

MODULE 7.

TRADITIONAL SURVEYING FLOW WITH POINTSCAPE™

Learning Outcomes:

Students should be able to use PointScape to perform 3D scanning following the traditional surveying flow which includes station leveling and setup, backsight/foresight setup and scanning and foresight coordinates exporting and importing.

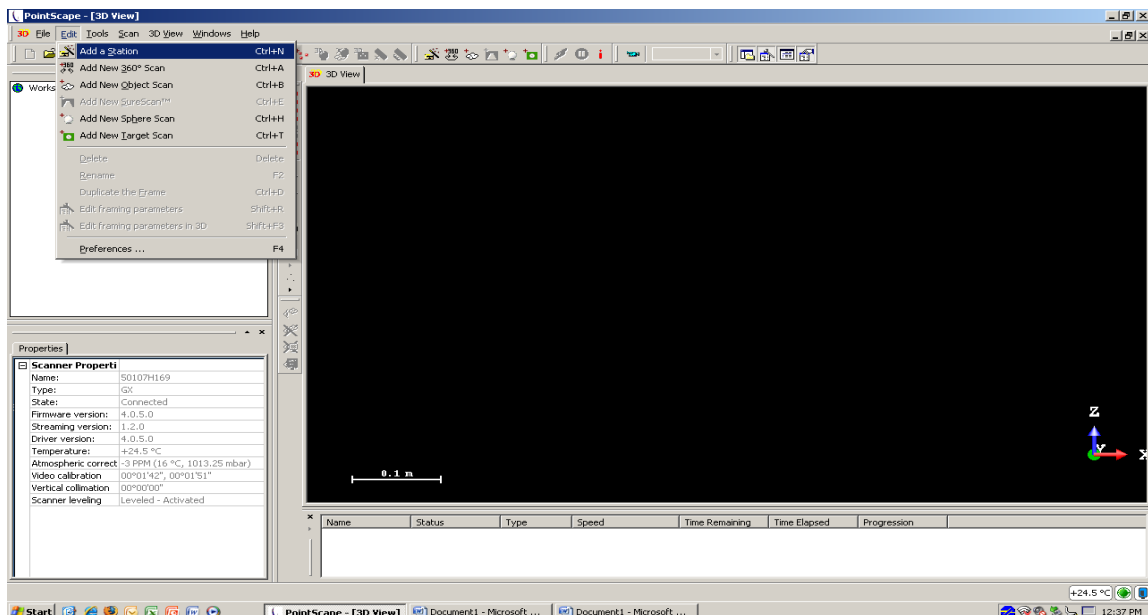
Lecture Contents:

7.1 Introduction

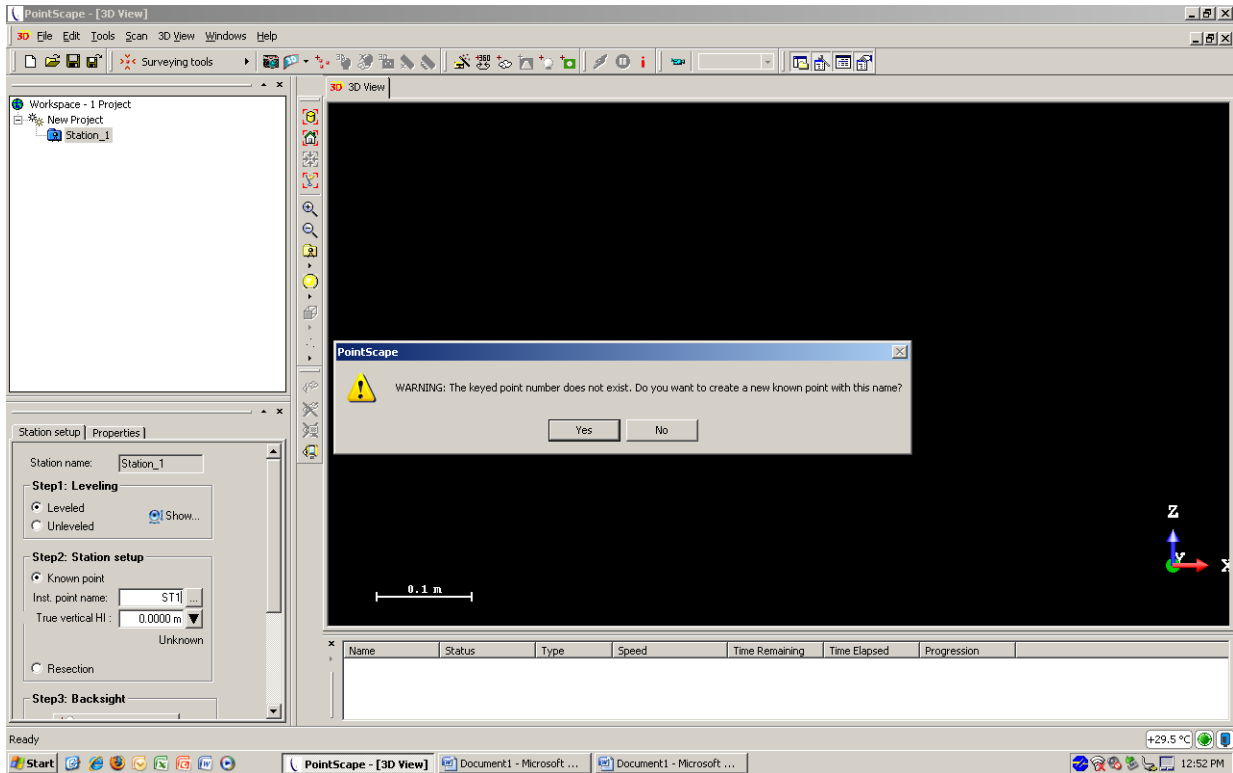
This module shows the steps to perform 3D laser scanning following the traditional surveying flow with PointScape. With the traditional surveying flow, post-scanning registration is not necessary since the scans are properly aligned during the surveying process. The traditional surveying approach requires the leveling of the station and a backsight point. The coordinates of the scanner position and the backsight point are known. As discussed in Module 6, when the station is leveled, the problem becomes 2D and only two known points are required. The surveying process is summarized by the flowchart in Figure 7.1.

7.2 Detailed Steps

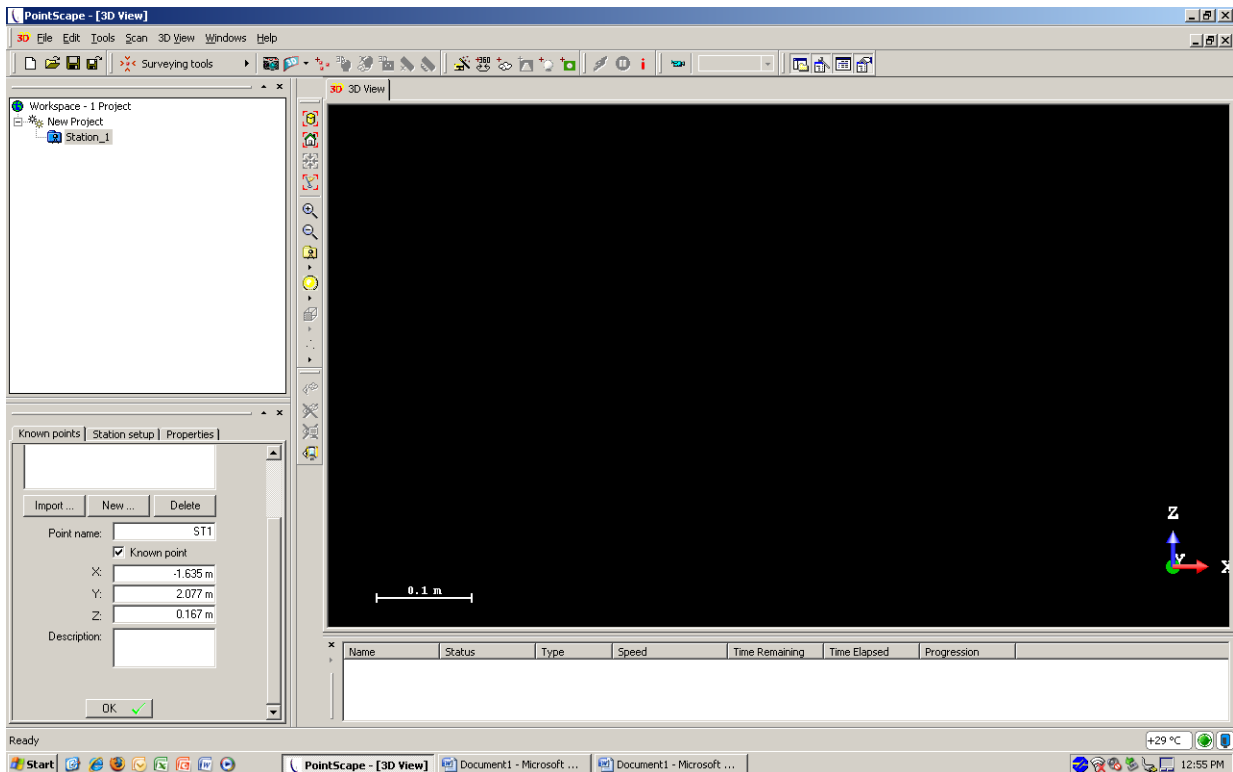
1. Setup and level the scanner and backsight target over two known points. (Control points)
2. In PointScape (PS), add a station.



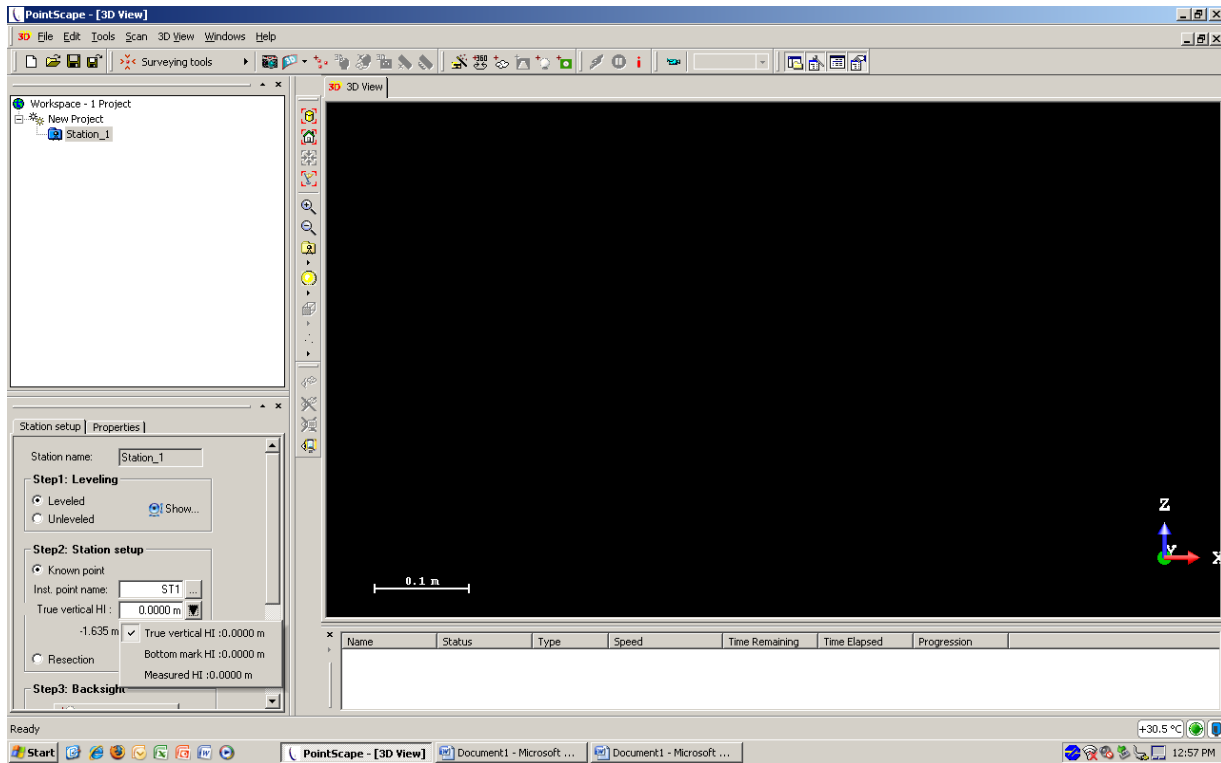
3. In the *Station setup* dialog box, check *Known Point*, enter the name of the known point and click yes when prompted.



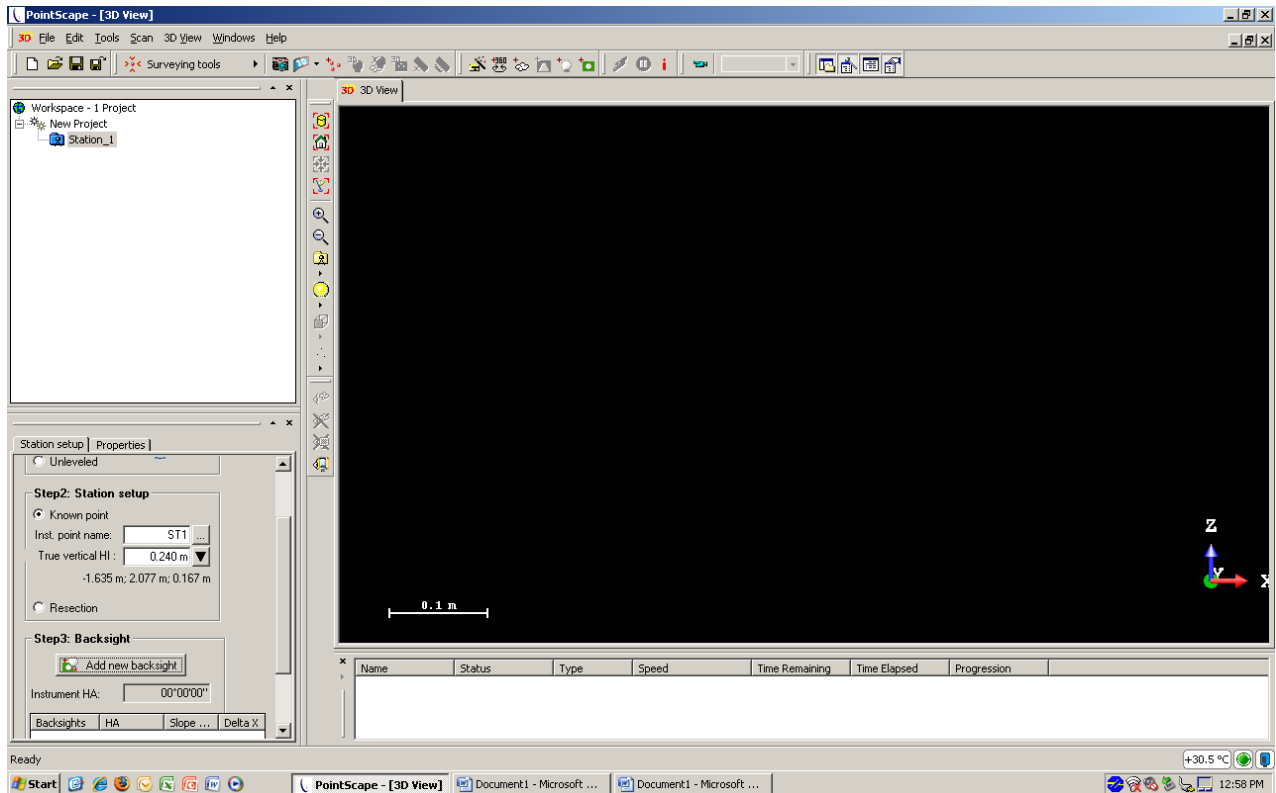
4. Check *Known point* in the *Know Points* dialog box and enter the coordinates. Click *OK*.



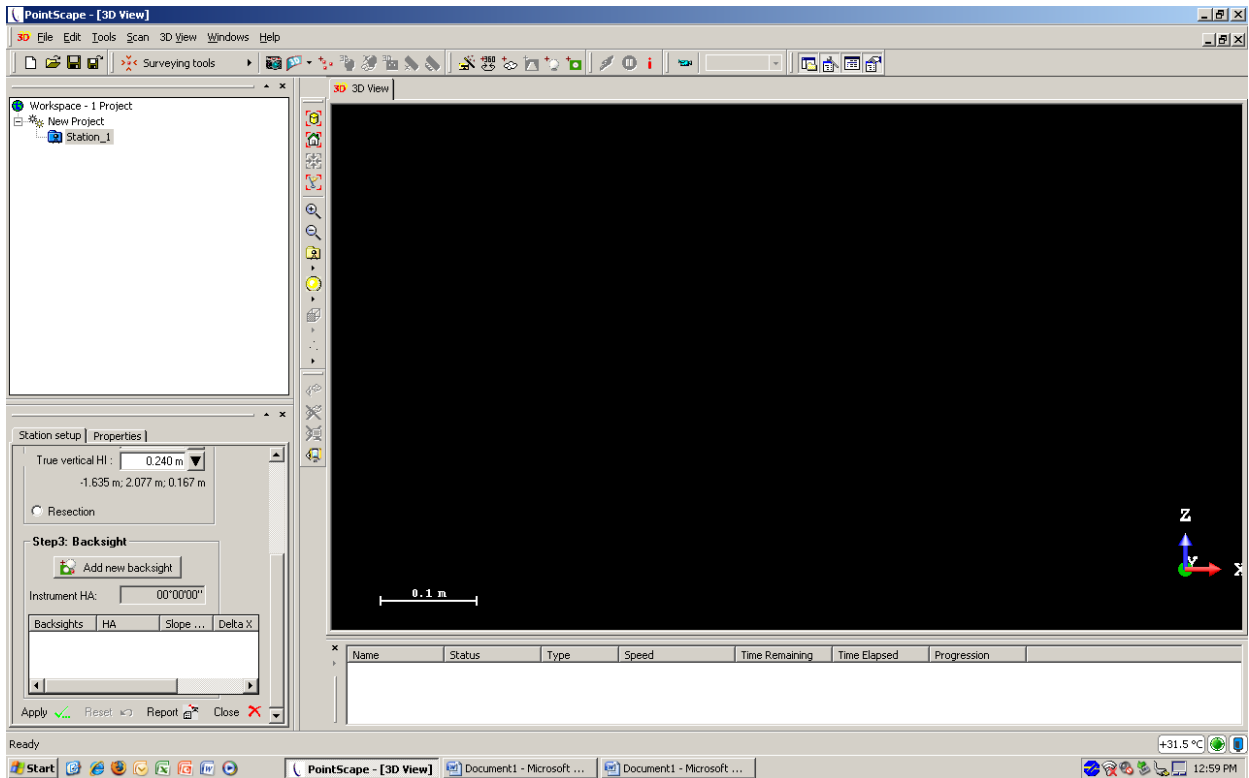
5. In the *Station setup* dialog box, select a HI option.



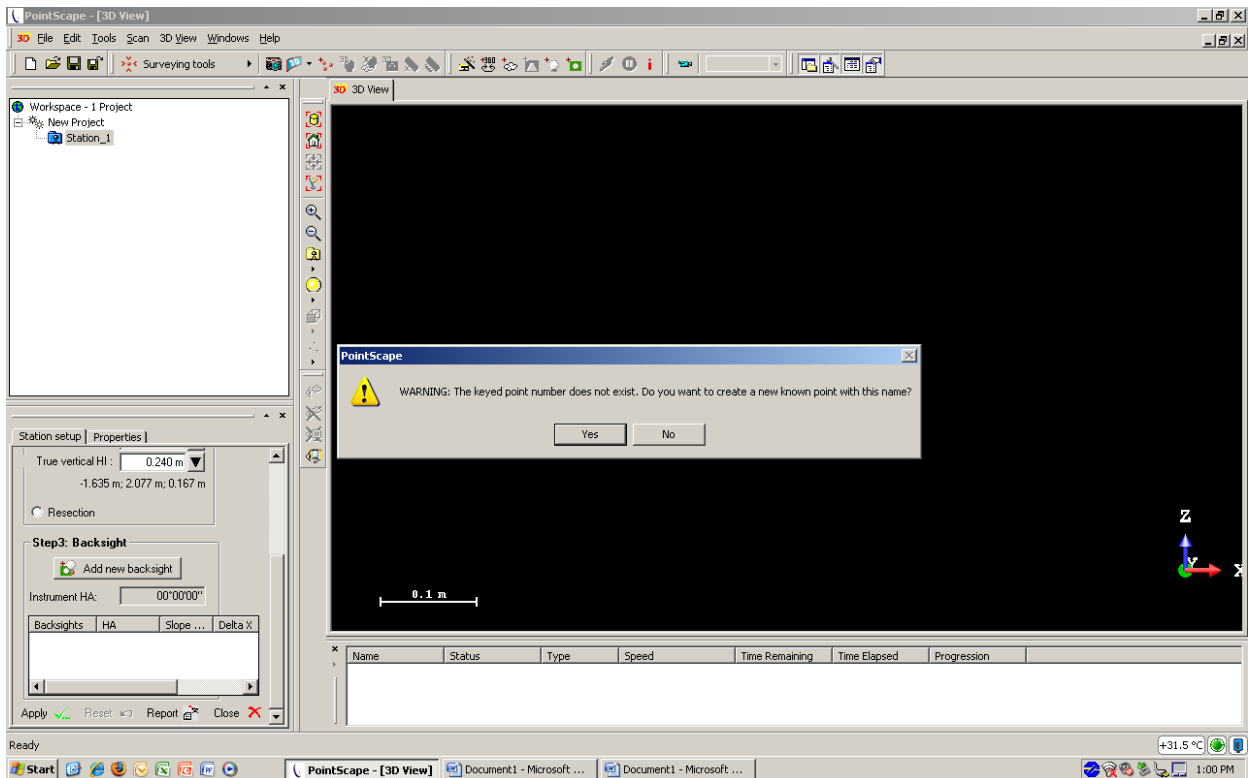
6. Enter the HI and press Enter.



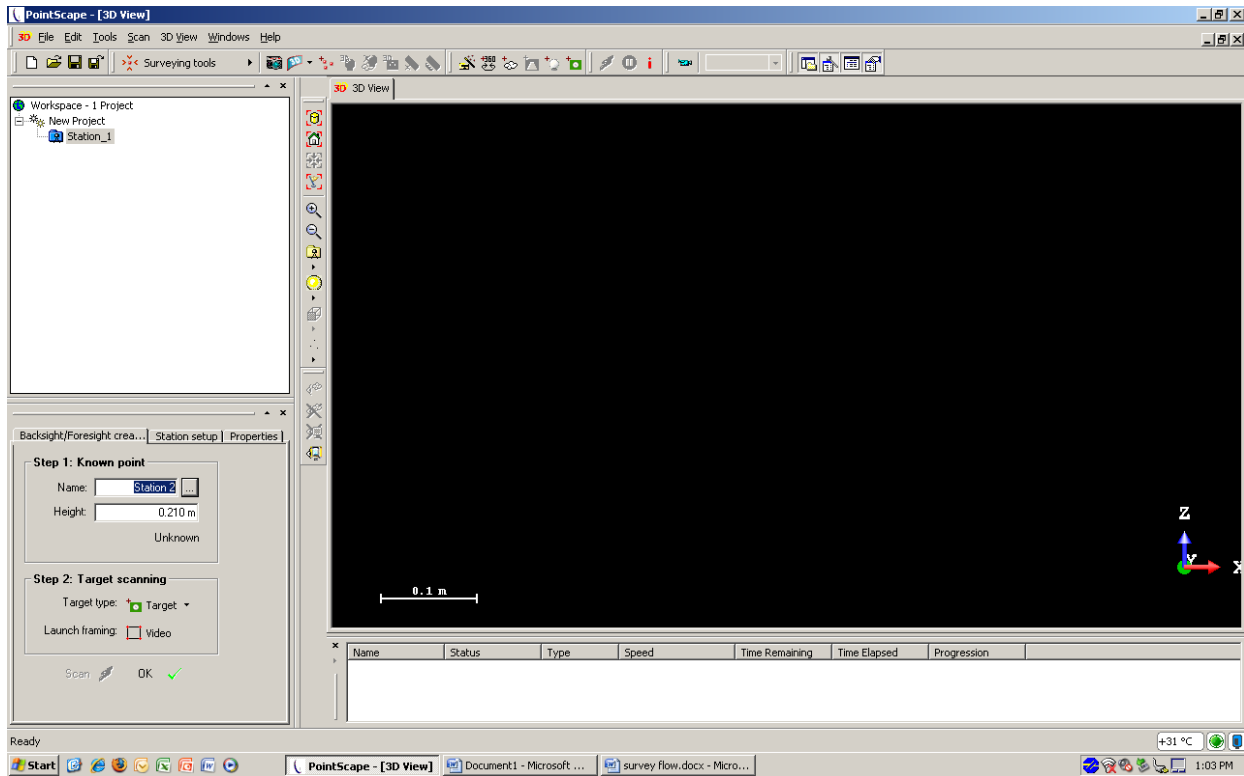
7. Click *Add new backsight*.



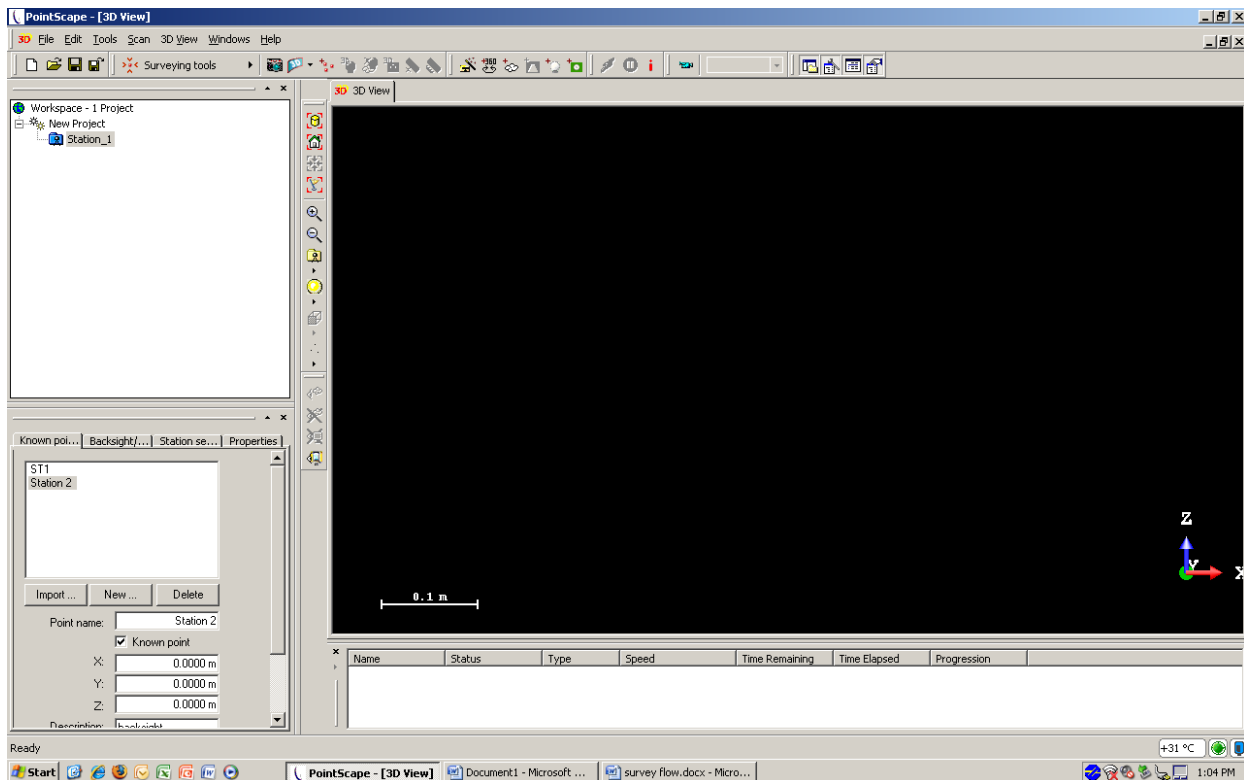
8. Click *Yes* when prompted.



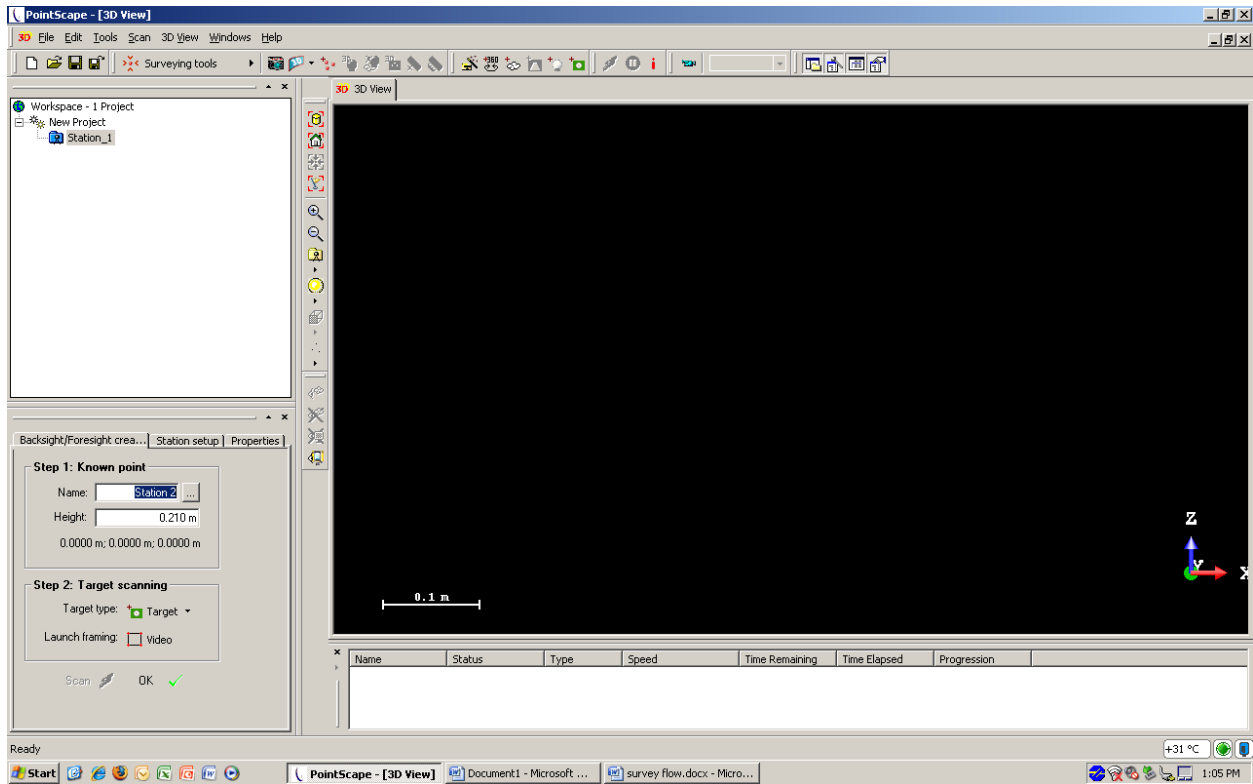
9. Enter the name of the backsight station and click the *Ellipsis* button.



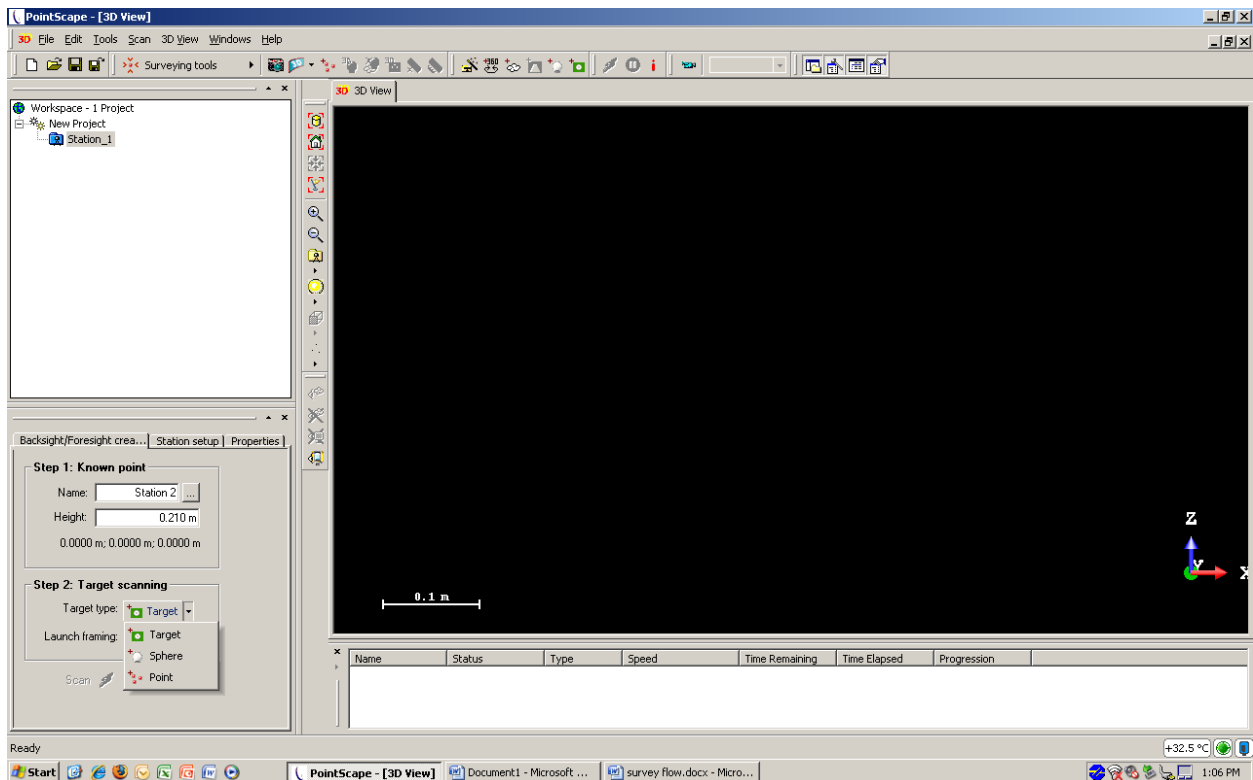
10. Check *Known point* and enter the coordinates (0.00, 0.00, 0.00 in the example) and click *OK*.



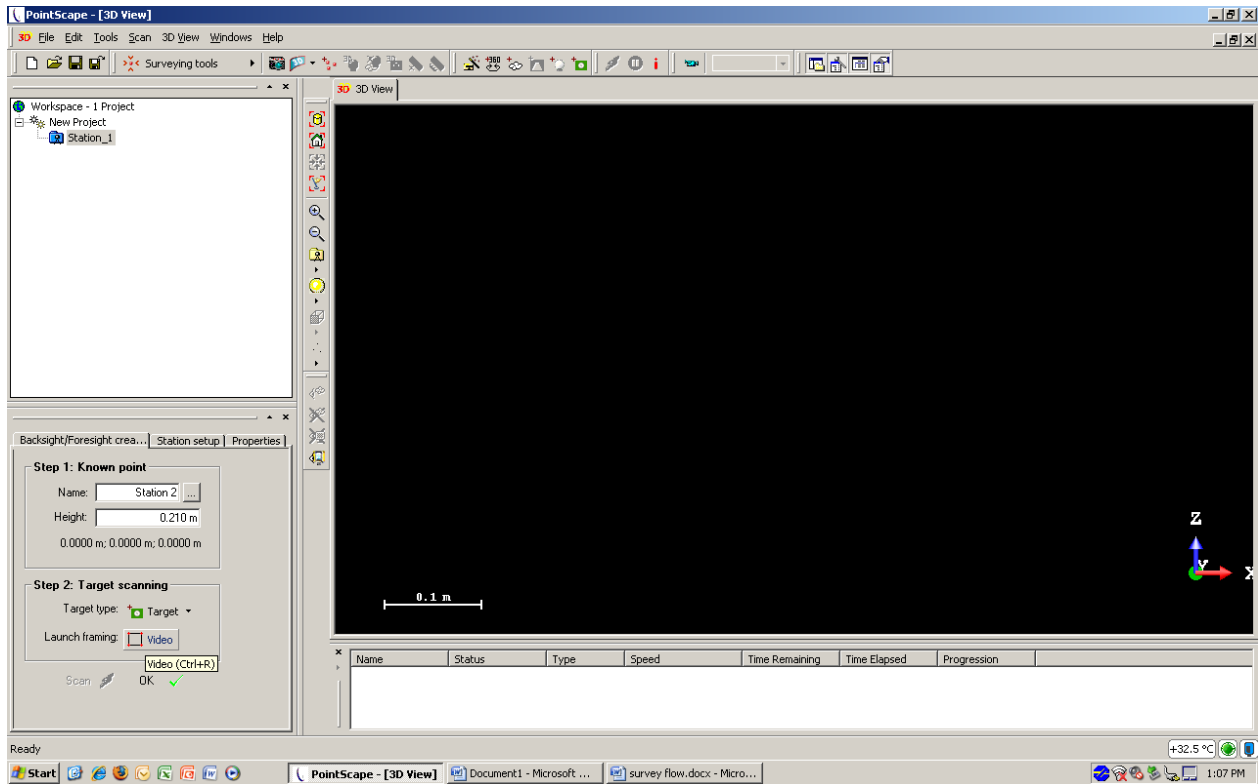
11. Enter target height.



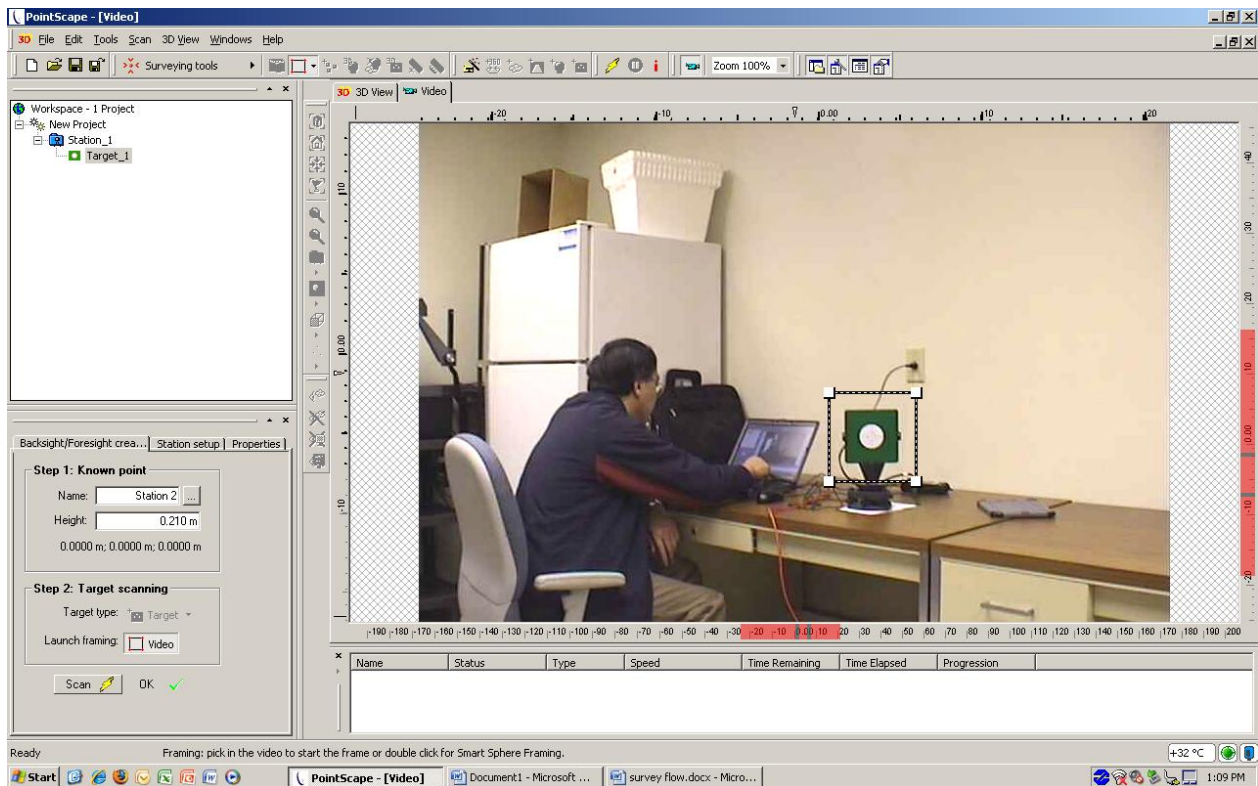
12. Select Target type from the dropdown list.



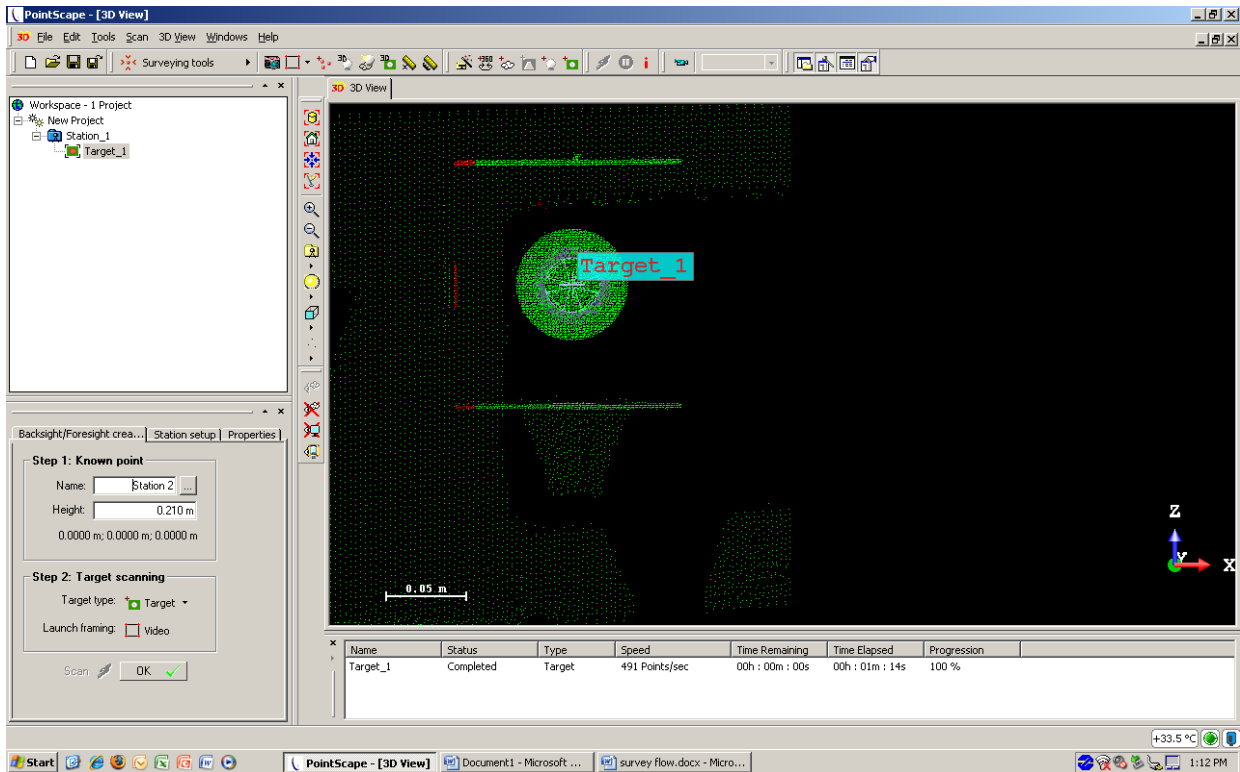
13. Click on the *Video* button to launch framing.



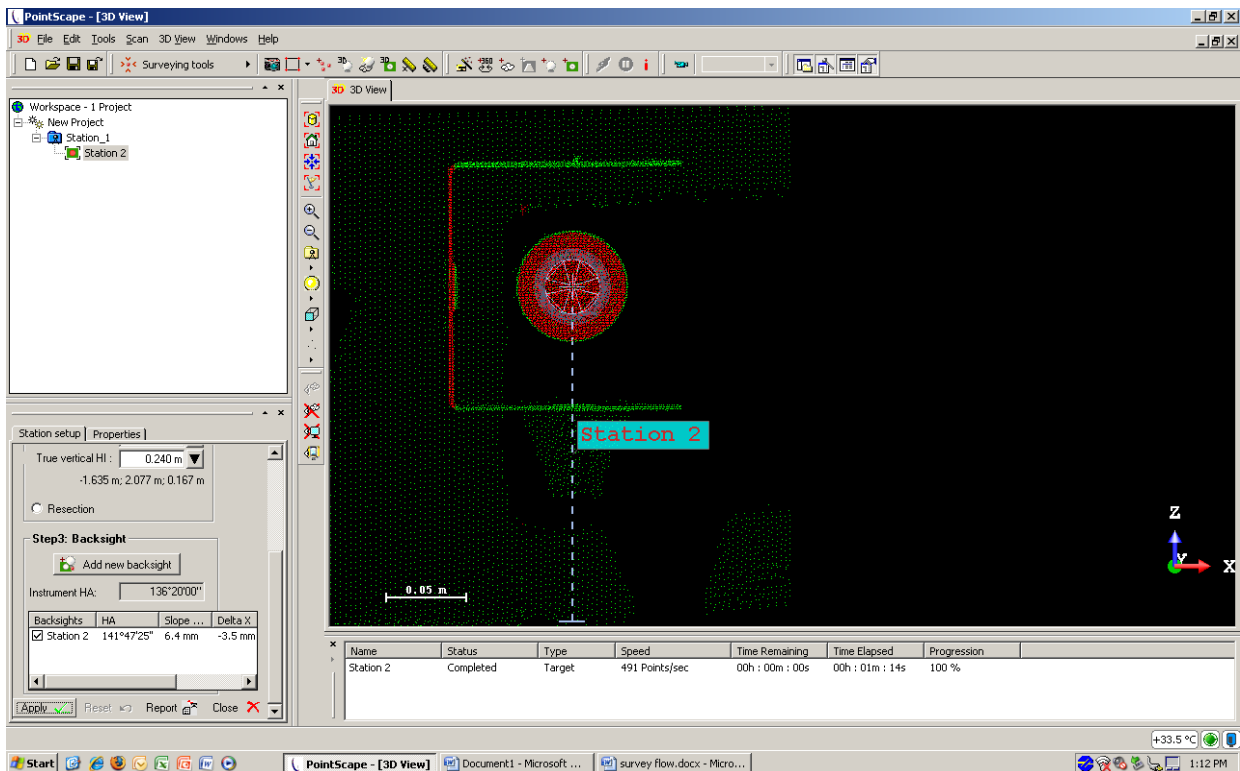
14. Frame the target and click the *Scan* button.



15. Click *Ok* to close the *Backsight/Foresight Creation* dialog box.



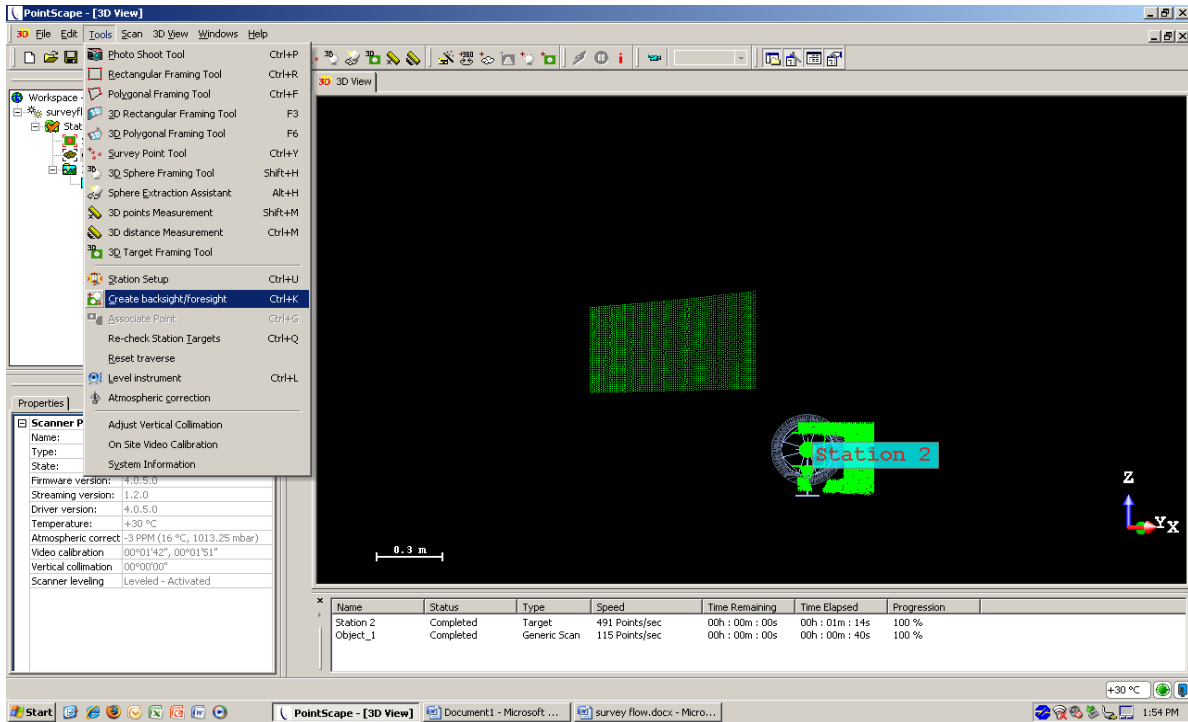
16. Click the *Apply* button to complete the setup.



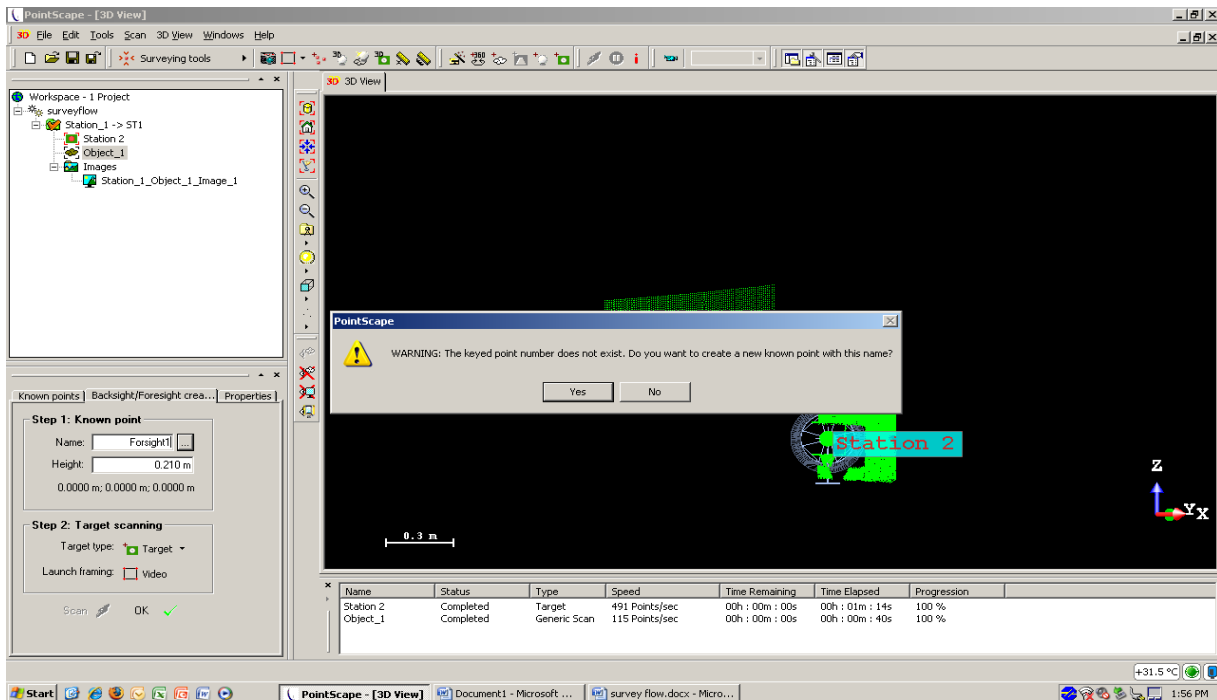
Add and perform scans at this station following the process discussed before.

17. To extend the traverse, mark an unknown foresight point and set a target over this point.

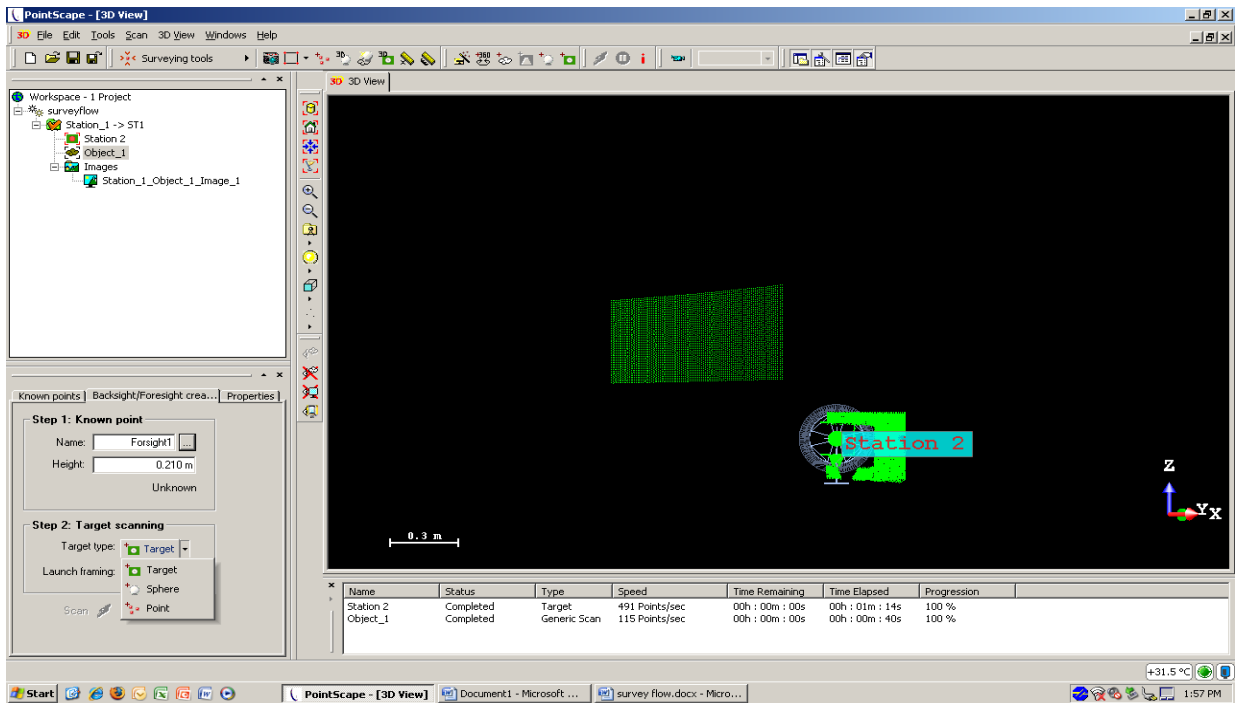
18. In PointScape, select *Create Backsight/Foresight* option from the *Tools* menu.



19. The *Backsight/Foresight Creation* dialog box open again. Enter a name for the foresight point and click *Yes* when prompted.

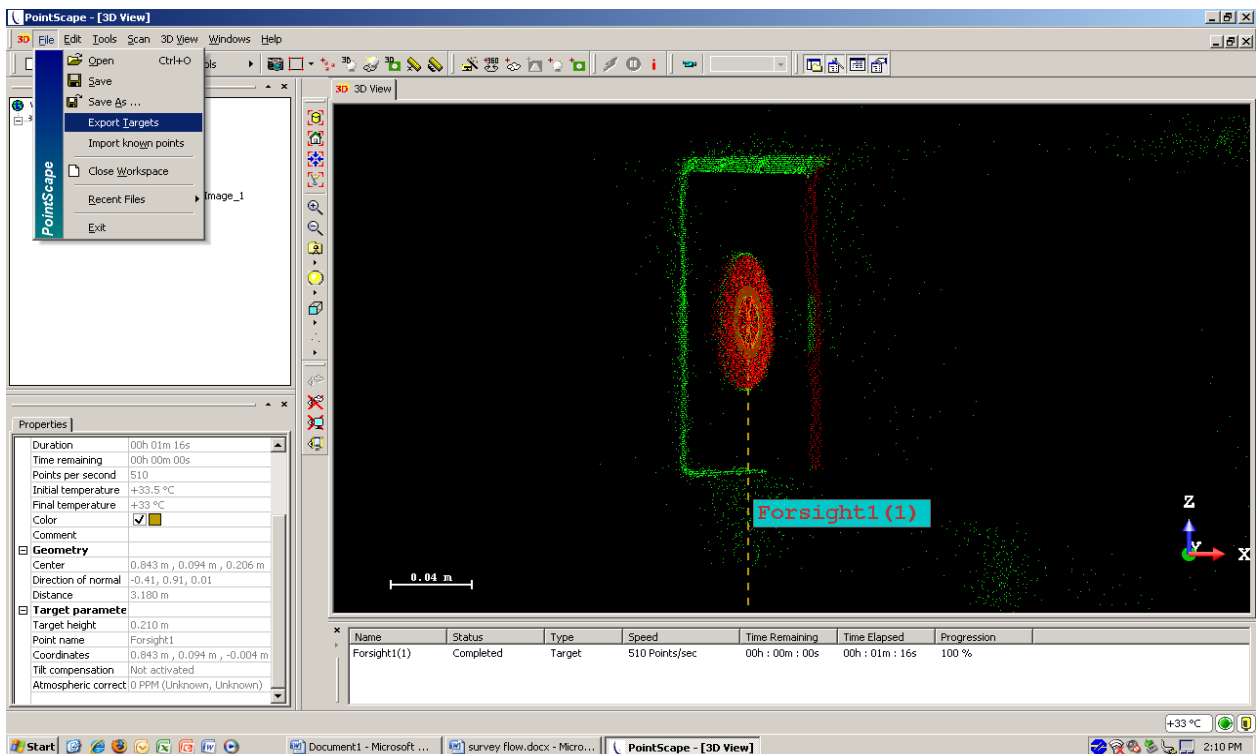


20. Enter the height of the target. Make sure that status of the point shows *Unknown*. Select a target type.

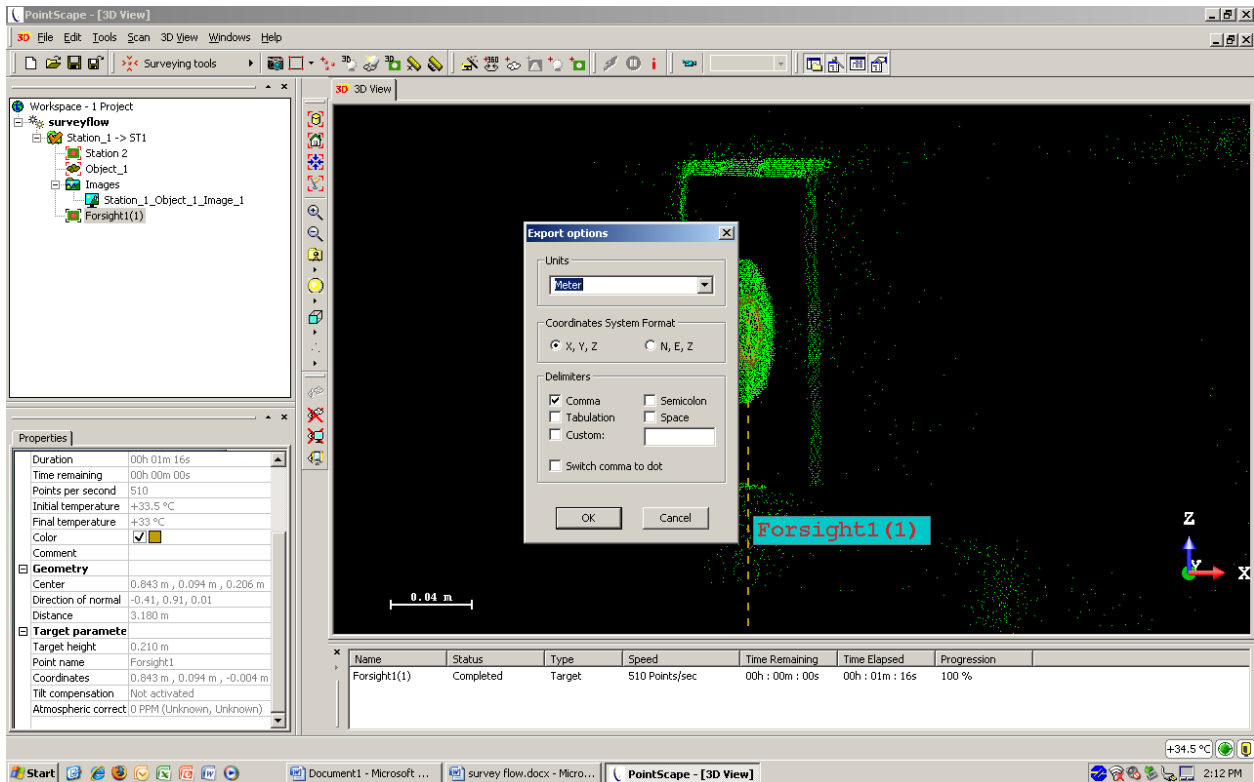


21. Repeat Steps 13-15 to complete the foresight scanning.

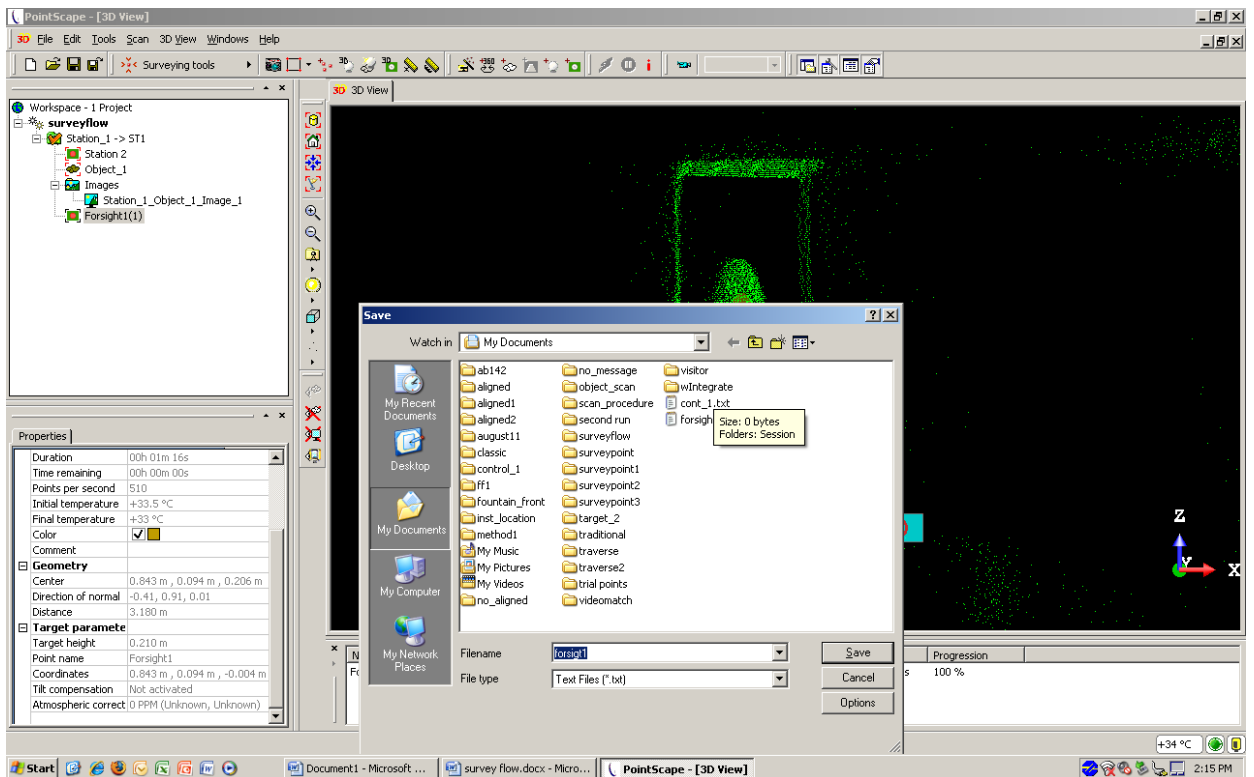
22. Export the targets for use to setup the next station. In the *File* menu, select *Export Targets*.



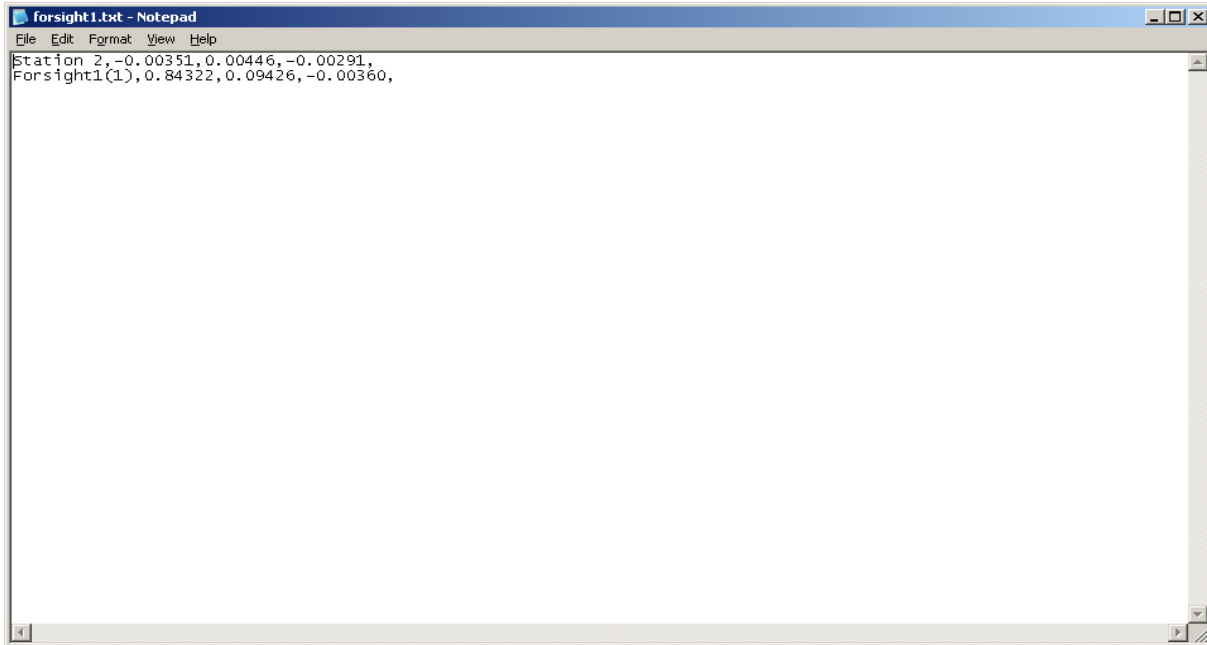
23. The *Export options* dialog box open. Select a format and click *OK*.



24. The *Save* dialog box open. Enter a name and the file is saved in *TXT* format.



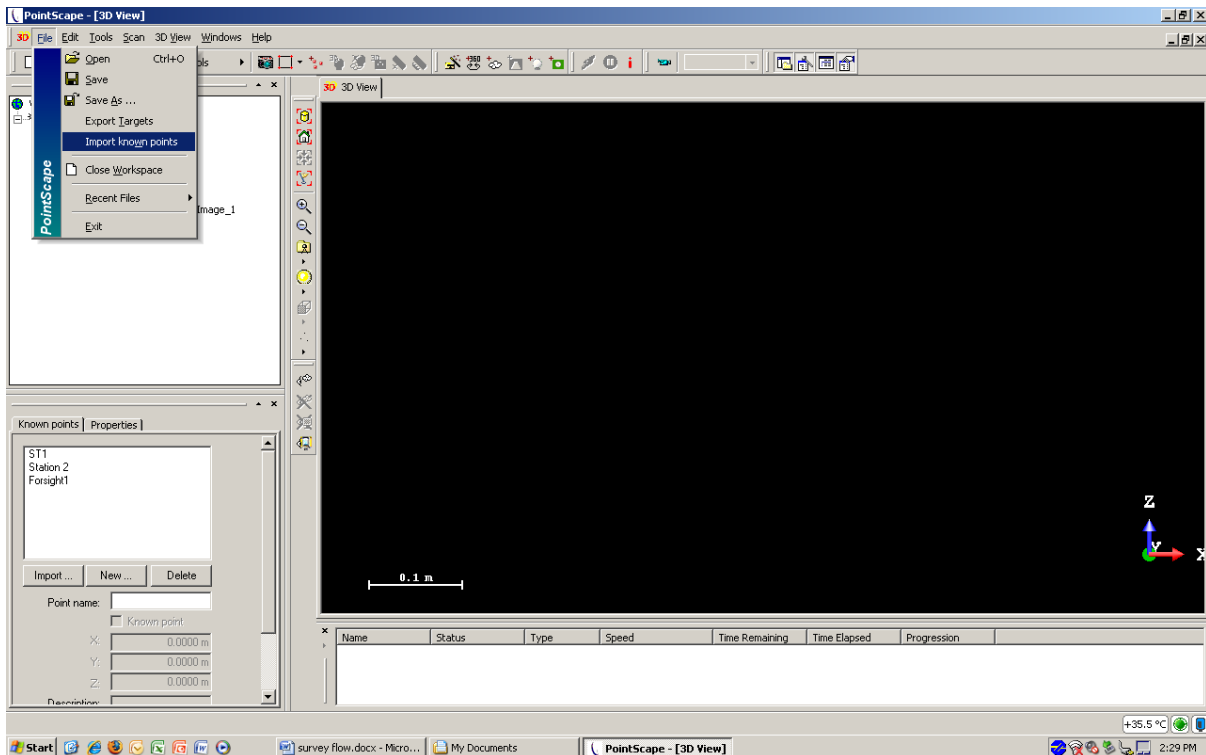
You can open the saved file with Notepad to see the saved coordinates of the targets.



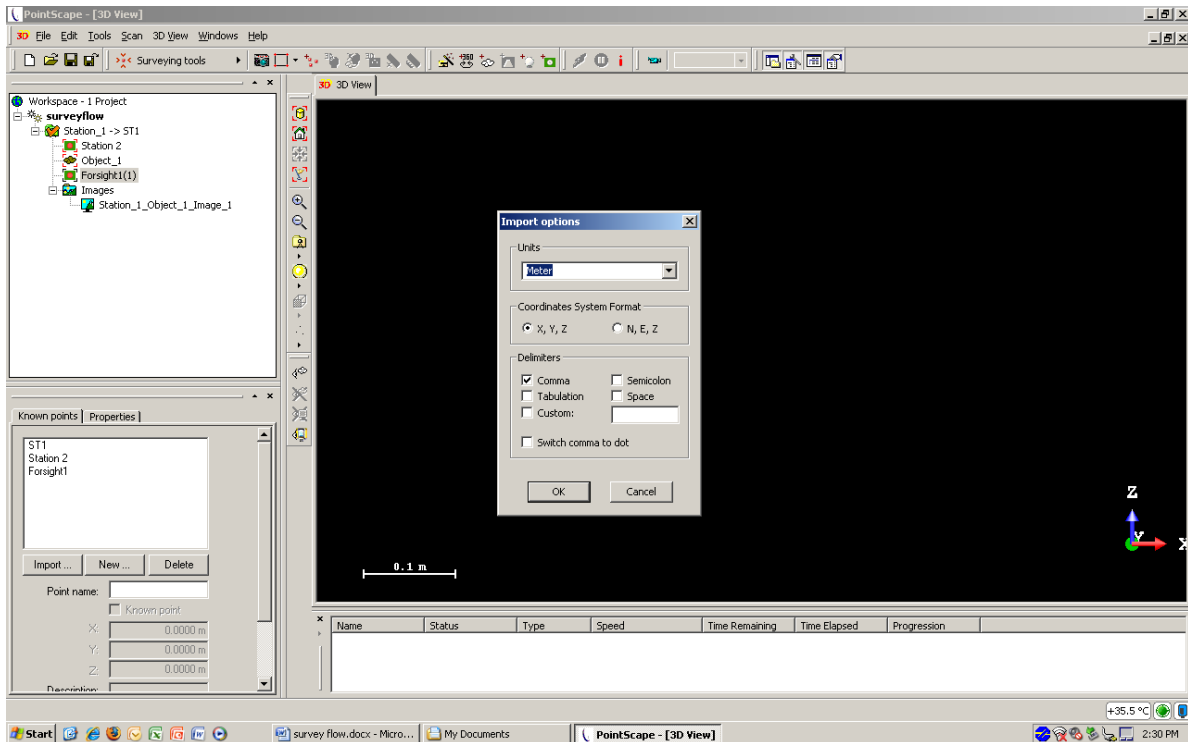
25. Save the PPF file and exit PointScape.

26. Setup the instrument at the foresight point and the target at the previous station point (ST1).

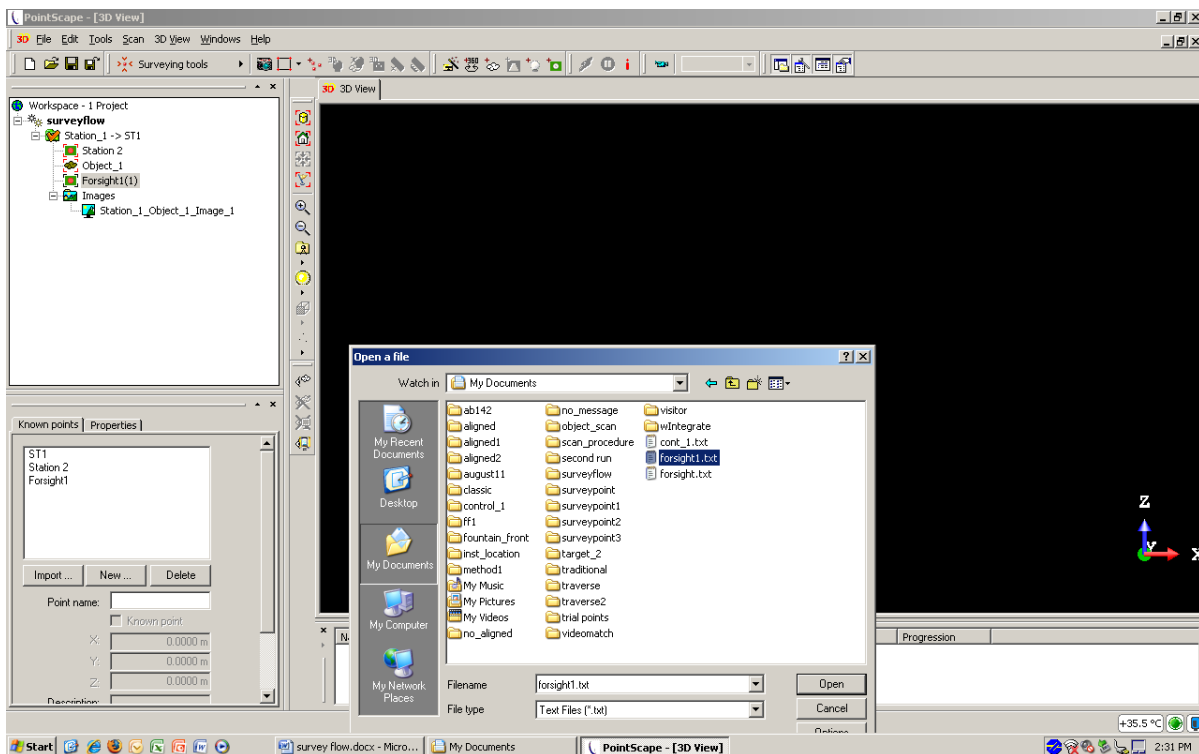
27. In the *File* menu, click *Import Known points*.



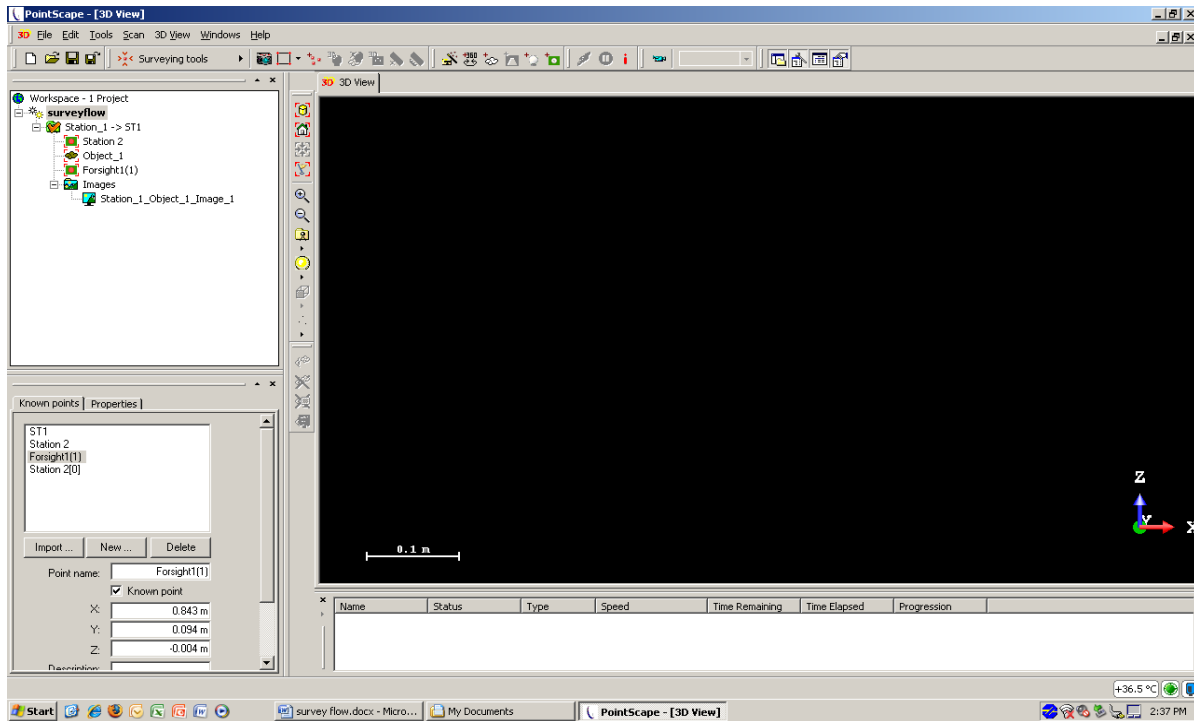
28. The *Import options* dialog box opens. Select a format and click *OK* (Make sure that the format is the same as the one you used for export).



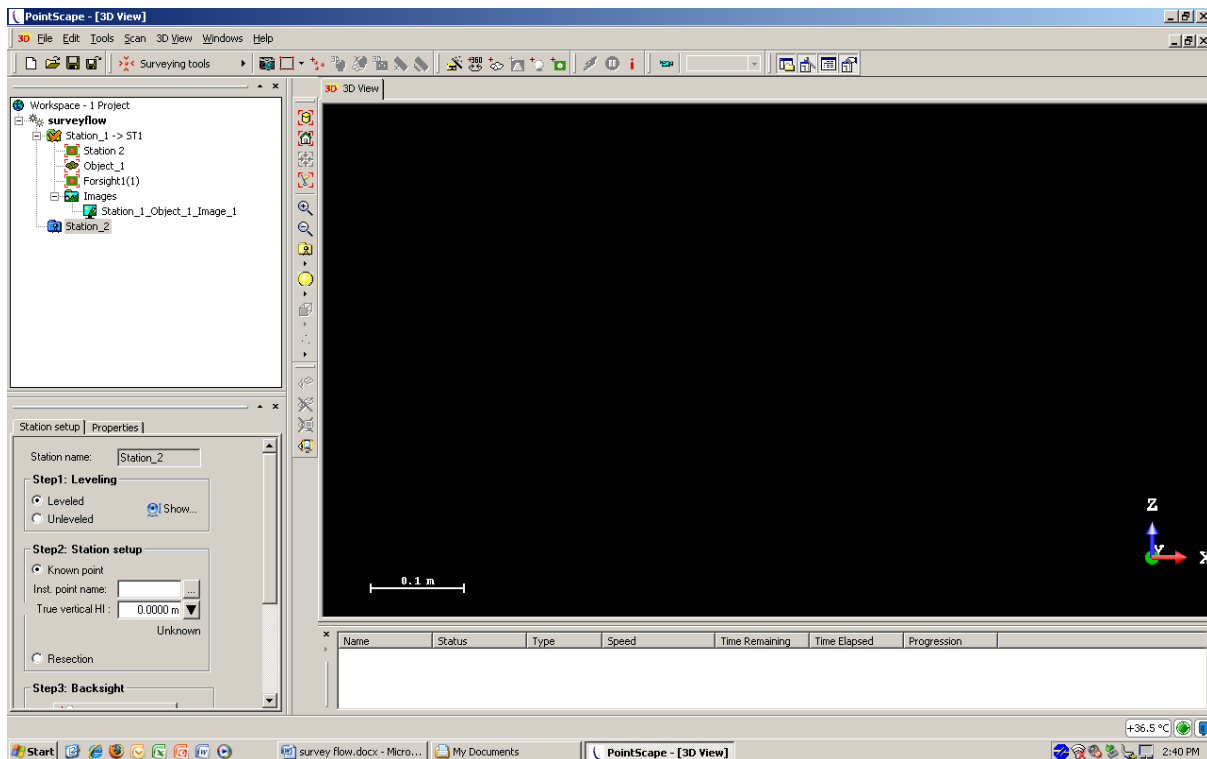
29. Select the *TXT* file that you saved at the previous station and click *Open*.



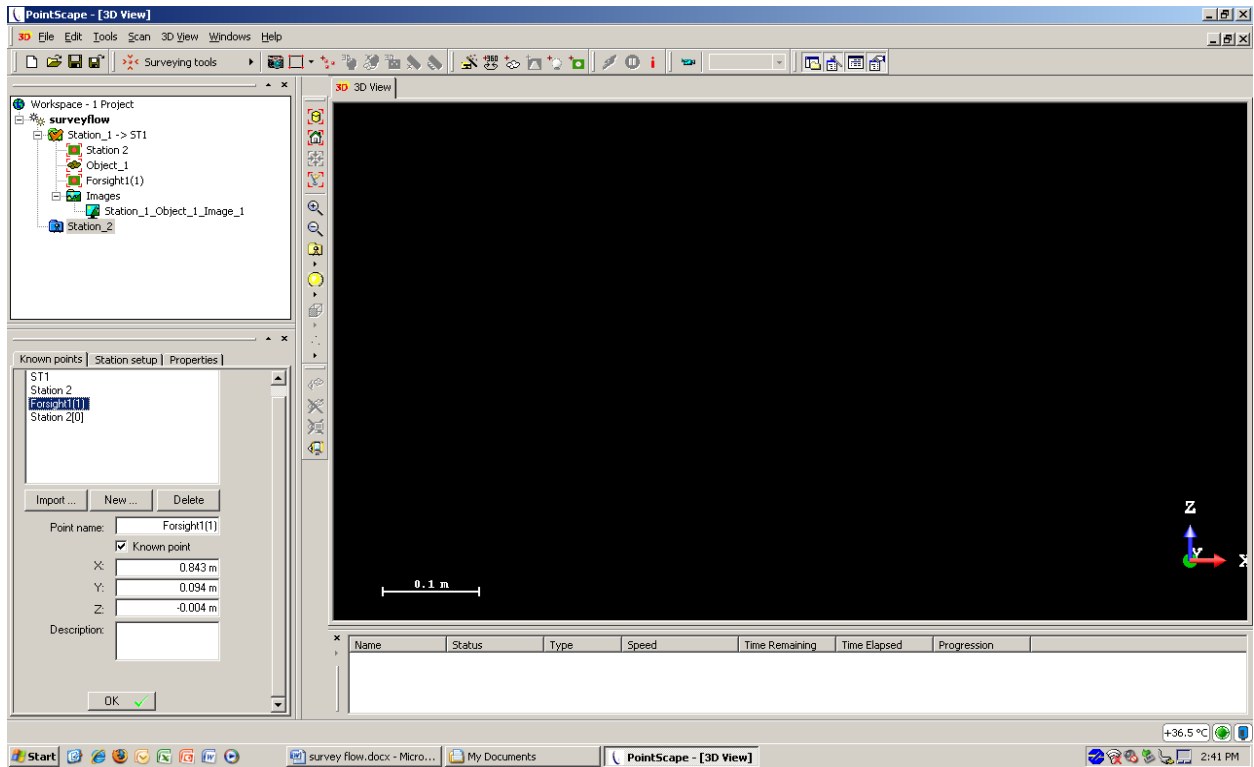
30. The imported points are listed in the *Known Point* dialog box. Click on a point name and the coordinates will appear in the boxes. Click *OK* to close the *Known point* dialog box.



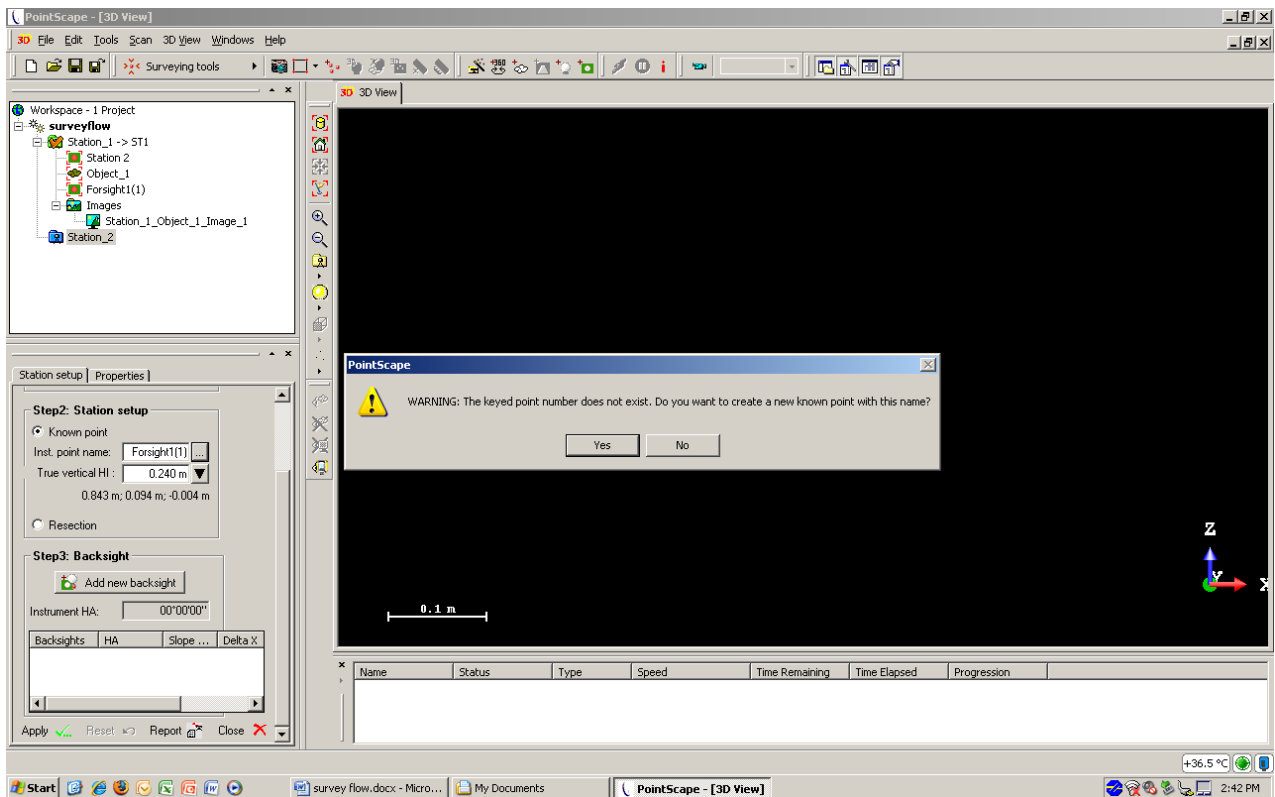
31. Add a new station. The *Station setup* dialog box is open. Check *Known point*, click the *Ellipsis* button to open the *Known points* dialog box.



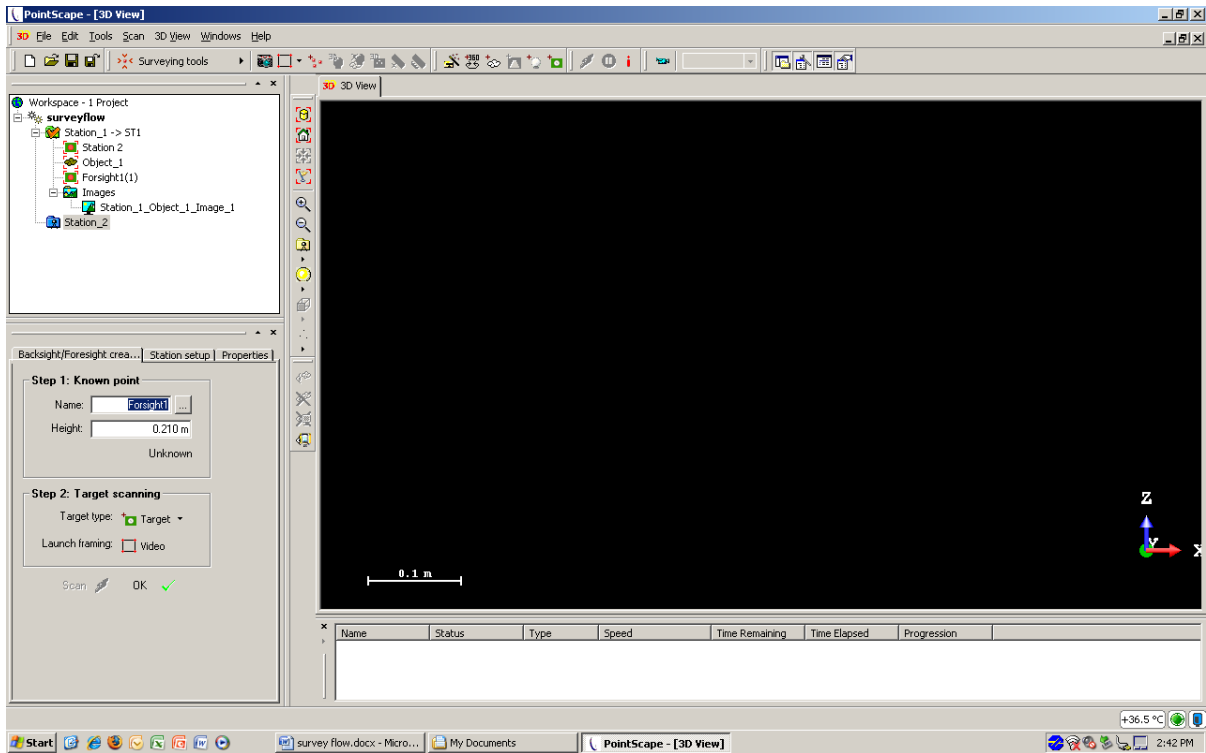
32. Select the last foresight point (Foresight1) and click *OK*.



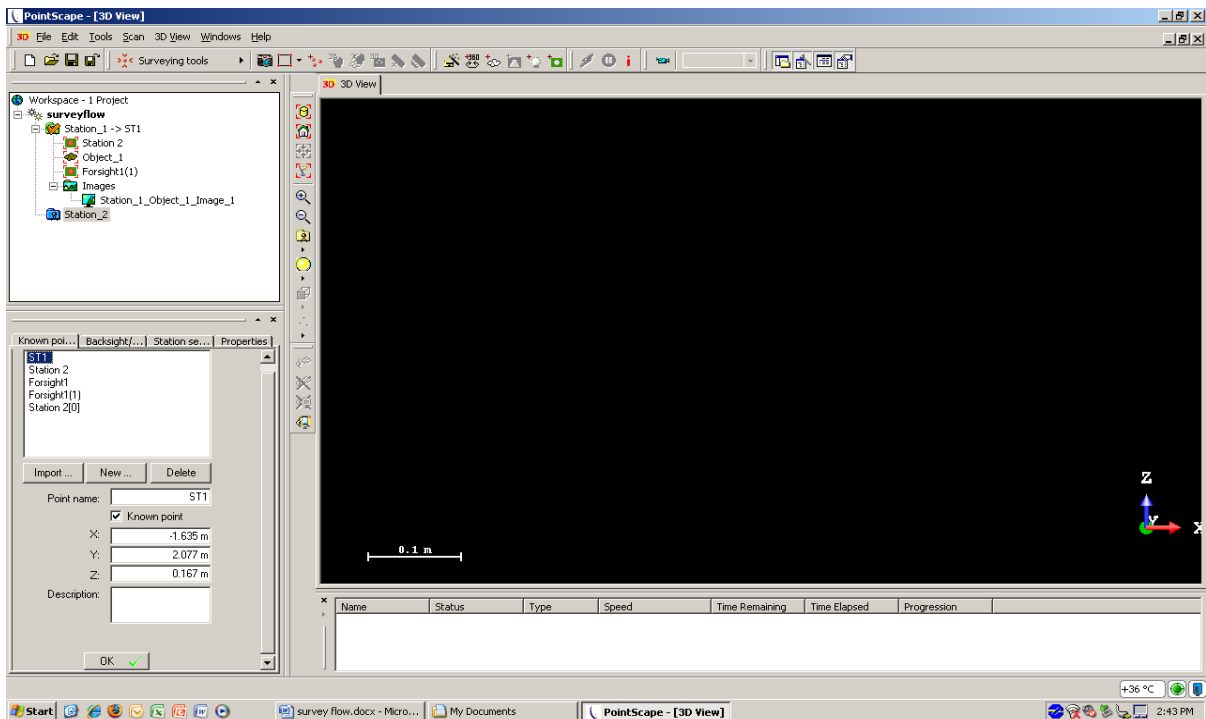
33. Enter the HI, click on *Add new backsight* and click *Yes* when prompted.



34. The *Backsight/Foresight* creation dialog box opens. Click the *Ellipsis* next to the Name box to open the *Known point* dialog box.

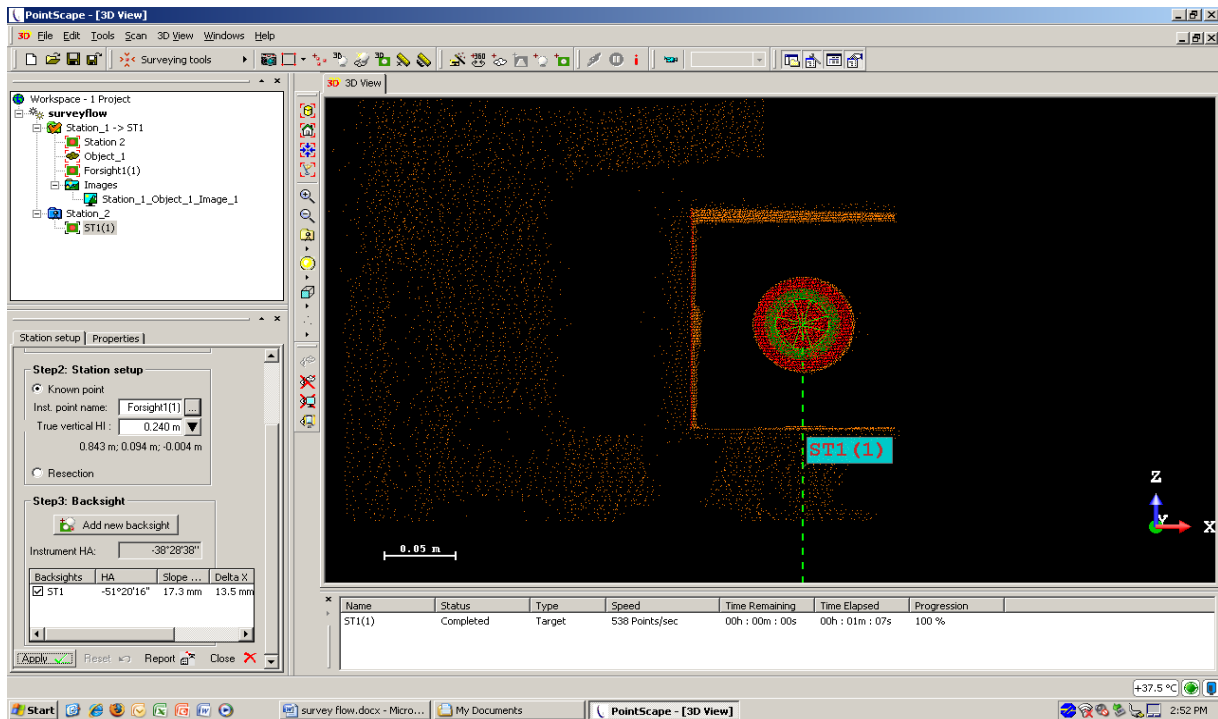


35. Select the last station point (ST1) and click *OK*.

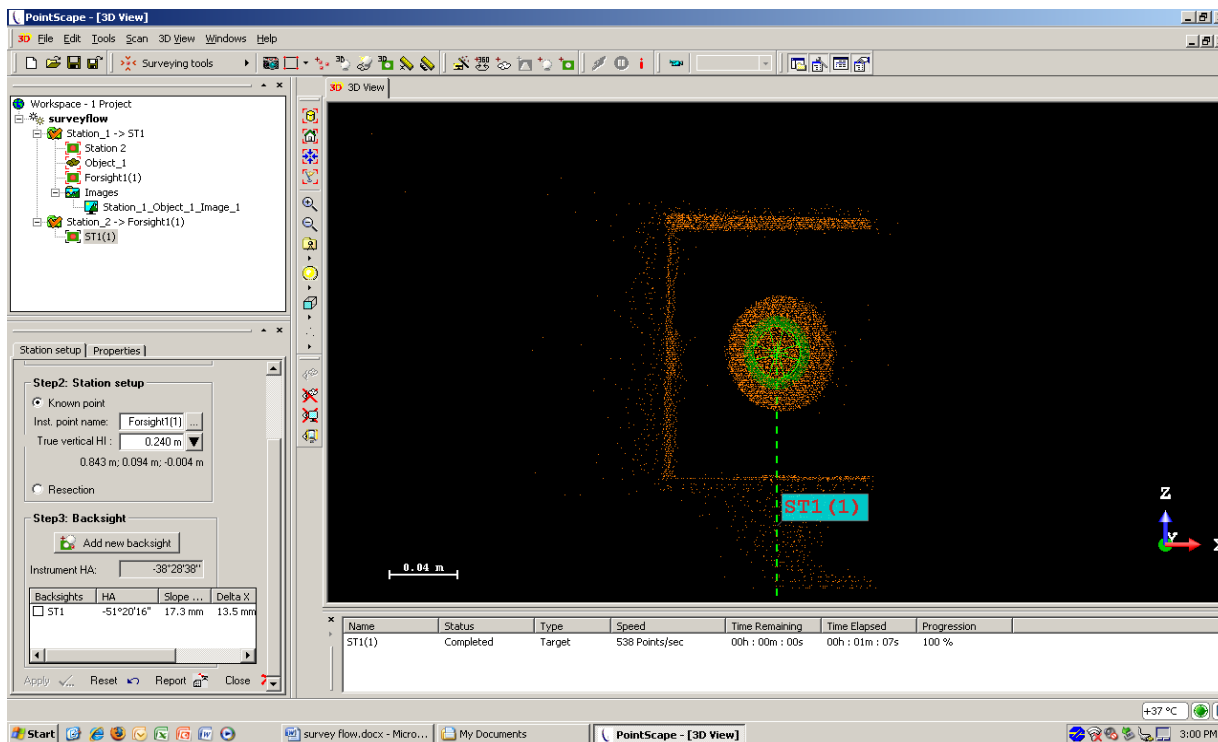


36. Repeat Step 13 to 15 to scan the target.

37. When the target scanning is done, click *Apply* to finish the Station_2 setup.



38. You are ready to scan at Station_2. The scans at this station will be in the same coordinate system as at Station_1.



39. When scanning is done at Station_2, repeat Steps 17 to 38 to extend the survey to Station_3, Station_4 and so on.

Questions:

1. What are the three different kinds of HI for the Trimble GX 3D laser scanner? Explain them.
2. What are the three target types that can be used to scan a backsight/foresight point?
3. Describe the station setup process in PointScape following the traditional survey flow.
4. Can you follow the traditional survey flow to perform 3D scanning without exporting and importing the foresight points?
5. What is the format used in importing and exporting foresight points?