

Guide to the Trimble Geomatics Office Sample Data

The Trimble Geomatics Office™ software is a link and survey reduction package. It provides a seamless link between your field work and design software. The software includes an extensive feature set that helps you to verify your fieldwork, easily perform survey-related tasks, and export your data to a third party design package.

This guide shows how to use the sample data provided with the Trimble Geomatics Office software version 1.5. It describes how to:

- create a project using the sample data template
- import sample data files
- process GPS baselines
- perform a network adjustment using both GPS and terrestrial observations
- view RTK and terrestrial data
- process feature codes
- export data

It also introduces the *Properties* window. For more information on the Trimble Geomatics Office software, refer to the *Trimble Geomatics Office User Guide* and the Help.

Note – *The section on processing GPS baselines only applies if you have the WAVE™ Baseline Processing module installed. Also, the sections on performing a network adjustment only apply if you have the Network Adjustment module installed.*



Creating a Project Using the Sample Data Template

To start the Trimble Geomatics Office software:

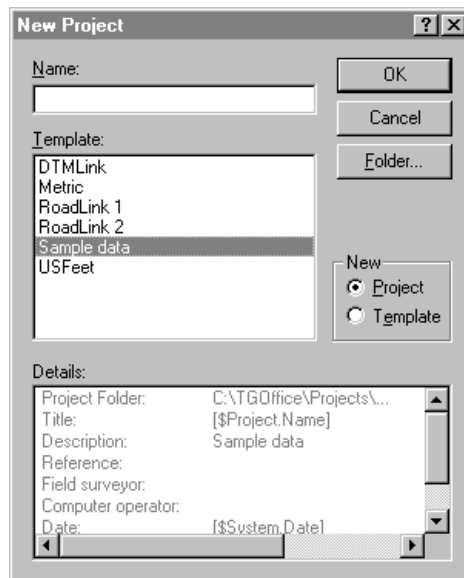
- Click  **Start** and then select *Programs / Trimble Geomatics Office / Trimble Geomatics Office*.

The Trimble Geomatics Office window appears.

To create a project:

1. Do one of the following:
 - Select *File / New Project*.
 - In the standard toolbar, click the *New Project*  tool.
 - In the project bar, click the *New Project*  shortcut.

The following dialog appears:



2. In the *Name* field, enter a name for the project.
3. From the *Template* list, select the *Sample Data* option.

4. In the *New* group, make sure that the *Project* option is selected and then click **OK**.

The project is created and the *Project Properties* dialog appears. The values in the fields in each tab are derived from the sample data template.

5. To close the *Project Properties* dialog, click **OK**.

Importing Sample Data Files

Table 1 lists the file formats and file names of the data in the sample data template.

Table 1 Sample Data

Data File Format	Filename	
NGS Data Sheet (*.htm)	moon2.htm	f1239.htm
	n245.htm	
Survey Controller (*.dc)	topo.dc	pp_kin.dc
	fast_sta.dc	
GPS Data (*.dat)	cont0550.dat	ppkin055.dat
	fast0550.dat	Wave055.dat
	Ktom0550.dat	Moon0550.dat
Name, North, East, Elevation, Code format	Control Coordinates.csv	
Digital Level files (*.dat, *.raw)	Level.dat	


This section shows you how to import the following files:

- NGS Data Sheet
- Control Coordinate
- GPS Data

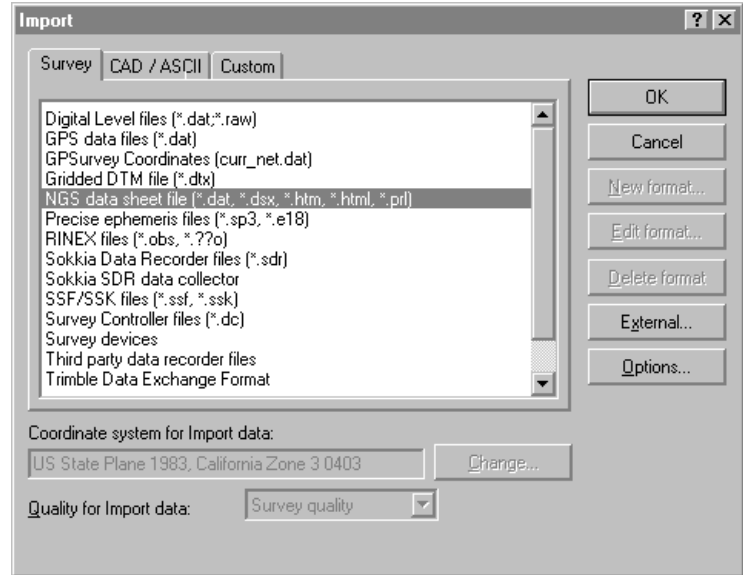
Importing NGS Data Sheet Files

National Geodetic Survey (NGS) Data Sheet files are files that contain coordinates for survey monuments in the United States of America. This section describes one way to import control information.

To import these files into your sample data project:

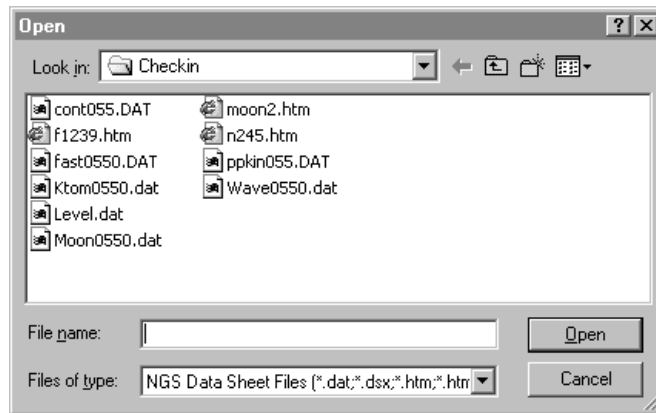
1. Open the *Import* dialog. To do this, do one of the following:
 - Select *File / Import*.
 - Select the *Import*  tool.

The following dialog appears:



2. In the *Survey* tab, select the *NGS data sheet file* (*.dat, *.dsx, *.htm, *.html, *.prl) option.

- Click **OK**. The following dialog appears:



The *Look in* field defaults to the project's *Checkin* folder.

- Highlight the moon2.htm, n245.htm, and f1239.htm files to import. (To select multiple files, press **[Ctrl]**.)
- Click **Open**.

The software imports the NGS data files and stores them in the Data Files\Trimble Files folder for the project. It imports the control points for the moon2, n245, and f1239 files, which you can see in the Survey view. The triangle symbol for the moon2 file shows that it is a 2D control point. The square symbols for the n245 and f1239 files show they are 1D control points (only the elevation is of control quality).

Labeling the points

To show the names of the points on the screen:

- Select *Select / All*.
- Select *View / Point Labels*. The *Point Labels* dialog appears.
- In the *Label Points with* field, select the *Name* check box and then click **OK**.

The points are labeled with their names.

Importing Control Coordinates

You can also import control coordinates from a text file into your project. To do this:

1. Select *File / Import* to open the *Import* dialog.
2. In the *Custom* tab, select the *Name, North, East, Elevation, Code* option.
3. In the *Quality for Import data* field, select *Control* quality.
Selecting this option ensures that the points you are about to import will have a control quality.
4. Click **OK**. The *Open* dialog appears. The *Look in* field defaults to the project's *Checkin* folder.
5. Highlight the *Control Coordinates.csv* file.
6. Click **Open**.

The software imports the Control Coordinate file and stores it in the *Data Files\Trimble Files* folder for the project.

Importing GPS Data (*.dat) Files

Using the *GPS Data files (*.dat)* option in the *Import* dialog, import the following files:

- *fast0550.dat*
- *Ktom0550.dat*
- *Moon0550.dat*
- *Wave0550.dat*

When you import GPS Data files, the *DAT Checkin* dialog appears. This dialog shows information about the imported GPS files. Click **OK** to import the .dat files.

The unprocessed baselines are displayed in the Survey view.

Use the steps outlined in Labeling the points, page 5, to label the GPS points.

Note – You can view a project in the Survey view or the Plan view. Use the Survey view when performing survey-related tasks, and the Plan view to view topographic features observed during the field survey.

Processing GPS Baselines

The Trimble Geomatics Office software includes the WAVE™ (Weighted Ambiguity Vector Estimator) baseline processor and Timeline. The WAVE baseline processor computes baseline solutions from GPS field observations made using static, FastStatic, or kinematic data collection procedures. Timeline displays GPS data found in raw observation files in a graphical, time-based format. Timeline is only available in the Survey view.

This section describes how to:


- use the WAVE Baseline Processor to process GPS baselines
- evaluate processed results
- examine observations in Timeline

Note – The functionality described in this section is only available if the WAVE baseline processing module is installed.

Processing Potential Baselines

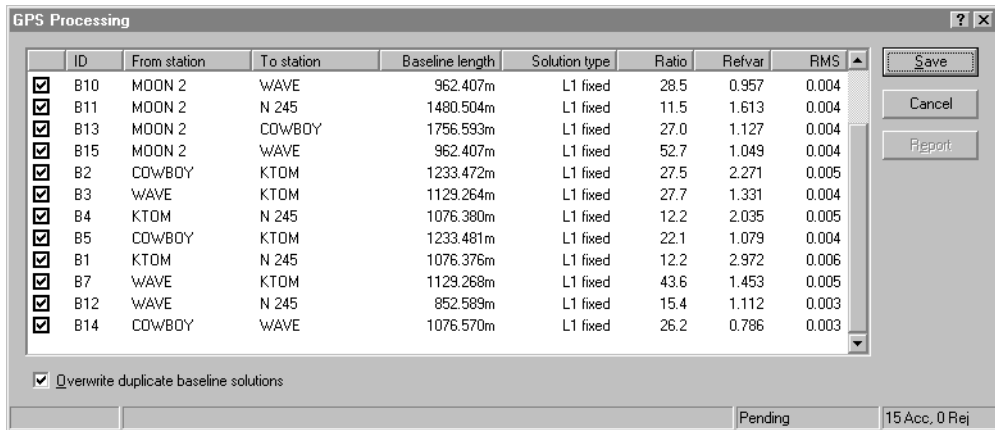
To process all potential baselines, do the following:

1. To ensure that no baselines are selected, do one of the following:
 - Select *Select / None*.
 - Click on a blank area of the screen.

2. To start the WAVE baseline processor, do one of the following:
 - Select *Survey / Process GPS Baselines*.
 - In the project bar, in the *Trimble Survey* or *Process* groups, click the *Process GPS Baselines*  shortcut.

The *GPS Processing* dialog appears.

Initially, the status bar in the bottom left corner of the dialog shows the files being loaded for processing. When the actual processing begins, the status bar shows the *From* and *To* stations and results are added to the table as they are completed. The processor then continues with the next baseline until all processing is complete, as shown below:



In its right corner, the status bar now displays a summary of the number of baselines accepted (Acc) and rejected (Rej).

3. Click **Save** to save the processed GPS baselines.

Use the steps outlined in Labeling the points, page 5, to label the GPS points that have just been processed.

Figure 1 shows the processed GPS baselines.

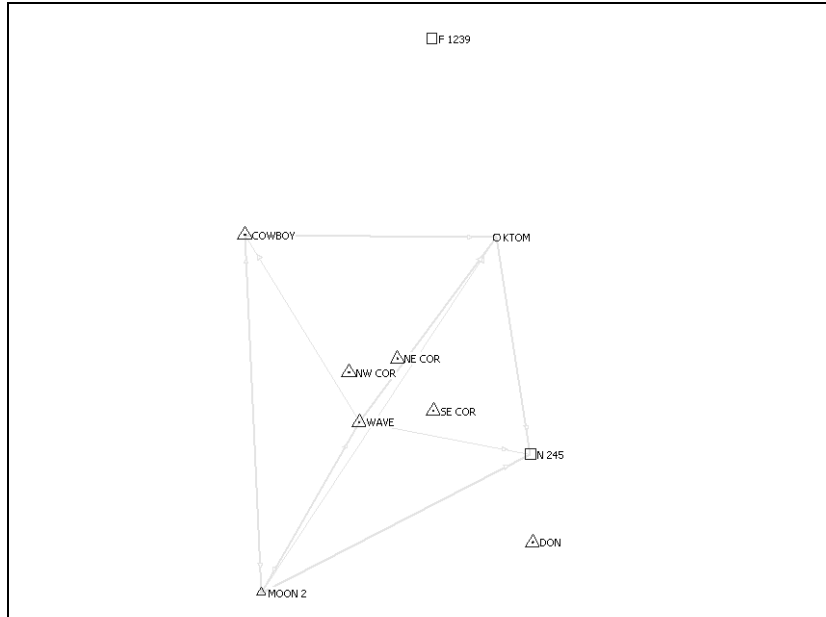
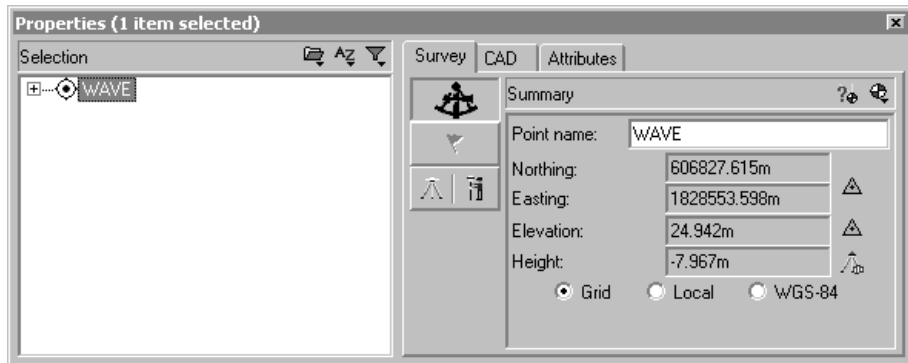


Figure 1 The GPS baselines

Evaluating Results


To examine the point WAVE:

1. Double-click the point WAVE in the center of the network. The following *Properties* window appears:





The *Properties* window lets you view the details of all entities (points, observations, lines, arcs, curves, text, annotations). Use it whenever you want to view and edit entity details.

To open the *Properties* window at any time, do one of the following:

- Select *Edit / Properties*.
- In the standard toolbar, click the Edit Properties  tool.
- Double-click a graphical entity.
- Press **[Alt]+[Enter]**.

When the *Properties* window is open, you can view an entity's details by clicking on it in the graphics window.

In the *Properties* window, the *Summary* page shows the coordinates and coordinate quality for the point WAVE. (To access this page, click .)

2. Expand the tree on the left hand side of the *Properties* window to view the observations and keyed-in coordinates for the point WAVE.
3. The Point Derivation report shows how a recomputation determined the calculated position for the point WAVE. To view the report, select .
4. The Point Derivation report appears. In this case, the NEE coordinate in the control coordinates text file was adopted. The height was derived from the geoid model.
5. Close the report.

Viewing the GPS Baseline Processing report

To view the GPS Baseline Processing report for the baseline from MOON 2 to WAVE:

1. Select the baseline from MOON 2 to WAVE. In the *Properties* window, do the following:
 - a. Make sure that WAVE is still selected.
 - b. In the left pane, click the plus sign (+) next to the point name WAVE to show all of the observations for the point.
 - c. Select MOON 2-WAVE.
2. Select *Reports / GPS Baseline Processing Report*.


The GPS Baseline Processing report appears. Scroll through the report to view the baseline summary, the baseline components, and the tracking summary.

The report lets you assess whether the baseline processing has been successful, and check the entered field data. For example, you can check the satellite residuals.

3. Close the report.

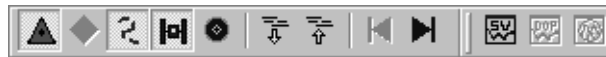
Using Timeline

You can use Timeline to examine the data for the baseline from MOON 2 to WAVE:

1. To start Timeline, do one of the following:
 - Select *View / Timeline*.
 - Select .

Timeline appears below the Survey map area of the graphics window. Horizontal bars represent the data collected by each GPS receiver. If a bar is broken into segments, this shows that it has multiple occupations.

The Timeline and Plot toolbars also appear, as shown below:



Tip – The Survey map area and Timeline are both part of the graphics window. To show more or less of Timeline, raise or lower the bar separating Timeline from the Survey map area.

2. In the *Properties* window, select the baseline from MOON 2 to WAVE.

The time in the *Properties* window shows that the baseline from MOON 2 to WAVE was observed for 8 minutes, from 7:11:02 on the 25th February 1999.

3. Enlarge Timeline so that it covers half of the graphics window.

Figure 2, shows the base receiver (*MOON 2*) and the roving receiver (*WAVE*) segments for the baseline. The bottom half of the observation segment bar is highlighted in a different color.

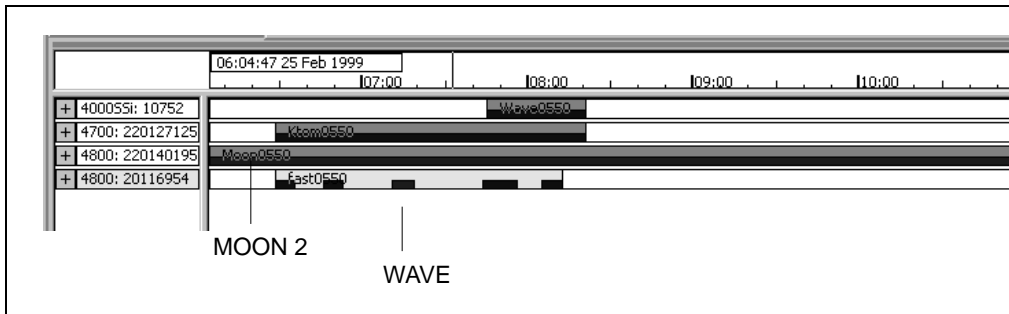
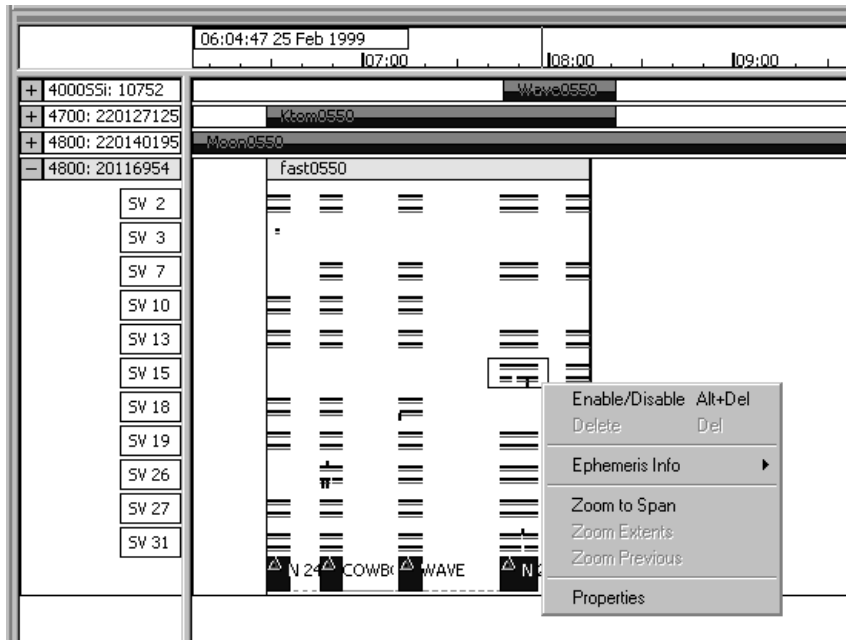


Figure 2 Timeline

4. In the file 4800:20116954, in the highlighted data segment, right-click to access the shortcut menu, and then select *Zoom to Span*. The data segment widens along the Timeline screen.
5. To expand the file, click the plus sign (+). This shows the satellites that were observed at *WAVE*.
6. To view the elevation data for satellite 26:
 - a. On SV 26, right-click to access the shortcut menu, and then select *SV Plot*. The *Timeline-GPS Signal Plots* window appears. You can use this window to view information about the satellites that were observed. For example, you can view the L1 and L2 signal-to-noise (SNR) ratios, the satellite azimuth, and the elevation.
 - b. Close the *Timeline-GPS Signal Plots* window.

- To view information about each observation, double-click on an observation segment. The *GPS Observation Properties* dialog appears.

*Note – If your GPS observations contain cycle slips, you can disable them. Drag a box around the cycle slip, then right-click to access a shortcut menu and select *Disable*, as shown below:*



- To close Timeline, select *View / Timeline*.

For more information about Timeline, refer to the *WAVE Baseline Processing User Guide*.

GPS Loop Closures

To check the quality of, and identify any errors in, a set of GPS observations within a network, you can perform loop closures and then view the GPS Loop Closures report.

To set up the information to be displayed in the GPS Loop Closures report:

1. Select *Reports / Setup / GPS Loop Closures Report*. The *Loop Closure Settings* dialog appears.
2. In the *Tolerance* group, set the horizontal and vertical tolerance.
3. In the *Report Sections* group, select the sections to be displayed in the report.

To view the GPS Loop Closures report:

1. Select *Reports / GPS Loop Closures Report*. If you have observations selected, the *Loop Closure Report* dialog appears:
 - In the *Report on* group, select the *Whole database* option and then click **OK**. The GPS Loop Closures report appears.

In the *Summary* section, the number of failed loops is 0. This shows that the GPS baseline loops close within the set tolerance, and that the data is ready for a network adjustment.

2. Close the report.

Performing a Minimally Constrained Adjustment of GPS Data

A minimally constrained adjustment is an adjustment with only one control point, which is held fixed in the survey network. This section describes how to:

- display the Ellipse Controls
- select the adjustment datum
- fix a point in the network
- perform a minimally constrained network adjustment
- view the adjustment results

Note – You can only perform a network adjustment if you have purchased the Network Adjustment module.


Setting up the project for minimally constrained adjustment for GPS data

The following sections show how to perform a minimally constrained adjustment of GPS data.

Display the ellipse controls

To display the *Ellipse Controls* toolbar, do one of the following:

- Select *View / Toolbars / Ellipse Controls*.
- Right-click on the Trimble Geomatics Office toolbar to access the shortcut menu, and then select *Ellipse Controls*.

In the toolbar, select the *Error Ellipse*  tool to show the ellipses when the adjustment is performed.

Set the WGS-84 datum

To perform a minimally constrained adjustment of GPS data, select the WGS-84 datum.

To do this:

- Select *Adjustment / Datum / WGS-84*.


Set the adjustment style

You can set up the adjustment style to suit your project. In this example, use the 95% confidence limits for the adjustment style. To do this:

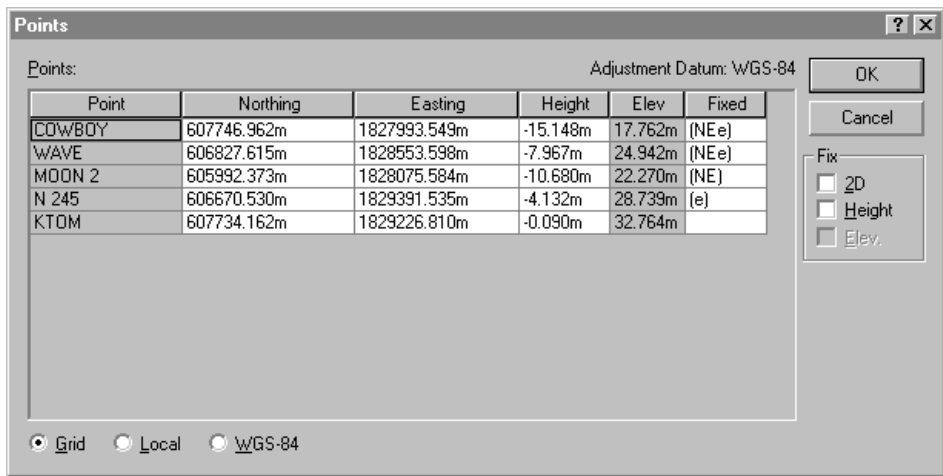
1. Select *Adjustment / Adjustment Styles*. The *Network Adjustment Styles* dialog appears.
2. In the *Network Adjustment Styles* dialog, select 95% Confidence Limits from the list and then click **Edit**.
3. In the 95% Confidence Limits dialog, select the *Set-up Errors* tab.
4. In the *GPS* group, do the following:
 - In the *Error in Height of Antenna* field, enter 0.003.
 - In the *Centering Error* field, enter 0.002.
5. In the *Terrestrial* group, do the following:
 - In the *Error in height of Instrument* field, enter 0.003.
 - In the *Centering Error*, enter 0.002.
6. To close each dialog, click **OK**.

Fixing the points in the network adjustment

To fix the points for the adjustment:

1. Do one of the following:
 - In the *Adjustment* group of the project bar, click the *Points*  shortcut.
 - Select *Adjustment / Points*.

The following dialog appears:




2. In the *Points* dialog, select MOON 2.
3. In the *Fix* group, select the 2D check box.
4. Click **OK**.

The point MOON 2 is fixed in the adjustment.

Performing a Minimally Constrained Adjustment

To perform the adjustment, do one of the following:

- Select *Adjustment / Adjust*.
- In the *Adjustment* group of the project bar, click the *Adjust*  shortcut.

Error ellipses will appear in the Survey view.

Viewing the Adjustment Results

To view the results of the adjustment, you need to view:

- the Network Adjustment report
- the *Observations* dialog

The following sections describe each task.

Viewing the Network Adjustment report

To view the Network Adjustment report:

1. Select *Reports / Network Adjustment Report*. The Network Adjustment report appears.
2. Maximize the report and in the Contents section, click *Statistical Summary*. (This summary is an important tool for analyzing the adjustment.)

The Chi-square test shows how well your observations fit together. However, in this adjustment, the Chi-square test fails. The network reference factor shows how well the observation errors are estimated. In this case, it exceeds 1.0.

3. Close the report.


When the Chi-square test fails and the network reference factor exceeds 1.0, this shows that the estimated observational errors are underestimated and do not match the amount of adjustment made to the observations.

There are two options:

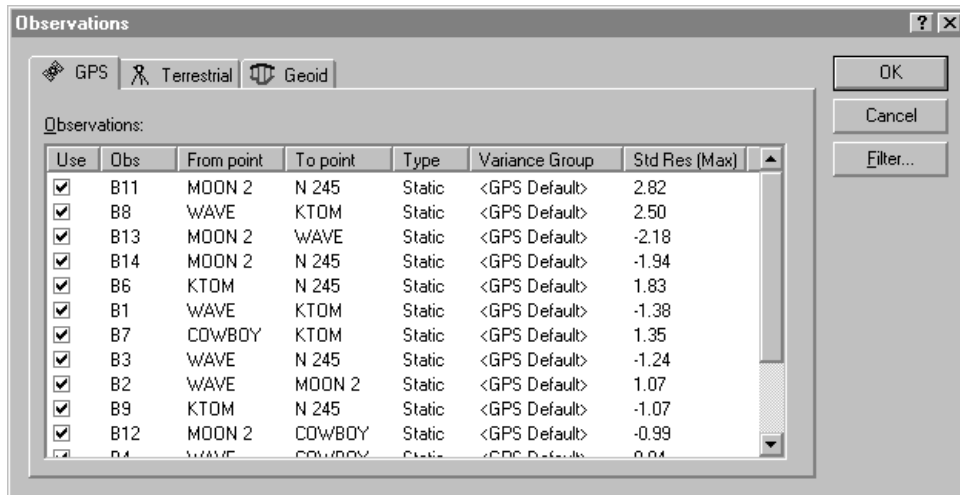
- Check to see that there are outliers in your data.
- Apply a scalar to the estimated errors to model the observation errors more accurately. (For more information, see *Applying a Scalar to the Estimated Errors*, page 21.)

Viewing the observations dialog

To view information in the *Observations* dialog:

1. Do one of the following:
 - In the *Adjustment* group of the project bar, click the *Observations*  shortcut.
 - Select *Adjustment / Observations*.

The following dialog appears:



2. To sort by outliers, click **Std Res (Max)**. In this case, there are no outliers.

Note – Select an observation to highlight it in the Survey view.

3. Click **OK** to close the *Observations* dialog.

Applying a Scalar to the Estimated Errors

To apply a scalar to the estimated errors:

1. Select *Adjustment / Weighting Strategies*. The *Weighting Strategies* dialog appears.
2. Make sure that the *GPS* tab is selected.
3. In the *Scalar Type* group, select the *Alternative* option.
Using the alternative scalar strategy for the second adjustment automatically multiplies the first scalar value (1.0) by the current adjustment network reference factor value.
4. Click **OK**.
5. To readjust the network, select *Adjustment / Adjust*.
6. To view the Network Adjustment report, select *Reports / Network Adjustment* report.
7. Maximize the report and in the *Contents* section, click *Statistical Summary*.
During the second adjustment, the new scaled estimated errors are applied. The Chi-square test still fails.
8. Close the report.
9. You can automate the process of applying a scalar to the estimated errors, using the automatic scalar option. To do this:
 - a. Select *Adjustment / Weighting Strategies*. The *Weighting Strategies* dialog appears.
 - b. Make sure that the *GPS* tab is selected.
 - c. In the *Scalar Type* group, select the *Automatic* option.
 - d. Click **OK**.

The software performs an automatic adjustment, using the Alternative scalar type option. It repeats this adjustment until the global statistics are acceptable; that is, until the Chi-square test passes. For more information, refer to the Help.

10. Readjust the network and view the Network Adjustment report. The Chi-square test should now pass.
11. Close the Network Adjustment report.

Note – When you have finished performing a minimally constrained adjustment on the GPS data, you can save coordinates for a calibration by selecting Adjustment / Calibration Coordinates / Save.

Adjusting Terrestrial Data

The Trimble Geomatics Office software supports the adjustment of terrestrial data, as well as GPS data. To include terrestrial data in an adjustment, you need to do the following:

1. Import terrestrial data.
2. Investigate any error flags.
3. Change to the adjustment datum.
4. Load geoid observations.
5. Perform a minimally constrained adjustment on the terrestrial data.
6. View the network adjustment report.

Importing Terrestrial Data

The terrestrial data set that is used in the sample data is called Topo.dc.

To import it:

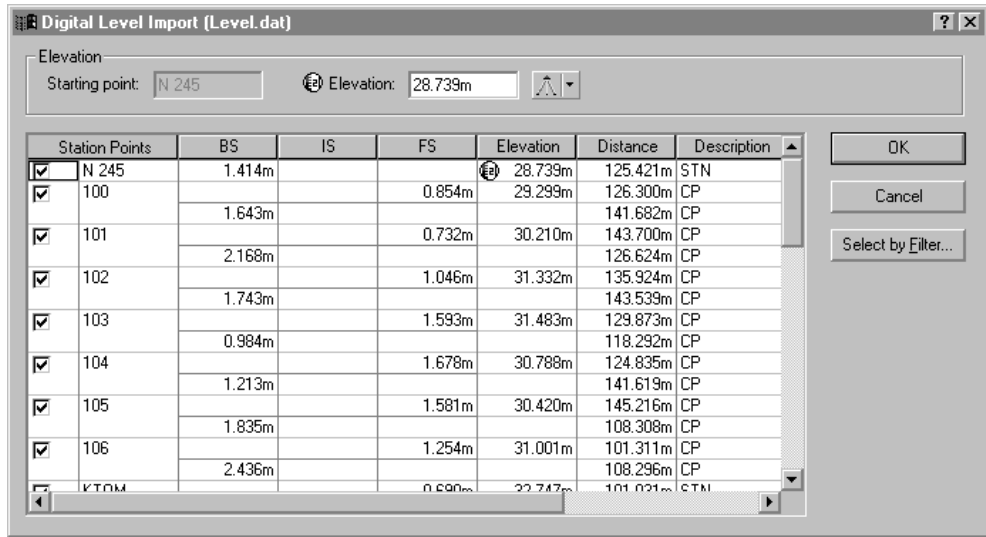
1. Select *File / Import* to open the *Import* dialog.
2. In the *Survey* tab, select the *Survey Controller files (*.dc)* option.
3. Click **OK**. The *Open* dialog appears. The *Look in* field defaults to the project's *Checkin* folder.
4. Highlight the Topo.dc file.
5. Click **Open**.

The software imports the file and stores it in the Data Files\Trimble Files folder for the project.


Leveling observations or delta elevations often form part of the terrestrial adjustment network. You can also use them to improve the elevations derived from GPS observations. There is a Digital Level file included with the sample data. To import data from a Digital Level file:

1. Select *File / Import* to open the *Import* dialog.
2. In the *Survey* tab, select the Digital Level files (*.dat, *.raw) option.
3. Click **OK**. The *Open* dialog appears. The *Look in* field defaults to the project's *Checkin* folder.
4. Highlight the Level.dat file.

- Click **Open**. The following dialog appears:



The *Digital Level Import* dialog does the following:


- Displays the data from a Digital Level file
- Determines which points are used to compute delta elevations. (Delta elevations are only computed between points selected as station points).
- Shows the elevation of the starting point. The starting point is represented by the symbol .

For more information, refer to the Help.

- To make sure that only the station points are imported into the project, click **Select by Filter**. The *Define Level Stations* dialog appears.
- Select the *Select points with* option.
- Make sure that the *Description* list shows *STN** and then click **OK**. In the *Digital Level Import* dialog, the points that are not station points will be cleared.
- Click **OK**. The Digital Level file is imported.

Note – Editing the data in the *Digital Level Import* dialog does not edit the digital level file.

To view the digital level observations in the *Properties* window:

1. Select *Select / Observations*. The *Observations* dialog appears.
2. From the *Type* list, select the *Delta Elevations* check box and then click **OK**.
3. To open the *Properties* window, do one of the following:
 - Select *Edit / Properties*.
 - In the standard toolbar, click the *Edit Properties*  tool.
 - Press **[Alt]+[Enter]**.

When the *Properties* window is open, click on a specific level observation to view its details.

4. Close the *Properties* window.

Investigating Error Flags

When you import Topo.dc, error flags appear in the data. To investigate them, do one of the following:

- Double-click on the error flags in the graphics window.
- Double-click on the error flag shown in the status bar.

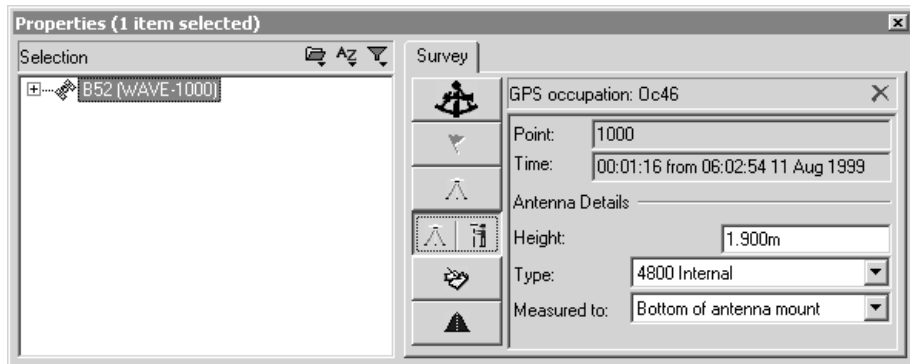
If you use the *Flag* icon in the status bar, all points with error flags appear in the *Properties* window.

To investigate these flags, you can view the point information in the Point Derivation report.

On point 1000, the flag is caused by the elevation and height on two check observations being out of tolerance. These two check observations do not match the enabled observation. This indicates that there may be something wrong with the observation.

To investigate it:

1. In the Point Derivation report for point 1000, click the hyperlink (the satellite icon) for the enabled observation and minimize the report. The observation is selected in the *Properties* window.
2. In the *Properties* window, select the rover Occupation page, as shown below:



3. The antenna height is 1.900. In this example, it should be 1.800.
4. In this page, change the antenna height to 1.800 and press **Enter**. The antenna height is changed.
5. To recompute the data, do one of the following:
 - Select *Survey / Recompute*.
 - Press **F4**.
6. The flag on point 1000 is removed.

Note – At this stage you can check that other antenna height blunders do not occur in the data. To change all of the 1.900 meter antenna heights to 1.800 meters, use the *Multiple Edit* dialog.

Adjusting Terrestrial Observations

The following sections show you how to adjust terrestrial observations.

Note – In this sample data, there is not enough redundancy in the level data to perform the minimally constrained terrestrial adjustment without the GPS data present. In some cases, you may have enough redundancy to remove your GPS data before performing a minimally constrained terrestrial adjustment.

Setting the adjustment datum

To perform a minimally constrained adjustment on terrestrial observations, you will need to change the datum to the project datum. To do this:

- Select *Adjustment / Datum / Project Datum – NAD 1983 Conus*.

Create a variance group for level observations

To create a separate variance group for the level observations in the adjustment, do the following:

1. Select *Adjustment / Observation Groups / Variance Groups*. The *Variance Group* dialog appears.
2. In the *Terrestrial* tab, click **New**. The *New Variance Group* dialog appears.
3. In the *Name* Group, enter **Level Observations** and then click **OK**. The *Edit Variance Group* dialog appears.
4. Click **Filter**. The *Observation Filter* dialog appears.
5. Clear all of the check boxes except *Delta elev* and click **OK** to return to the *Edit Variance Group* dialog.
6. In the *Available Observations* group, select the delta elevations observations and click **Add**. The delta elevation observations now appear in the *Group observations* field.

7. Click **OK** to return to the *Edit Variance Group* dialog.
8. Click **Close**.

Remove sideshots from the adjustment

The following example shows how to remove side shots from the adjustment:

1. To select the sideshot observations:
 - a. Select *Select / Observations*. The *Select Observations* dialog appears.
 - b. Make sure that the *General* tab is selected.
 - c. In the *Type* list, select the *Terrestrial – Single face only* check box.
 - d. Select the *Side shots only* check box.
 - e. Click **OK**.

The terrestrial sideshot observations are selected.

2. To remove the sideshot observations from the adjustment:
 - a. Select *Edit / Multiple Edit*. The *Multiple Edit* dialog appears.
 - b. In the *Perform these edits to the selected observations* group, select the *Use in Network Adjustment* option.
 - c. From the *Use in Network Adjustment* list, select No.
 - d. Click **OK**.

The sideshot observations will not be used in the network adjustment.



Tip – You can also remove the sideshot observations from the adjustment using the *Terrestrial* tab in the *Observations* dialog. To do this, clear the *Use* check box for a highlighted observation. The *Use* check box for all of the other selected observations will also be cleared.

At this point in the adjustment, you will also need to load geoid observations so that the relationship between elevations (from terrestrial observations) and ellipsoid heights (from GPS observations) can be established.


Loading geoid observations

To load geoid observations:

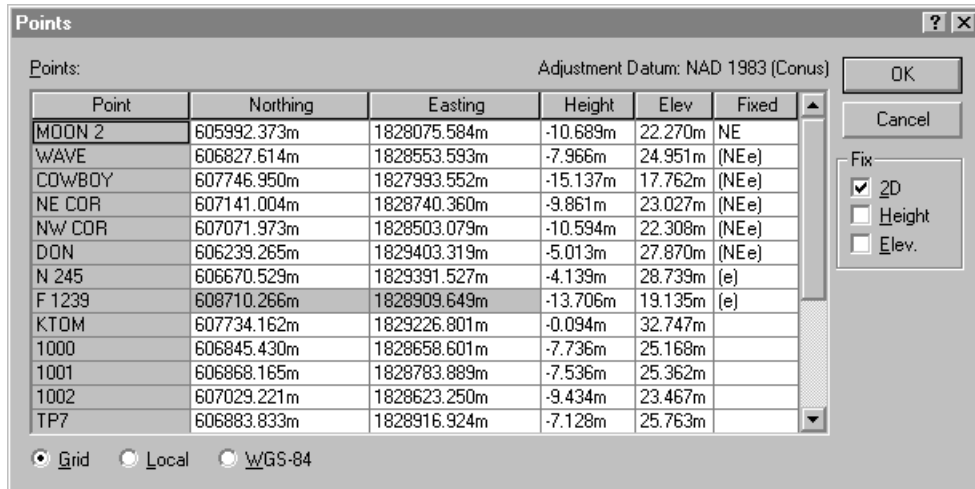
1. Select *Adjustment / Observations*. The *Observations* dialog appears.
2. In the *Geoid* tab, click **Load**. The geoid observations are loaded into the *Observations* group.
3. Click **OK**. You are now ready to fix a point in the network.

Fixing the points in the network

To fix the points for the adjustment:

1. Do one of the following:
 - In the *Adjustment* group of the project bar, click the *Points*  shortcut.
 - Select *Adjustment / Points*.


The following dialog appears:



2. Select MOON 2, and in the *Fix* group, select the 2D check box.
3. Select N245, and select the *Elev.* check box.
4. Select F1239, and select the *Elev.* check box.
5. Click **OK**.

Adjust

To perform the adjustment, do one of the following:

- Select *Adjustment / Adjust*.
- In the *Adjustment* group of the project bar, click the *Adjust*  shortcut.

Viewing the Network Adjustment report

To view the Network Adjustment report:

1. Select *Reports / Network Adjustment Report*. The Network Adjustment report appears.
2. Maximize the report and in the *Contents* section, click *Statistical Summary*. (This summary is an important tool for analyzing the adjustment.)

The Chi-square test shows how well your observations fit together. The network reference factor shows how well the observation errors are estimated. In this case, the Chi-square test passes.

Note – You should also view the *terrestrial observation statistics*.

3. Close the report.

Scaling the errors

To scale the standard errors:

1. Select *Adjustment / Weighting Strategies*. The *Weighting Strategies* dialog appears.
2. Make sure that the *Terrestrial* tab is selected.
3. In the *Apply Scalars To* group, select the *Variance Groups* option.
4. In the *Scalar Type* group, select the *Automatic* option.
5. Click **OK**.
6. Select *Adjustment / Adjust* to readjust the network and then view the Network Adjustment report.

7. To scale the geoid observations:
 - a. Before scaling the geoid observations, you need to fix elevations. In the *Points* dialog, fix the elevations of the points *N 245*, *WAVE*, *DON*, and *F 1239*.
 - b. In the *Weighting Strategies* dialog – *Geoid* tab, select the *Alternative* scalar type option.
8. Select *Adjustment / Adjust* to readjust the network and then view the *Network Adjustment* report.
9. Click **OK**.


Performing a Fully Constrained Adjustment

You can now perform a fully constrained adjustment.

To do this:

1. Make sure that the adjustment datum is still set on the project datum.
2. You now need to generate the necessary transformations by constraining (fixing) the control points you have chosen to use in your network. The control points are usually well-established survey marks with high-accuracy horizontal (2D) or vertical coordinates.
3. To do this:
 - a. In the *Points* dialog, fix the following points:
 - MOON 2 – NE
 - N 245 – e
 - WAVE – NEe
 - DON – NEe
 - F 1239 – e
 - b. Click **OK**.

Note – Perform an adjustment after fixing each point. This lets you check that each point is not contributing to errors in the adjustment.

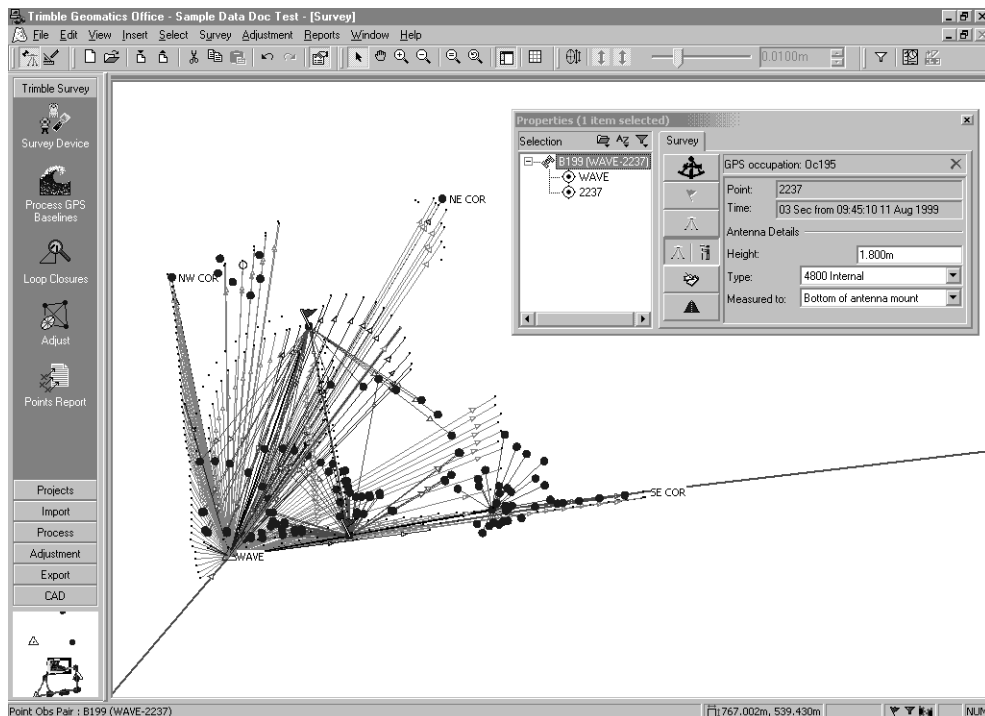
4. Select *Adjustment / Adjust* to perform a fully constrained adjustment.
5. Select *Reports / Network Adjustment Report* to view the *Network Adjustment Report*. The Network Adjustment report appears.
6. View the information in the Statistical Summary section. The Chi-square test passes, indicating a successful adjustment. You can now view the adjusted coordinates for the file.
7. Close the Network Adjustment report.
8. In the toolbar, select the *Error Ellipse*  tool to turn off the ellipse display.

For more information about network adjustments, refer to the *Network Adjustment User Guide*.

Viewing RTK and Terrestrial Data

This section shows how to view data in the Survey view.

The following window shows the data displayed in the Survey view. (In this case, view filters are used to customize the way that the observations are displayed. For more information, see Applying a View Filter, page 36.)

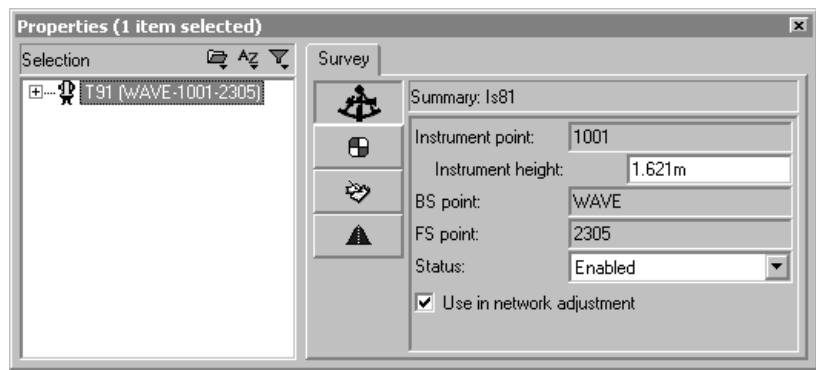




You can use the *Survey* tab of the *Properties* window to view and edit the survey-related properties of an entity. For example:

- Points
- GPS observations
- Conventional observations
- Laser rangefinder observations

- Reduced observations
- Level observations
- Azimuth observations

In the window on the previous page, the observations at the bottom left of the screen were collected conventionally because overhead obstructions prevented the collection of GPS data. Double-click on a conventional observation to display it in the *Properties* window, as shown below:




This *Properties* window shows the instrument setup details for the conventional observation from points 1001 to 2305. Use the *Target setup*  and *Observation data*  page buttons to examine the target setup details and the observation components between the instrument and target setups.

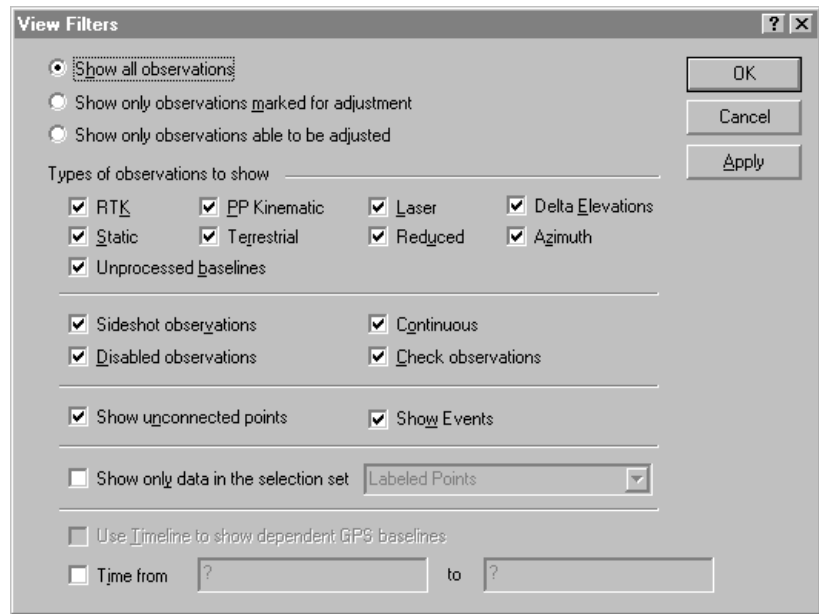
Use the *Properties* window to view the survey-related properties of other entities, such as laser rangefinder observations.

Applying a View Filter

You can use a view filter to change the way the observations are displayed in the Survey view. To apply a view filter:

1. Do one of the following:
 - Select the *View Filters*  tool.
 - Choose *View / Filters*.
 - Press **Ctrl+F**.

The following dialog appears:




2. To select the types of observations that you want to view, select an option from the *Observations* group. For example, select the *Show all observations* option to enable all observation types to be selected for viewing.

Note – The *Show only baselines marked for adjustment* and *Show only baselines able to be adjusted* options are only available if you have the Network Adjustment module installed.

The check boxes in the *Types of observations to show* group vary according to the option selected. The upper group displays the observation types that can be selected for viewing. The lower group displays the properties for the observation types (where applicable).

3. In the *Types of observations to show* group, do the following:
 - a. Select the check boxes from the upper group to select the observation types that you want to view.
 - b. Select the appropriate check boxes from the lower group to display only the observation types (selected in the upper group) with those properties.

Note – *You can only use the check boxes in the lower group if you have specified an observation type for the upper group.*

Once a filter is applied to a project, the *View Filters are on*  icon appears in the status bar. You can double-click this icon to access the *View Filters* dialog and make any changes to the filters.

Note – *The view filters remain applied even after you close and then reopen a project.*

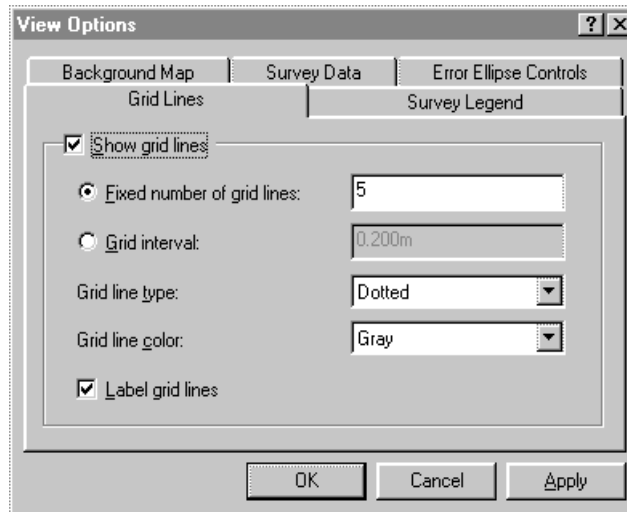
For more information on using the Survey view and applying a view filter, refer to the *Trimble Geomatics Office User Guide*.

Viewing Grid Lines

Grid lines in the graphics window show the scale of the project. They can help you to easily find particular coordinate locations.


To show grid lines in the graphics window, do the following:

1. Select *View / Options*. The following dialog appears:



2. In the *Grid Lines* tab, select the *Show grid lines* check box. You can display:
 - A fixed number of grid lines – the same number of grid lines will be displayed when you zoom in and out.
 - Grid lines at the interval that you specify – the number of grid lines displayed is increased or decreased depending on whether you zoom in or out.
3. Select an appropriate line type and color from the *Grid line type* and *Grid line color* lists.
4. If necessary, label the grid lines by selecting the *Label grid lines* check box.



Tip – You can also display the grid lines in the graphics window by selecting the *Grid Lines*  tool in the toolbar.

Viewing Background Maps

The Trimble Geomatics Office software can display Background Map files in the graphics window. You can import Drawing exchange format (.dxf), Windows bitmap (.bmp), or Tagged Image File Format (.tif) files to display. These files must be georeferenced, using ESRI's World file format, to be displayed correctly.

A World file is an ASCII text file with a .tfw or .wld extension. To be used in the Trimble Geomatics Office software, the World file must:

- use the same coordinate system as your project
- have the same units as your project

Note – *The rotation in the World file is not used in the Trimble Geomatics Office software.*

To select a Background Map file to display:

1. Select *View / Options*. The *View Options* dialog appears.
2. In the *Background Map* tab, click **Add**. The *Add* dialog appears.
3. Select *halfmoon.bmp* and click **Open**. The file appears in the File names list in the *Background Map* tab.
4. Click **OK**. An aerial photo image appears in the background of the graphics window.

To remove the image:

- In the *Background Map* tab, select the file and click **Remove**.

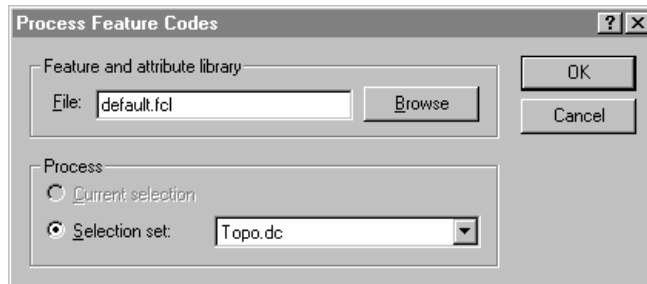
For more information about Background Map files, refer to the Help.

Feature Code Processing

This section describes how to process feature codes. You can process any points that have feature codes assigned to them.

To process feature codes:

1. Switch to the Plan view. To do this, do one of the following:
 - In the toolbar, select the *Plan View* tool.
 - Select *View / Plan*.
2. In the Plan view, select *Tools / Process Feature Codes*. The following dialog appears:

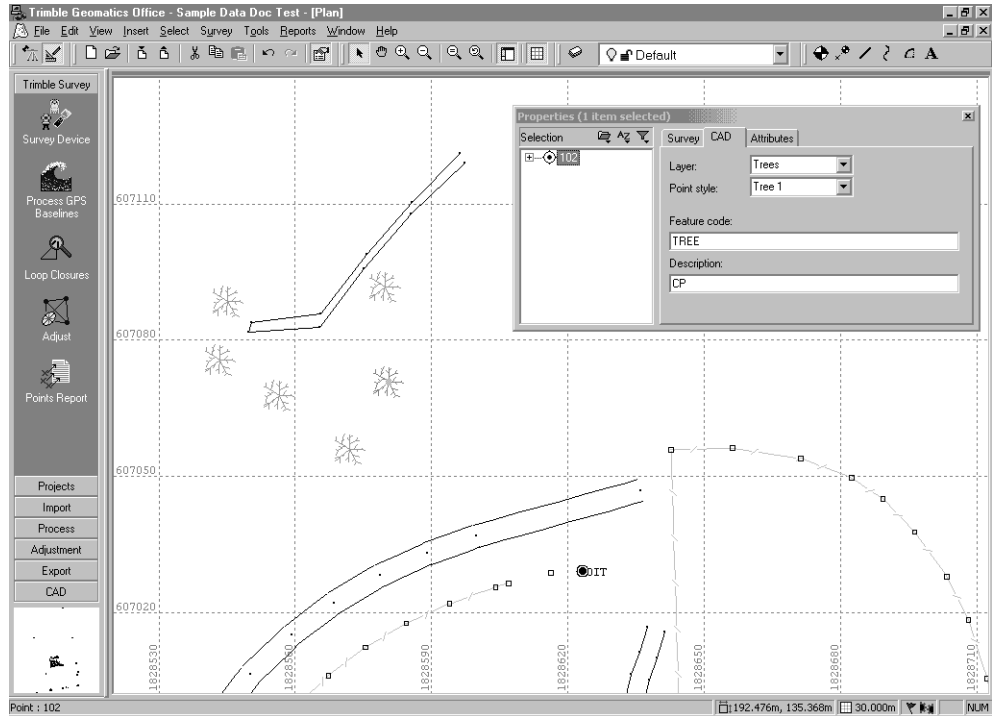


3. In this example, use the Default.fcl feature and attribute library that appears in the dialog. However, you can click **Browse** and use the *Browse* dialog to locate and select the feature and attribute library with which you want to process feature codes.
4. In the *Process* group, select the Topo.dc selection set.

Note – You must choose a selection set created from the imported .dc file, **not** the current group of selected points. This ensures that the points are processed in the order in which they are collected. If you select points using any other selection method, unexpected feature code processing can occur.

5. Click **OK** to start processing feature codes.

The following window shows the zoomed results of the feature code processing:



After feature code processing, the Plan view graphically shows the area that was surveyed. (Note that conventional observations were made in an area where there are a lot of trees.)

The sample data also has feature and attribute information.

To view attributes:

1. Double-click a point feature. The *Properties* window appears.
2. Select the *Attributes* tab. It shows the attributes for the currently selected feature.

You can export attributes to a number of popular GIS software formats. For more information, refer to the Help.

In the Plan view you can also do the following:


- Create, edit, and delete:
 - Layers
 - CAD styles
 - Annotation templates
- Add lines, curves, arcs, text, and annotations

For more information on using the Plan view, refer to the *Trimble Geomatics Office User Guide*.

Exporting Data

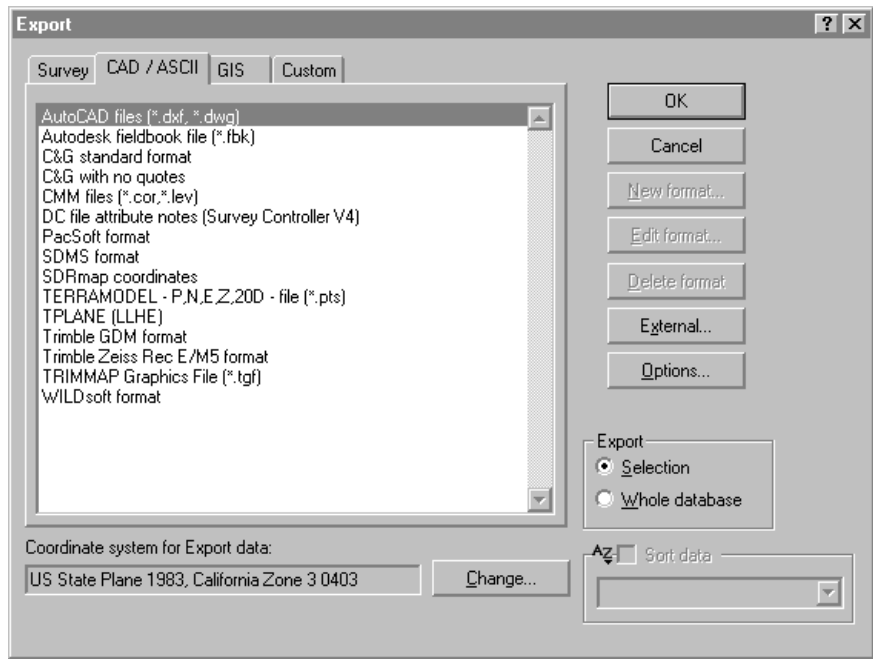
This section shows how to export the project as an AutoCAD .dxf file.

To create a .dxf file from your project:

1. Do one of the following:
 - Select *File / Export*.
 - Click the *Export*  tool.

The *Export* dialog appears.

2. Select the *CAD / ASCII* tab, as shown below:



Tip – You can configure the format of the DXF/DWG file by clicking **Options**.

3. Select the *AutoCAD files (*.dxf/*.dwg)* option and click **OK**. The *Save As* dialog appears.
4. Locate the folder you want to export the file to.
5. In the *File Name* field, enter a name and then click **Save**.

The software creates the file in the folder that you selected.

Further Information

This document uses the sample data to show some of the functionality of the Trimble Geomatics Office software. There are also other files that can be easily imported and viewed.

For more information, refer to the *Trimble Geomatics Office User Guide*, *WAVE Baseline Processing User Guide*, and the *Network Adjustment User Guide*.

Copyright

© 2000–2001 Trimble Navigation Limited. All rights reserved. The Sextant logo with Trimble is a trademark of Trimble Navigation Limited, registered in the United States Patent and Trademark Office. The Globe & Triangle logo with Trimble, Trimble Geomatics Office, and WAVE are trademarks of Trimble Navigation Limited. All other marks are the property of their respective owners.