gps and GPSAndTS2.gps.

Though this tutorial does not cover the topic, it is from this screen that you would define the traverse file needed to compute either GPS loop closures or totals station traverse closure. See the manual for further details.

Notice the standard error settings related to GPS. The GPS instrument centering error can be defined. The vector standard error is a factor that can be used to increase the standard errors as defined in the GPS vector files.

None of the settings in this screen are specific to processing GPS vectors. See the manual for details on the settings in the 'Adjustment' dialog box.

None of the settings in this screen are specific to processing GPS vectors. See the manual for details on the settings in the 'Output' dialog box. Press the OK to return to the main SurvNET dialog box.

3 Following is the main SurvNET window. To process the data chose the Process/Network Adjustment option.

The project should process and converge and the following windows should be displayed.

Let's review sections of the report that are unique to the processing of GPS vectors and the 3D model.

Notice that now that we are working with a specific datum instead of an assumed coordinate system that latitude/longitude, state plane coordinates and geocentric coordinates are all displayed.

In the above unadjusted observations section of the report, notice that distances have been converted to mark to mark distances. Note that vertical angles are now treated as measurements in the 3D model. And lastly, notice that the GPS vectors are also displayed. The GPS vectors are displayed as delta X,Y,&Z in the geocentric coordinate system.

In the above adjusted coordinate section of the report, notice that the grid, elevation, and combined factor are displayed with the adjusted geographic coordinates.

In the above adjusted measurements section the adjusted measurements are shown along with their residuals, standard residuals and standard deviation.

This completes the Lesson 3 tutorial title SurvNET.