Using Spreadsheets, Selection Sets, and COGO Controls

About this tutorial

In this tutorial, you will view spreadsheets, create a selection set, and work with COGO controls.

Note: If you need additional help at any time you are using the software, press **F1** to display the online help.

Step 1. Open the project

For this tutorial, you will use the project file *Using Spreadsheets.vce*. GNSS, total station, and level data has already been imported into the project, and GNSS baselines have been processed.

Note: The downloaded *UsingSpreadsheets* folder contains this PDF file and the *Using Spreadsheets.vce* project file.

1. In SO, select **File > Open**.

2. In the **Open File** dialog, browse to *..\UsingSpreadsheets\Using Spreadsheets.vce* and click **Open**.

   The project opens in the **Survey Office** window.
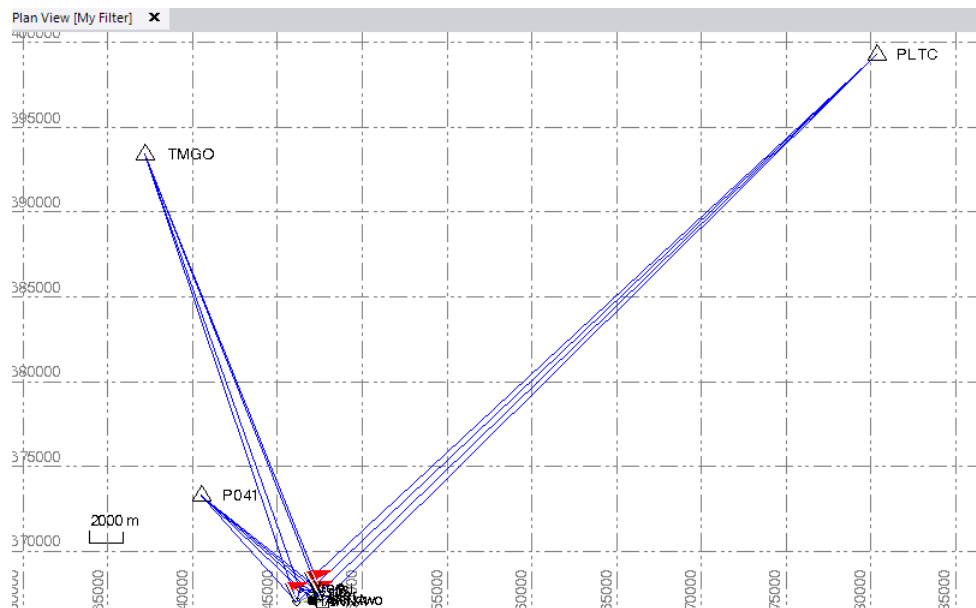
The project file is read-only. You can perform the tutorial steps without saving the project file. However, if you are interrupted while performing the tutorial, you can save it with a new name by selecting **File > Save Project As**. Then, you can re-open the project to continue the tutorial at a later time.

You are now ready to explore some of **Survey Office's** features.

Step 2. View spreadsheets

In this step, you will view two spreadsheets available in **Survey Office:**

- **Occupation Spreadsheet**
- **Point Spreadsheet**

You can customize what is displayed in spreadsheets and how it is displayed, as shown in the following steps.

1. In the **Quick Access** toolbar **(**located at the top of the **SO** window), select **Project Settings**.

2. In the navigation (left) pane in the **Project Settings** dialog, select **View > Points Spreadsheet**.

   A list of the names of columns available for the **Points** spreadsheet display in the table. Each column name is followed by an indicator of whether the column should be included in the spreadsheet.
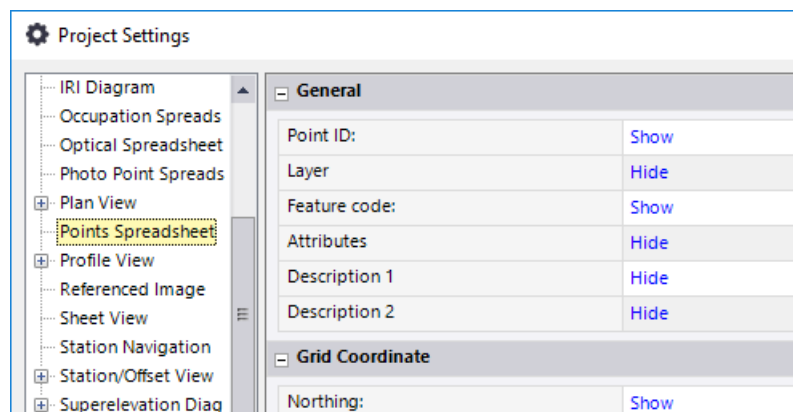
   You can click on any of the **Show/Hide** indicators to change the selection.

   In the navigation (left) pane in the **Project Settings** dialog, you can select other spreadsheets in the **View** menu to view and change the **Show/Hide** column settings for them as well. For this tutorial, there is no need to make changes.

3. Click **Cancel** to close the **Project Settings** dialog.

   Next you will see how to customize a spreadsheet by sorting the rows in it.

4. In the **Survey Office** ribbon, select **Home > Data > Points**.

   The **Point Spreadsheet** displays.

Points			
Point ID	Northing	Easting	Elevation
3	367522.310	947543.066	1667.8
5	367651.438	947306.474	1673.5
B 412	?	?	1636.1
filter	367373.761	946961.681	1662.3
flange	?	?	1649.9
frey	367794.848	946313.793	1674.7
fsi	367662.441	947578.608	1680.1
HANNA	366983.780	946136.640	1672.1
P041	373256.924	940529.009	1745.9
PLTC	399270.154	980323.935	1522.0
sixtwo	367043.046	947640.682	1655.3

You can sort the rows in the spreadsheet based on the column heading you select. By default, the rows are sorted in ascending alphabetical order based on the **Point ID**.

5. Click the **Elevation** column heading to sort the rows based on the ascending and descending elevation of the points.

   Note that the **Sort** icon indicates whether the sort is in ascending (the arrow points up) or descending (the arrow points down) order.

You can filter the displayed rows by clicking the filter icon for a column and selecting the appropriate filter. The default filter is **All.**

6. Click the **Feature Code** filter icon and select **NonBlanks** in the context menu.

Only points with feature codes assigned are displayed in the spreadsheet.

You can further customize your spreadsheet as follows:

- Resize the width of any column by placing the cursor on the column border in the heading row and dragging it left or right.

- Move a column to a new location using "drag-and-drop."

- Move the spreadsheet tab to a new location. Simply click on the tab label and drag it downward off the tab bar before releasing. Then select a location option in the context menu.

  Try right-clicking the tab label and selecting **New Vertical Tab Group** to display the tab vertically in the window.

  Use the same procedure to move the tab back.

Any content displayed in blue in the spreadsheet can be edited. For example, you can type in a new **Point ID,** or you can edit a **Feature Code** directly in the column or by clicking the browse button to display the **Feature Code Editor** dialog.
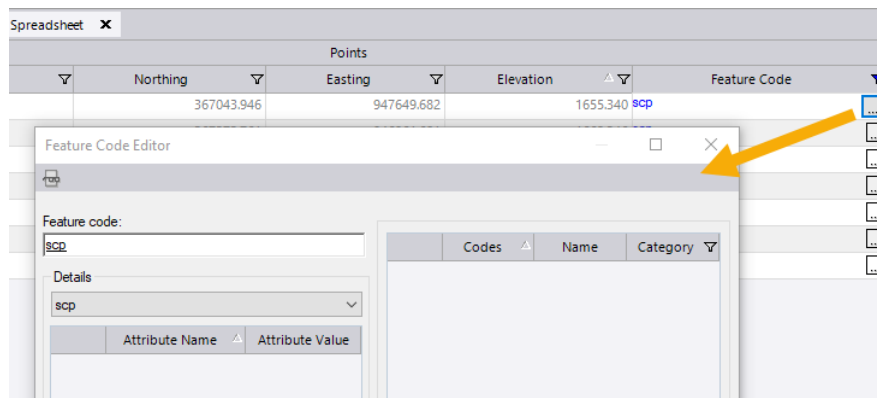
You can copy rows from a spreadsheet into a Microsoft Excel spreadsheet. Just select the rows you want to copy, press **Ctrl+C** to copy, select a cell in the Excel spreadsheet, and press **Ctrl+V** to paste. Although the header row cannot be selected, it is always copied and pasted into the spreadsheet along with the rows you select.

You can display the **Properties** pane for any point by selecting the row, right-clicking, and selecting **Properties** in the context menu.
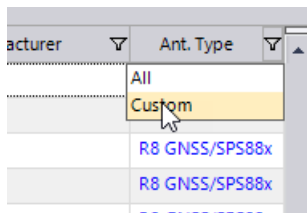
Custom filters allow you to select the criteria for filtering data displayed in a spreadsheet. In the following example, you will select to view only the points that did not use the *R8 GNSS/SPS88x Internal* antenna type.

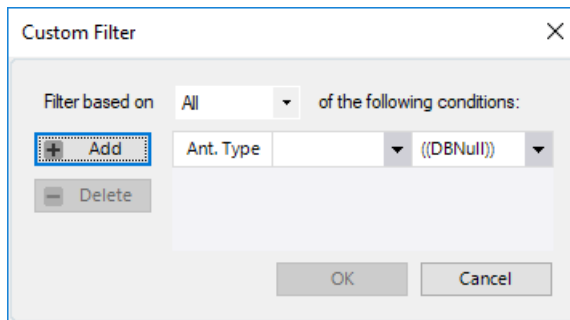7. Select **Home > Data > Occupation**.

   The **Occupation Spreadsheet** displays.

Plan View [My Filter] ✕ Point Spreadsheet ✕ Occupation Spreadsheet ✕						
					Occupations	
Point ID ▲ ▽	Start Time ▽	Duration ▽	Field Method ▽	File Name ▽	Ant
▶ 3	6/14/2006 11:23:46	00:46:30	Static	89911653a.dat	2.000
3	6/14/2006 9:42:46	00:38:30	Static	80341651a.dat	2.000
5	6/14/2006 10:37:46	00:33:30	Static	01241652a.dat	2.000
5	6/14/2006 12:25:21	00:35:26	Static	01241654.dat	2.000
5	6/14/2006 8:58:16	00:34:00	Static	80341650a.dat	2.000
5	6/14/2006 11:44:16	00:27:30	Static	80341655a.dat	2.000
filter	6/14/2006 10:34:46	00:35:30	Static	15151656a.dat	2.250

8. Click the **Ant. Type** filter icon ▽ and select **Custom** in the context menu.

acturer ▽	Ant. Type ▽
	All
	Custom
	R8 GNSS/SPS88x
	R8 GNSS/SPS88x

   The **Custom Filter** dialog displays.

Custom Filter ✕

Filter based on [All ▾] of the following conditions:

[+ Add]   [Ant. Type ▾] [▾] [((DBNull)) ▾]

[− Delete]

[OK]   [Cancel]

9. In the **Ant. Type** drop-down list, select *Does not equal to*.

10. In the second (operand) drop-down list, select *R8 GNSS/SPS88x Internal.* Then click **OK**.

    The spreadsheet refreshes based on your custom filter. Only points that did not use the *R8 GNSS/SPS88x Internal* antenna type display.

Occupations				
File Name ▽	Ant. Height ▽	Ant. Method ▽	Ant. Manufacturer ▽	Ant. Type ▽
p0411650.06	0.008	Bottom of ante	Trimble	Choke Ring
pltc1650.06o	0.000	Bottom of ante	Trimble	Micro-center
tmgo1650.06	0.000	Bottom of ante	Ashtech	700936A_M

You are done looking at spreadsheets. Next, you will take a look at how to create and use selection sets.

Step 3. Create a selection set

If you need to select the same objects over and over, it can be frustrating to manually make your selections and it is easy to make mistakes. Instead, you can use the **Selection Explorer** to create reusable selection sets.

1. Click on the **Plan View** and use your mouse wheel to zoom in. Press the mouse wheel and move the mouse to center the points as shown here.
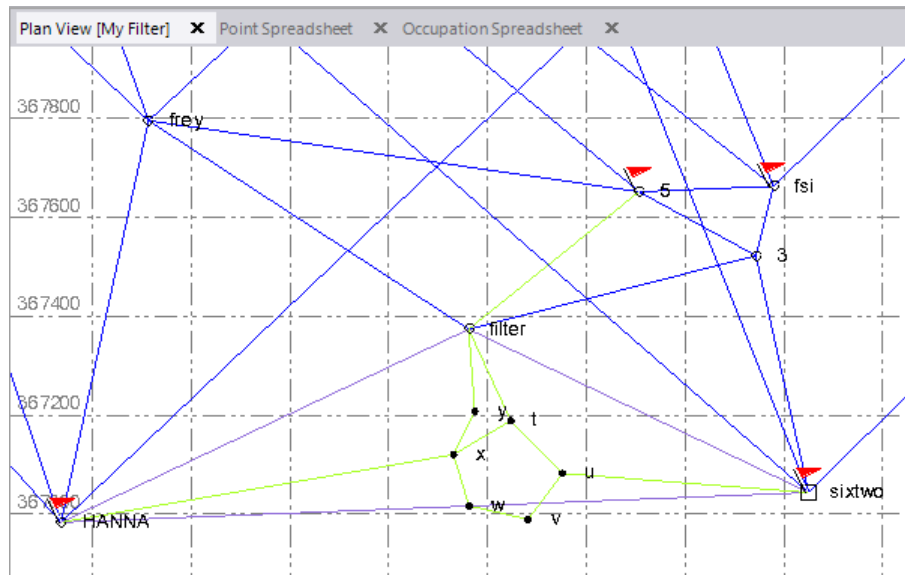

2. Select **Home > Selection > Selection Explorer** to display the **Selection Explorer**.

The **Selection Explorer** includes a **Selection Sets** list (1 below) that includes all of the selection sets in your project. Located beneath it is a **Selection Palette** list (2 below) that includes all of the member objects included in the currently selected selection set(s). If *<Selection Snapshot>* is selected in the **Selection Sets** list, whatever is selected in the graphic view is included in the **Selection Palette** list, allowing you to save your selection as a new selection set or add it to an existing selection set. Since you have not yet made a selection, nothing is displaying in the **Selection Palette** with *<Selection Snapshot>* selected. The tool bar includes icons for commands you can use to create and modify selection sets as necessary.
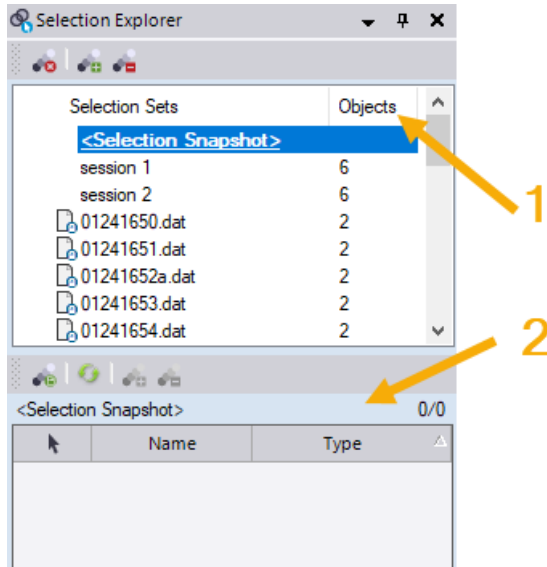
Selection Sets tool bar:
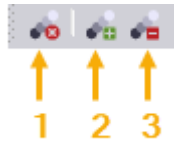
1 - **Remove selection sets without deleting contained objects** - Click this icon to remove any selected selection set(s) from the project without removing their member objects.

2 - **Add the selection to selection sets** - Click this icon to display the **Add To** dialog, which allows you to specify selection sets to which you want to add any currently selected objects in the project.

3 - **Subtract the selection from selection sets** - Click this icon to display the **Subtract From** dialog, which allows you to specify selection sets from which you want to remove any currently selected objects in the project.

Selection Palette tool bar:

1 - **Create a selection set (save entire selection palette)** - Click this icon to display the **Save As** dialog, which allows you to create a new selection set containing all of the objects displayed in the **Selection Palette** list.

2 - **Refresh the selection snapshot** - Click this icon, if active, to refresh the *<Selection Snapshot>* set displayed in the the **Selection Palette** list.

3 - **Add objects to the selection palette** - Click this icon to add to the **Selection Palette** list any selected objects in the project.

4 - **Subtract objects from the selection palette** - Click this icon to remove from the **Selection Palette** list any selected objects in the project.

3. In the **Plan View,** use your cursor to draw a selection box around the group of objects you want to include in your selection set, as shown here.
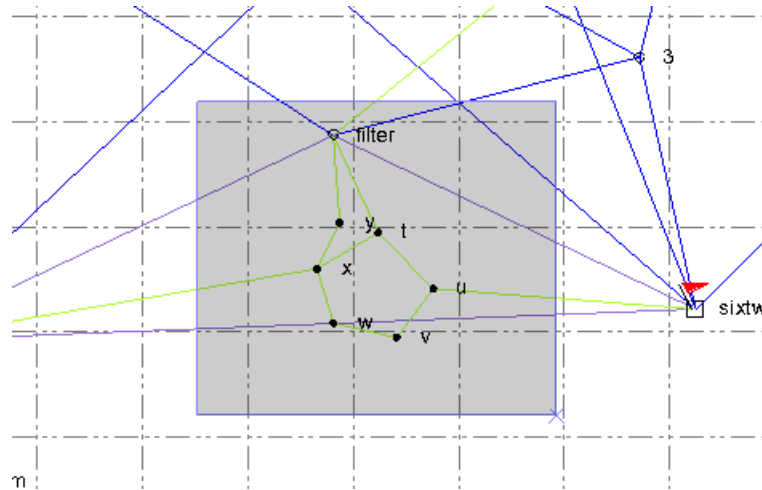

Selection rules are as follows:

- Click and drag from *left to right* to select only the objects that are included in the selection box (for example, points).

- Click and drag from *right to left* to select the objects that are included in the selection box (for example, points) along with any objects that cross the selection box (for example, observations, baselines, vectors, and mean angles).

- Use **Ctrl + click** or **Ctrl + drag** to add a single object or multiple objects to the selection set.

- Use **Shift + Ctrl + click** or **Shift + Ctrl + drag** to remove a single object or multiple objects from the selection set.

Your selections display in the **Selection Explorer** in the **<Selection Snapshot>** objects list.
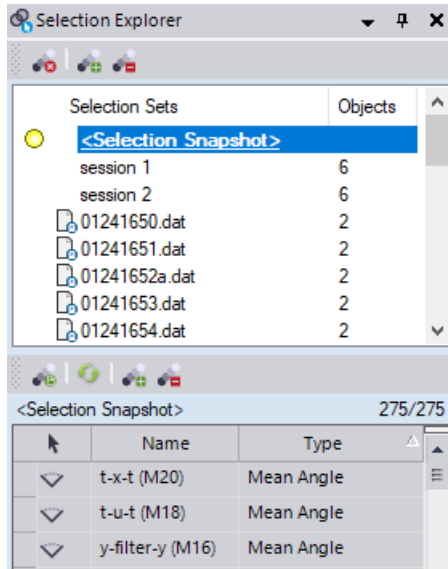
4. On the **Selection Explorer** toolbar, click the **Create a selection set (save entire selection palette)** icon to display the **Save Selection Set As** dialog

5. In the **Save <Selection Snapshot> As** dialog, enter a name for your selection set: *Tutorial Selection.* Then click **OK**
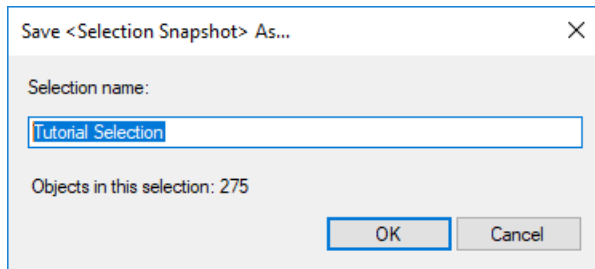
Your new selection set is added to the **Selection Sets** list. To view the objects contained in your selection set, simply select the set in the **Selection Sets** list.
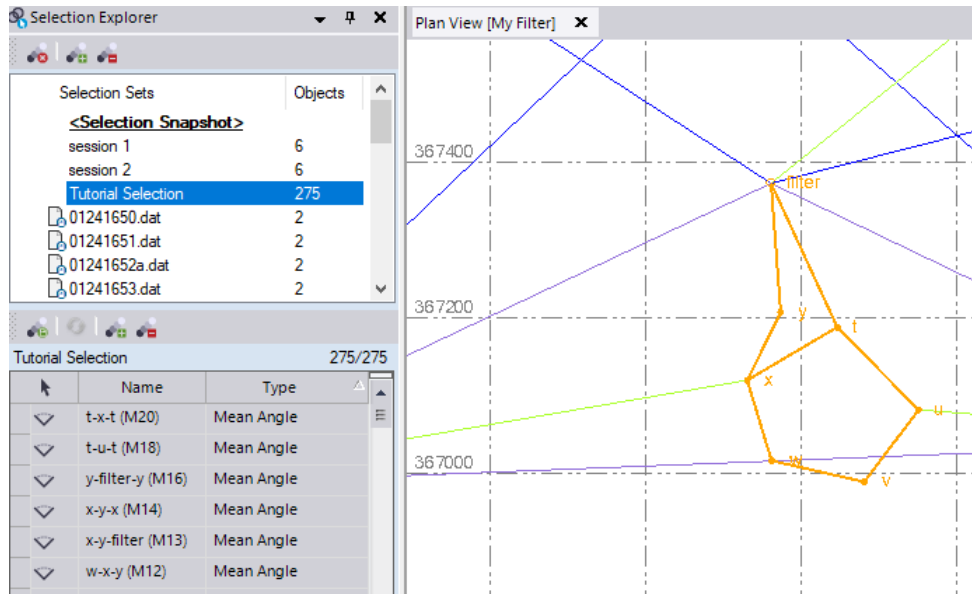
You can view properties for any object in the selection set by selecting it in the list, right-clicking, and selecting **Properties** in the context menu. To select multiple objects in the list, use **Ctrl + click** or **Shift + click**. Selecting multiple objects can be particularly useful if you want to specify a property (for example, a feature code) for all of them at the same time.

To select the objects in multiple selection sets, press the **Ctrl** key and make your selections in the **Selection Sets** list.

6. Close the **Selection Explorer** pane.

Additional notes:

▪ Selection sets are created automatically when you import data containing scan station labels. See "Work with Scan Station Labels and Selection Sets" in the SO Help for more information.

▪ The selection sets you create, and those created from some types of imported files, also appear in the **View Filter Manager**. They can be used as a starting point in creating view filters. See "View Filter Manager Options" in the SO Help for more information..

You are done working with selection sets. Next, you will take a look at some useful COGO controls.

Step 4. Work with COGO controls

COGO (COordinate GeOmetry) controls are the boxes in various commands that help you calculate angles, bearings, coordinates, distances, elevations, and offsets in your project. They enable you to enter data in a variety of ways, including:

▪ Typing values and point IDs in the box

- Picking points in graphic views
- Right-clicking in graphic views and selecting additional snap and COGO options from the context menu

COGO controls provide this flexibility so that you have many ways in which you can enter data within a single command, rather than forcing you to work through multiple commands.

COGO snap commands use geometric calculations to help you specify coordinates more easily and accurately. Snap commands can calculate a snap point by using existing geometry or by using parameters that you enter. Snap commands are available any time you are required to enter a coordinate. Simply right-click to see the options.

In the following procedure, you will create four new points in your project (*1*, *2*, *6*, and *7*) using the various COGO controls and snap commands available in **Survey Office**. However, before you create new points, you should verify that snap mode options are set correctly.

1. Click the **Snap** button on the status bar in the bottom of the **Survey Office** window.
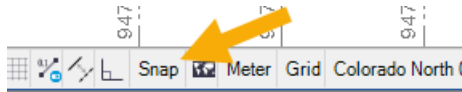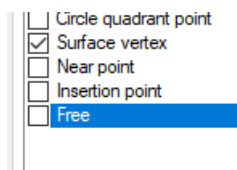

The **Running Snap Mode Options** dialog displays.
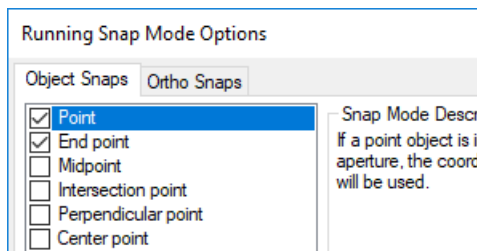
This dialog allows you to specify snap mode options. The description for each option is displayed in the dialog.

In this procedure you will be using snap commands to select points. To ensure you are selecting a point and not a coordinate near a point, you will deselect the **Free** mode (if it is selected).


2. In the **Running Snap Mode Options** dialog, do the following:

   a. Verify the **Point** mode check box is checked.

   b. Uncheck the **Free** mode check box.

   c. Click **OK.**

3. Create point *1* as follows:

   a. In the **SO** ribbon, select **CAD > Points > Create Point**.

   The **Create Point** pane displays.
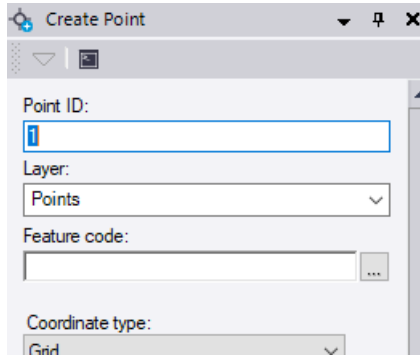
   b. Ensure the **Point ID** field displays *1*, the **Feature code** field is blank, and the **Coordinate type** field displays *Grid*.

   c. Right-click in the **Northing** field and select **Bearing Distance**.
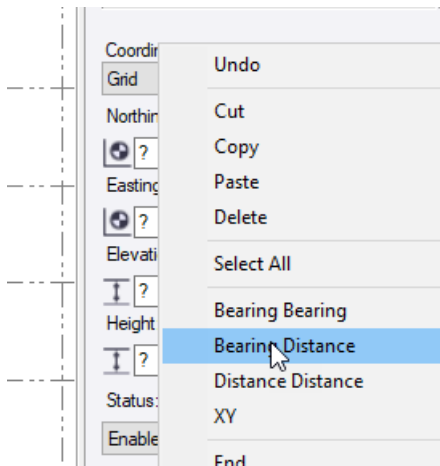
   The **Bearing Distance** pane displays. These controls enable you to calculate a point based on a beginning point, a bearing, and a distance. The zero (0) bearing is north and bearings are measured clockwise. No elevation (Z value) is set using this option.
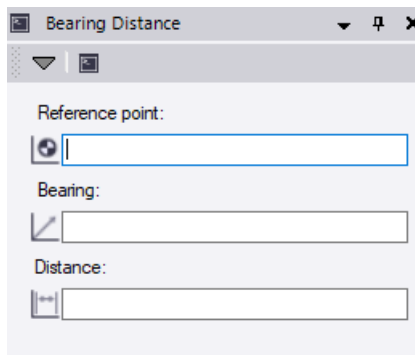
Note: For this tutorial, you will be entering bearing values. However, if you prefer, you can enter azimuth values. In the following steps, instead of entering a bearing value of *S37 44 56E* you could enter a north azimuth value of *142 15 04* (142° 15' 04").

    d.   Click in the **Reference Point** field, then click on point *5* in the **Plan View**.

        The coordinate for point *5* displays in the field. As an alternative, you could just type *5* in the field.

    e.   In the **Bearing** field, enter *s37 44 56e.*

        There is no need to enter capital letters for *South* and *East*.

    f.   In the **Distance** field, enter *290.91sft*.

        Note that the value specifies the distance unit *sft* (US survey foot)*.* This is required if a value you want to enter uses a distance unit that is different than the unit specified in the **Project Settings** dialog (meters).

    g.   Click **OK**.
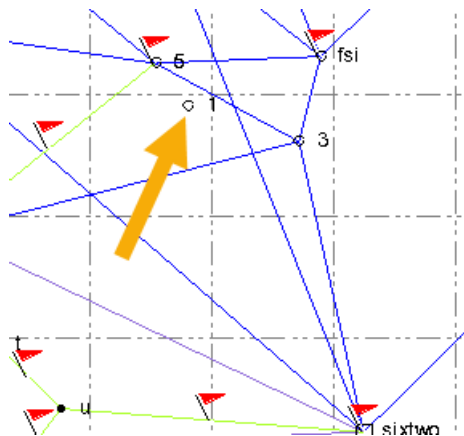
        The coordinates for the new point *1* display in the **Create Point** pane.
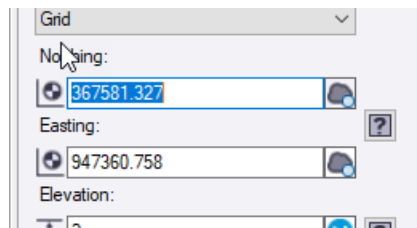
        There is no need to enter an **Elevation** or **Height** value.
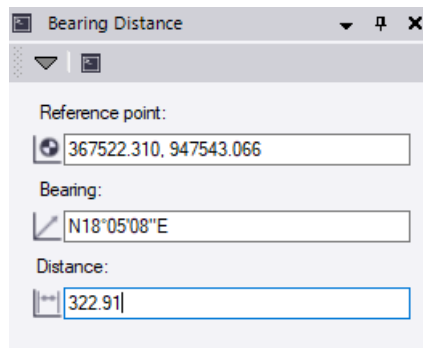
    h.   Click the **Add** button.

        The new point *1* displays in the **Plan View**. The **Create Point** pane has been cleared so you can create another new point.
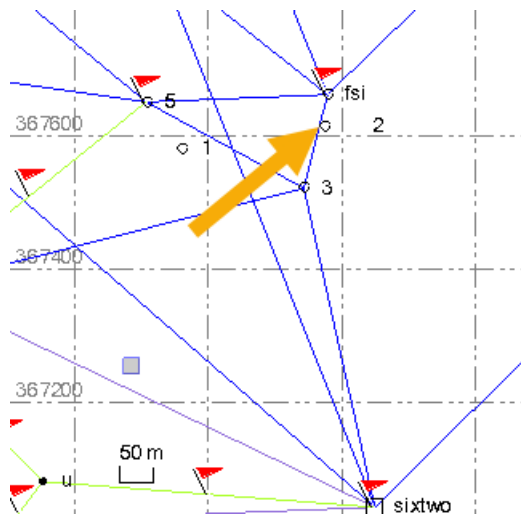

4.   Create point *2* as follows:

    a.   In the **Create Point** pane, ensure the **Point ID** field displays *2*.

b. Right-click in the **Northing** field and select **Bearing Distance**.

The **Bearing Distance** pane displays.

c. In the **Reference Point** field, enter *3*.

The point ID automatically converts to a coordinate.

d. In the **Bearing** field, enter *n18 05 08e*.
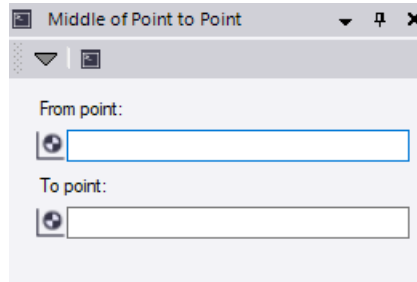
e. In the **Distance** field, enter *322.91sft.*

f. Click **OK.**

The coordinates for the new point *2* display in the **Create Point** pane.

g. Click the **Add** button.

The new point *2* is displayed in the **Plan View**.

You are now ready to create a new point *6*, which will be located midway between points *1* and *2*.

5. Create point *6* as follows:

a. In the **Create Point** pane, enter *6* in the **Point ID** field.

b. Right-click in the **Northing** field and select **Middle of Point to Point**.

The **Middle of Point to Point** pane displays. These controls allow you to calculate a location midway between two points.
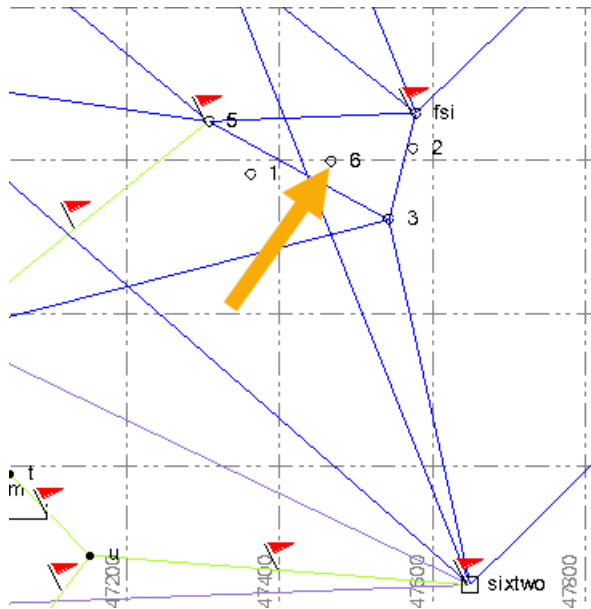

c. In the **From point** field, enter *1*.

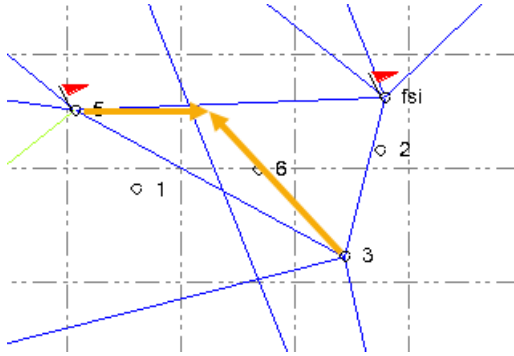d. In the **To point** field, enter *2*.

e. Click **OK.**

The coordinates for the new point *6* display in the **Create Point** pane.

f. Click the **Add** button.

The new point *6* is displayed in the **Plan View**.

Next you will create a new point *7*. This point will be located in line with points *3* and 6, 5° south of the *5-to-fsi* line, as shown in the following image.

6. Create point *7* as follows:

   a. In the **Create Point** pane, ensure *7* displays in the **Point ID** field.

   b. Right-click in the **Northing** field and select **Bearing Bearing**.

   The **Bearing Bearing** pane displays. These controls allow you to calculate the intersection of two bearings defined by a first point and second point.
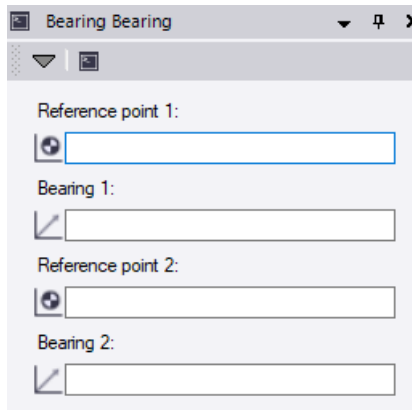
   c. Click in the **Reference point 1** field and then select point *5* in the **Plan View**.

   The cursor automatically moves to the **Bearing 1** field.

   d. Select point *fsi* in the **Plan View** to define the bearing.

   The cursor automatically moves to the **Reference point 2** field.

   e. Click back in the **Bearing 1** field and type *+5* after the bearing value.

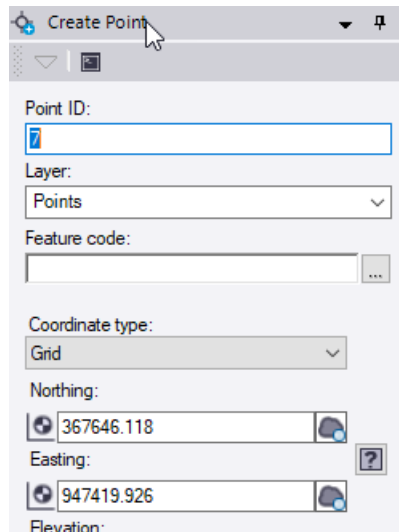   This adds *5º* to the bearing as soon as you click in a different field.
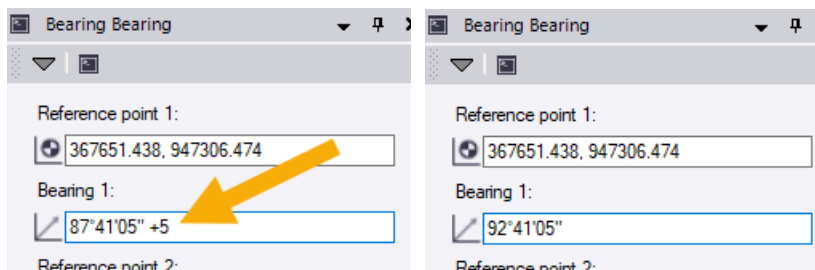
   f. Click in the **Reference point 2** field and then select point *3* in the **Plan View**.

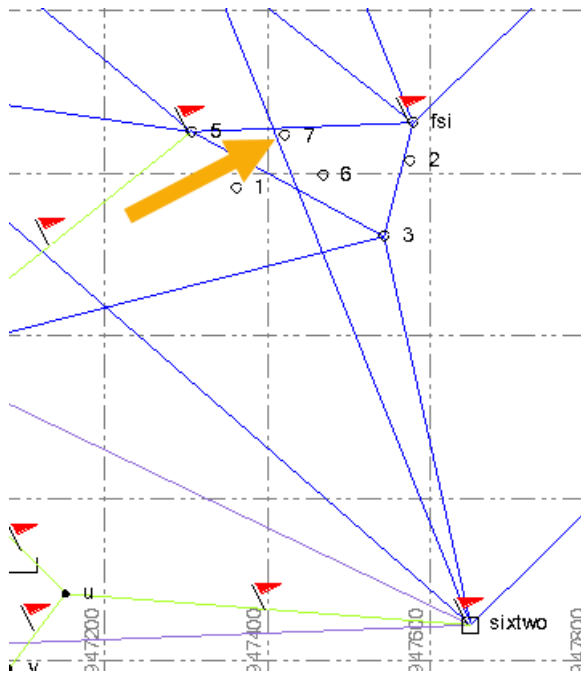The cursor automatically moves to the **Bearing 2** field.

g. Select point *6* in the **Plan View**.

The coordinates for the new point *7* display in the **Create Point** pane.

h. Click the **Add** button.

The new point *7* displays in the **Plan View**.

You can now reselect the **Free** snap mode option in case you need it turned on for other projects.

You are done working with COGO controls. Feel free at this time to continue exploring the **Survey Office** software. Press **F1** at any time to view the associated online Help.

This completes the tutorial.