



POINT LAYOUT OF AERIAL SPEED ZONES



CADD and Mapping Services
OHIO DEPT. OF TRANSPORTATION



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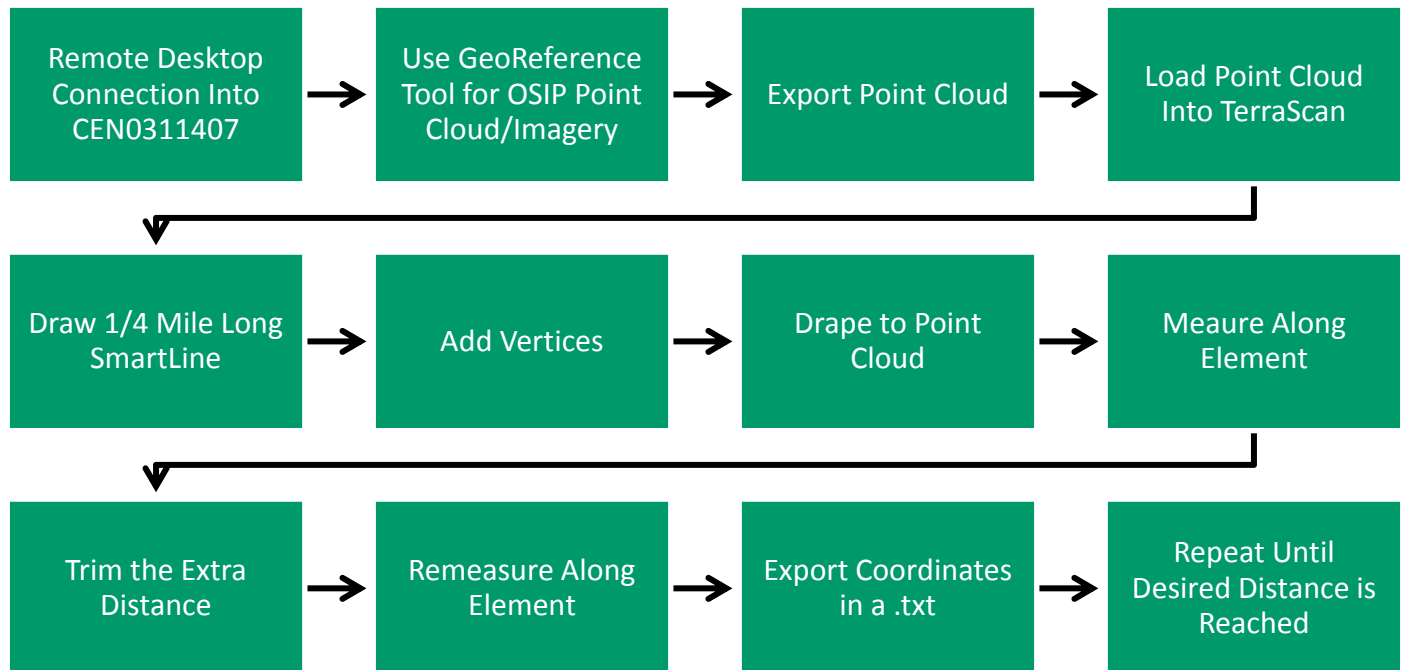
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Intent

The intent of this document is to provide the user the ability to generate points along a surface a set distance apart. (This guide focuses on the generation of coordinates for aerial speed zones).

Workflow

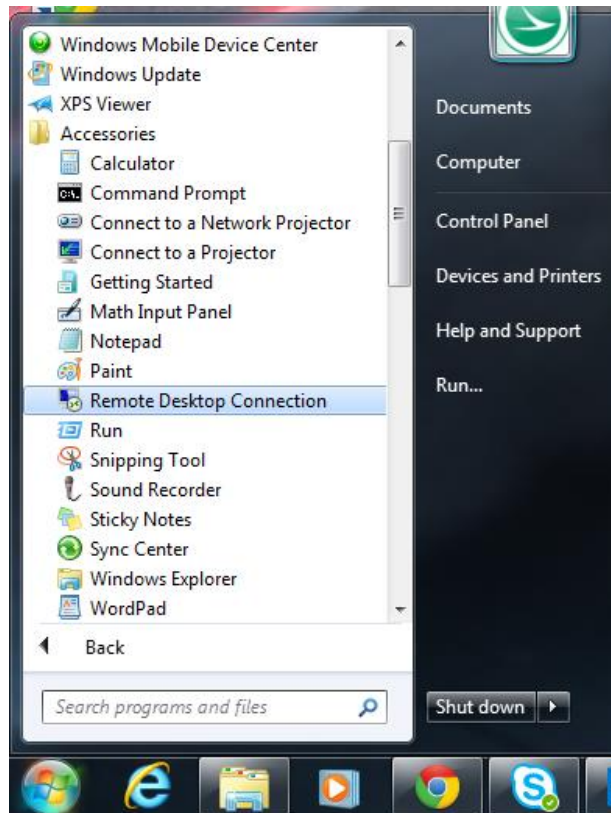


Remote Desktop Connection

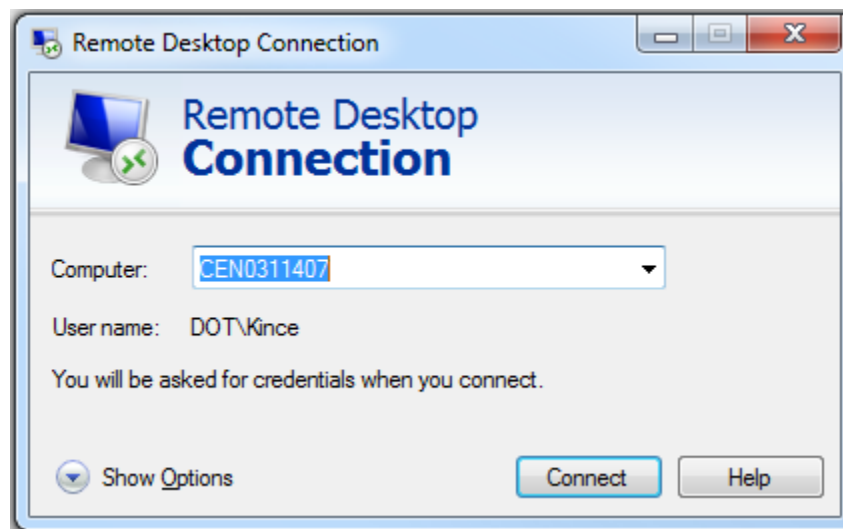
To utilize the Terrasolid suite of products remote desktop connection needs to be used. The software is licensed on a single computer located in CADD and Mapping Services (due to how often the software will be utilized compared to the price). This poses a small challenge due to the fact only one person can be logged in at a time. Fortunately, the process takes 10 minutes or less so if by chance someone is remoted in the process should not take long. It is imperative that the user disconnects from the remote connection once the process is completed to allow other users the opportunity to use it

Under the start menu click All Programs → Accessories → Remote Desktop Connection





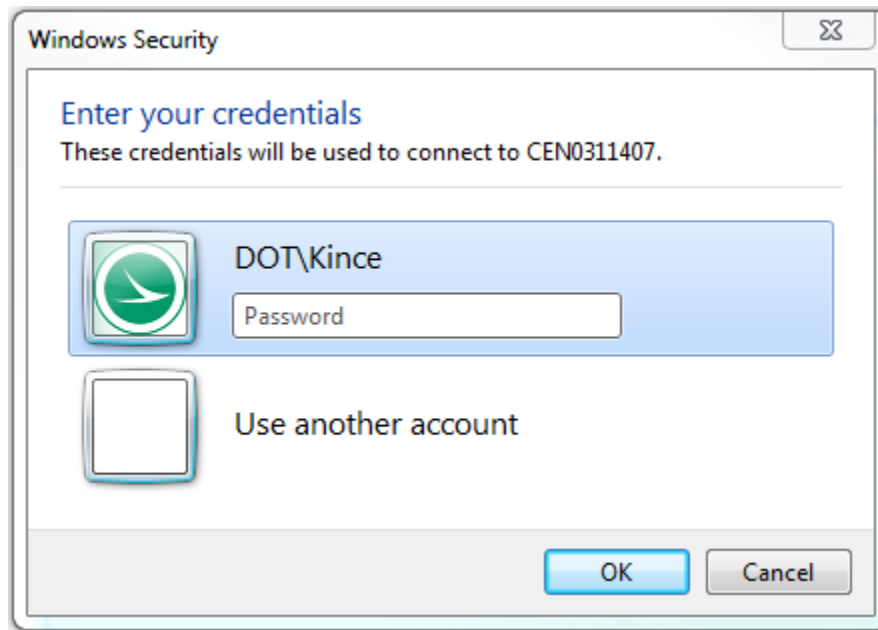
A dialog box will appear to locate the computer you would like to remotely connect to (see next page)



The computer name you are trying to remote into is CEN0311407 and your user name will appear in the section below.

Once selected click the Connect button.

A windows security dialog box will be displayed and the user will need to login using their ODOT credentials (same as the user and password to log into the computer)



Click OK to continue.

You are now logged into the computer and an ODOT Computer & Internet Use Policy screen will appear click ok to continue.

Note: If you are using dual monitors the computer only remotes into one screen the other screen will be the user's computer.

Opening Microstation

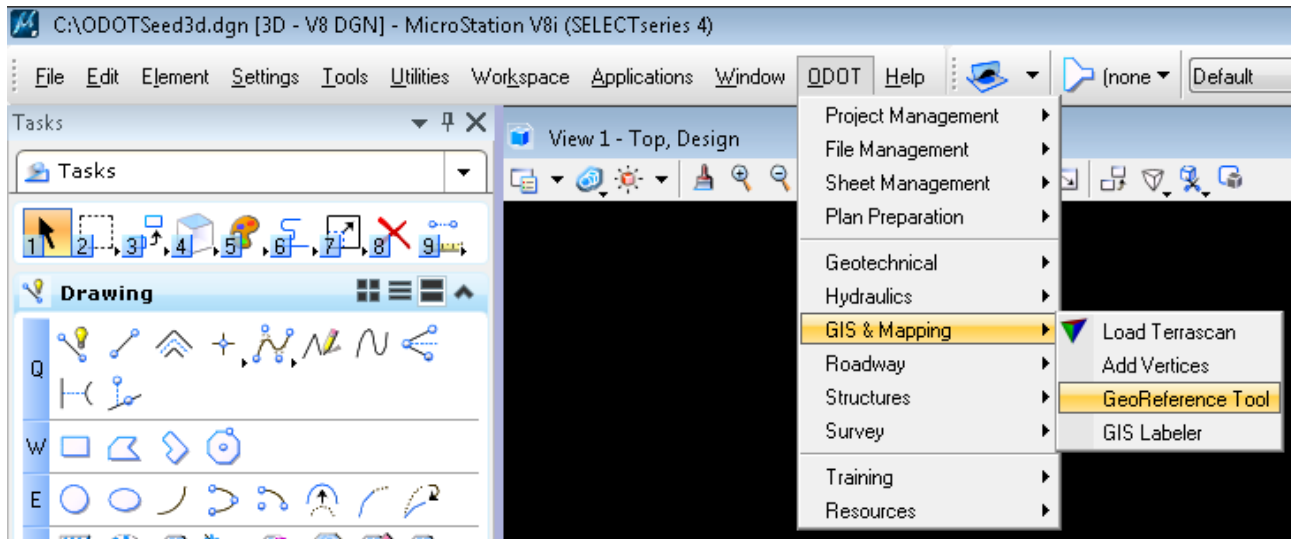
Open Microstation (Create a 3D seed file for the appropriate reference frame).



*For the GeoReferencing tool to work properly the coordinate system must be set!

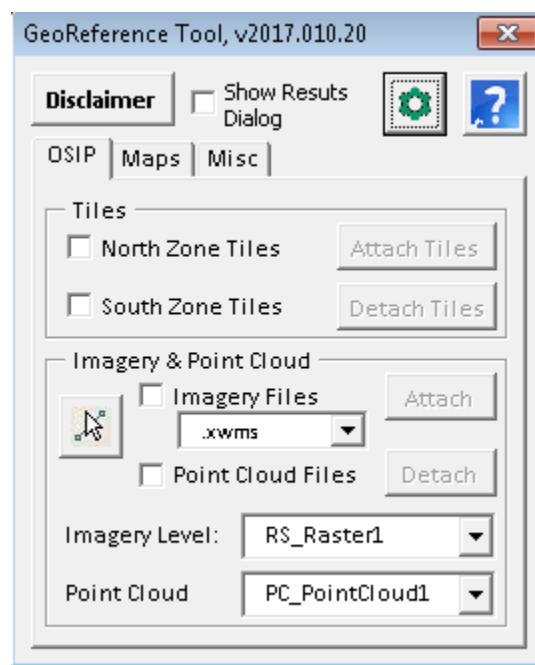
Using the GeoReference Tool

Under the ODOT tab at the top of the Microstation window, Select the GIS and Mapping toolbar and open the GeoReference Tool.



A disclaimer will pop-up, please read at your leisure then press the OK button.

The GeoReference Tool dialog will appear.

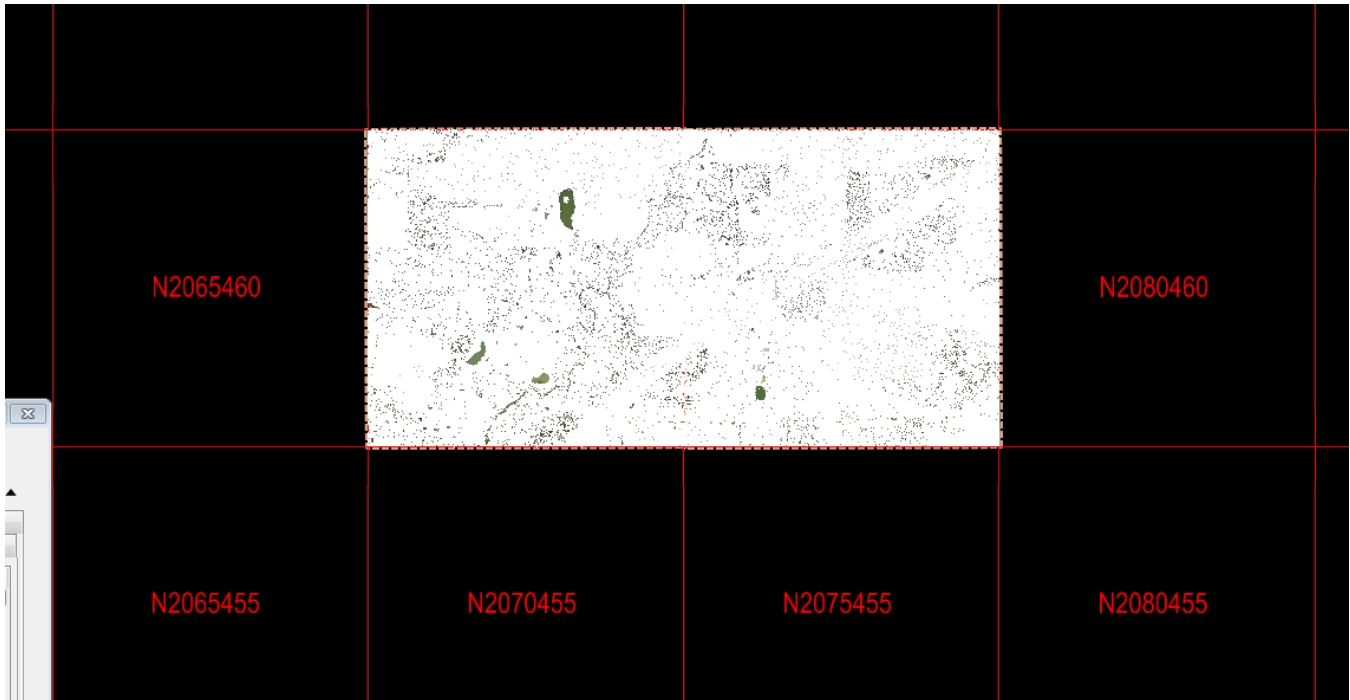


Depending on the State Plane Zone you are in select the North or the South Zone Tiles. Once toggled on press the attach button.

Select (by highlighting) the tiles you would like to load. Check on the Imagery Files and Point Cloud Files check boxes. Press the Attach button.

Once completed a Process Complete dialog box will appear.

Press OK



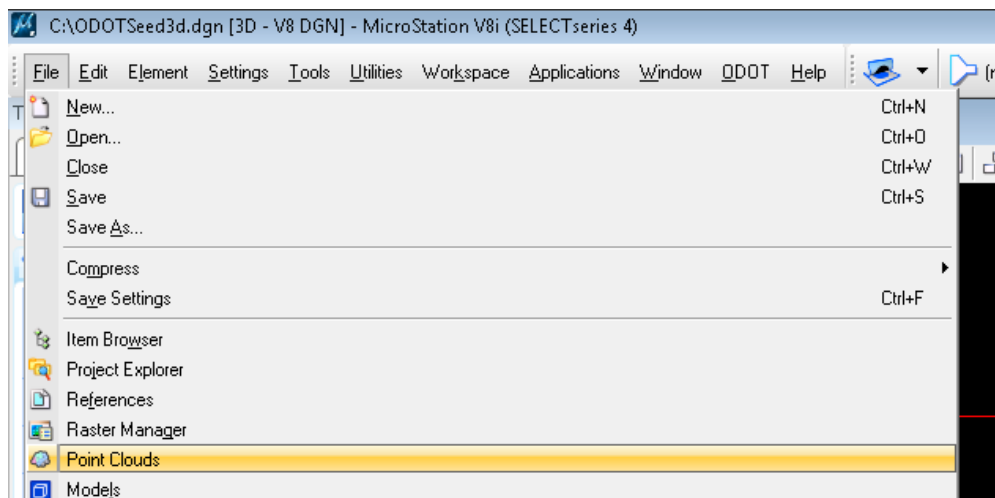
Exporting a Point Cloud

The GeoReference Tool attaches OSIP LiDAR data as a .pod under the point cloud manager (this file format is a Bentley proprietary format). In order to import the cloud into TerraScan we need to export the .pod files into an .xyz format.

Open the Point Cloud Manager by either the docked icon:



Or by selecting the Point Clouds Tool from the File menu.

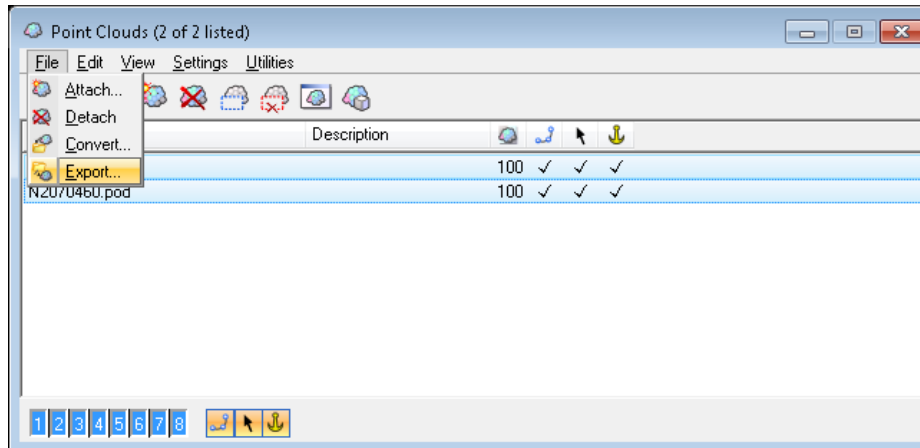




Once selected the Point Clouds dialog will appear.

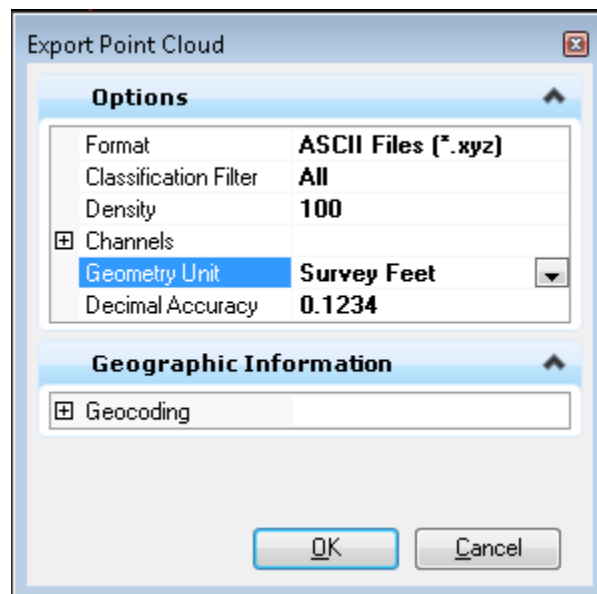
Select the .pod files you would like to export (hit control and data point (left click) to select multiple).

Under File (on the Point Clouds dialog box) select export.



The Export Point Cloud dialog box will appear.

Under the format section please select ASCII Files (*.xyz) and change the units to Survey Feet.



Press OK to export.

Save the data to a different location (the idrive is read only) and press save.

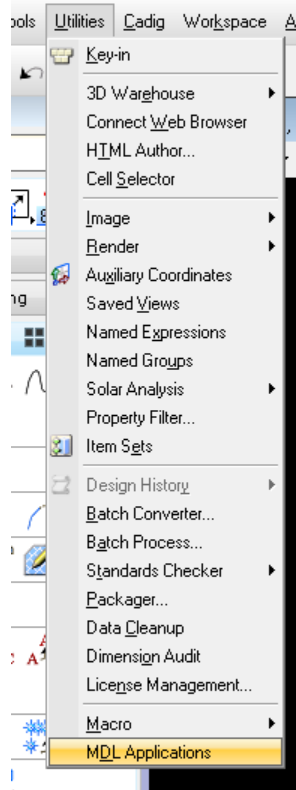
Once Saved re-open the GeoReference Tool and detach the Point Clouds and Tiles (leave the imagery to place smart line).

Starting TerraScan

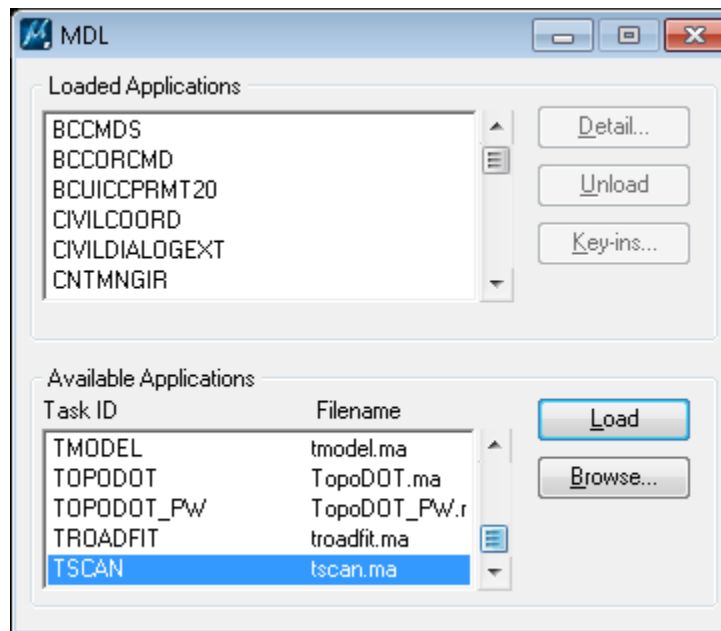
Terrascan is an MDL application that is run within Microstation (not a tool but more of a plugin which uses the Microstation interface)



To start the MDL, select Utilities → MDL Applications



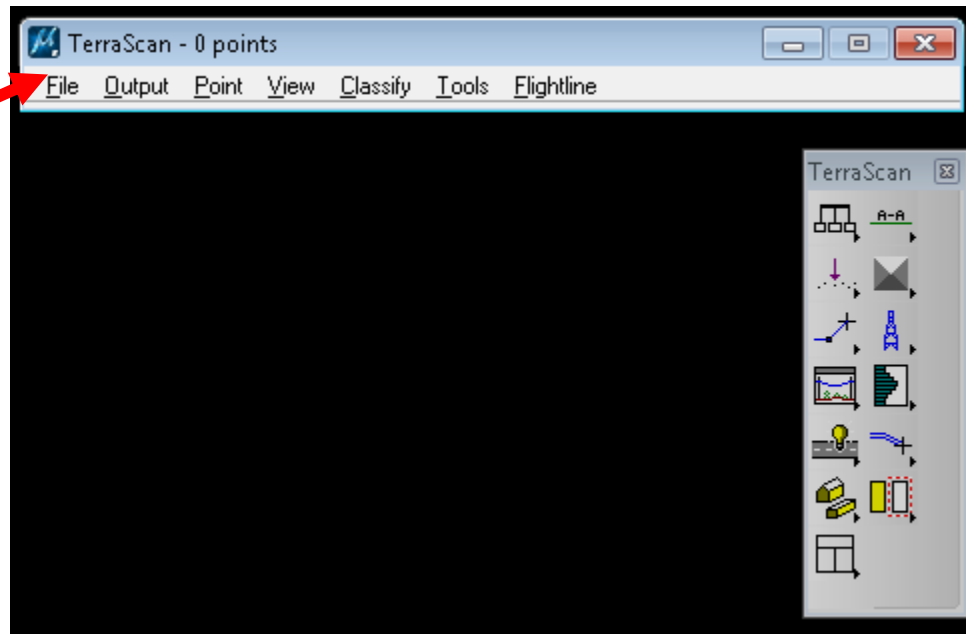
An MDL dialog box will appear (depicted on the next page) under the Available Applications section select the TSCAN task ID and then click load. (The MDL window can be closed)



TerraScan opens two windows (shown below).



Main
Toolbar



Read Points in TerraScan

Using the Main toolbar (depicted in the above photo in red) select File → Read Points

Select the file you wish to load and open (in this case a .xyz file exported from the Point Cloud Tool)

Load Points dialog box will appear (Use the default settings) and click OK to load the data.



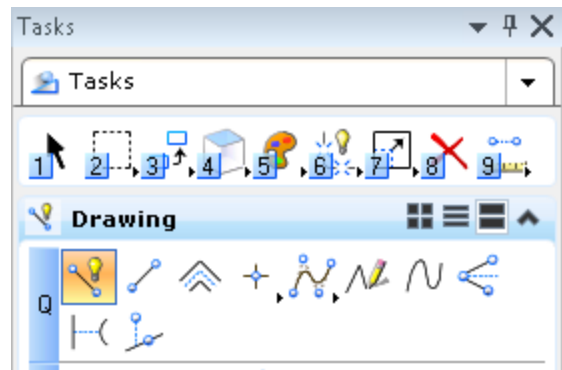


Placing the Initial Smart Line

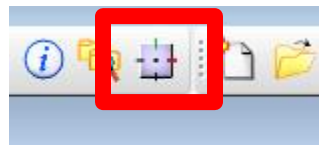
Using the OSIP imagery (or any raster) zoom into the starting area of the speed zone (If you are starting at a mile post use the D11 lat-long converter to get a close starting point for the line).

Start the Smart Line Tool and toggle on Accudraw.

SmartLine Tool is located under the Task Bar → Drawing tab (Row Q)



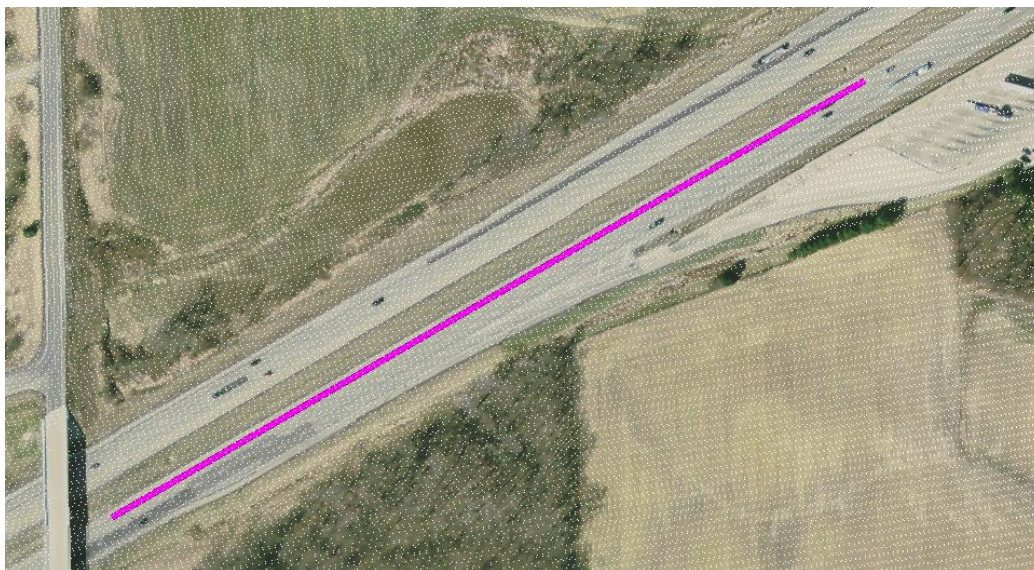
To Toggle on Accudraw press the toggle Accudraw button (typically docked at the top of the screen)



Select the paint strip (if visible) with the smart line command.

(If Accudraw is in XYZ mode (typically docked at the bottom of the screen) press the space bar to change to distance and angle)

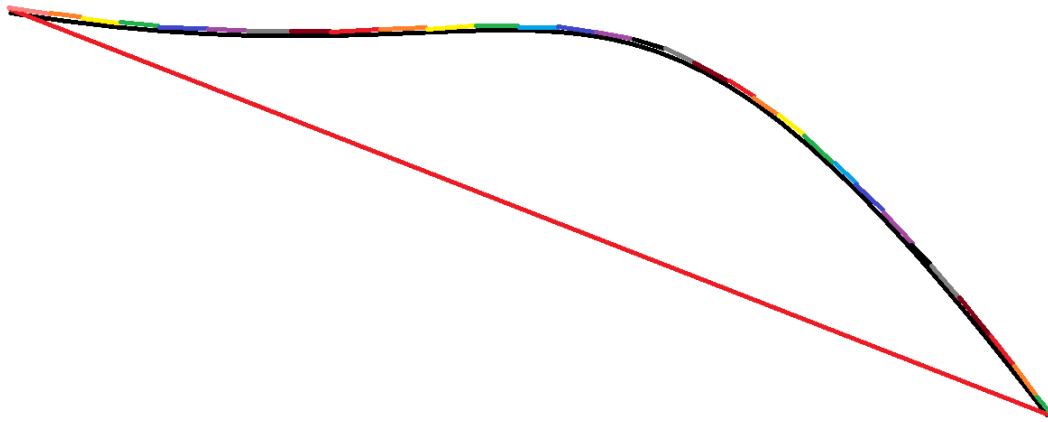
In the distance box of Accudraw type in the desired distance (typically 1320 feet). Press enter to lock the distance. With the mouse select the angle of the line by clicking on the edge line further down the road. (For visualization purposes, you can change the line color and weight)





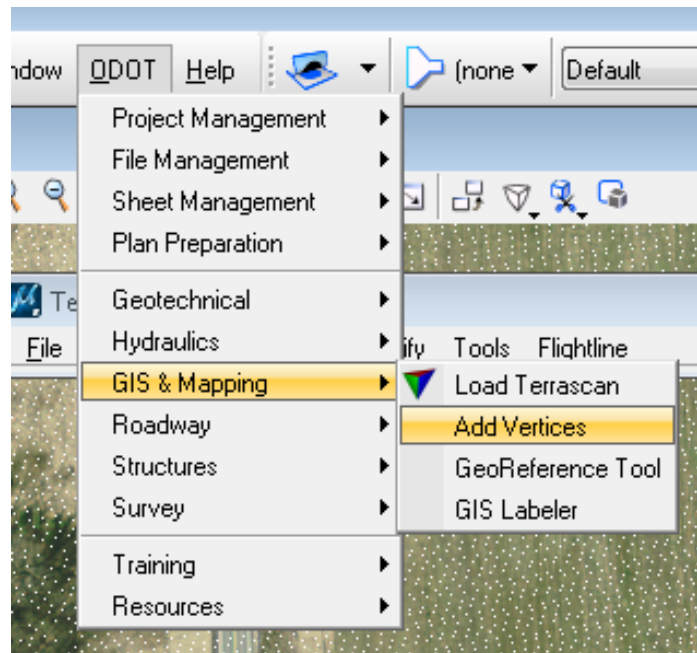
Line Stroking

To drape our line accurately, we will need to add stroking to the line. This function adds vertices at periodically spaced intervals (for our purposes 1ft.) to drape our line at more than 2 points.

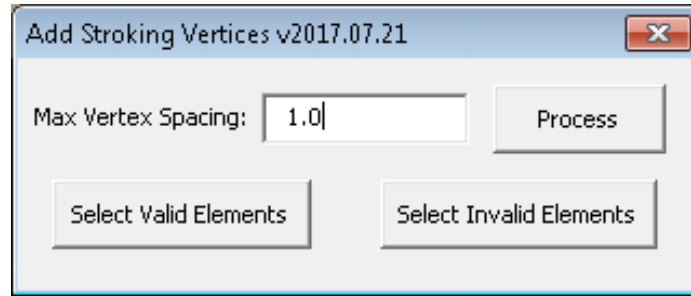


The Red line depicts what would happen if we didn't use linear stroking, while the multicolored line segments match the black contour of the surface we are trying to follow.

To add the vertices, we will utilize a VBA under the ODOT tab → GIS & Mapping → Add Vertices.

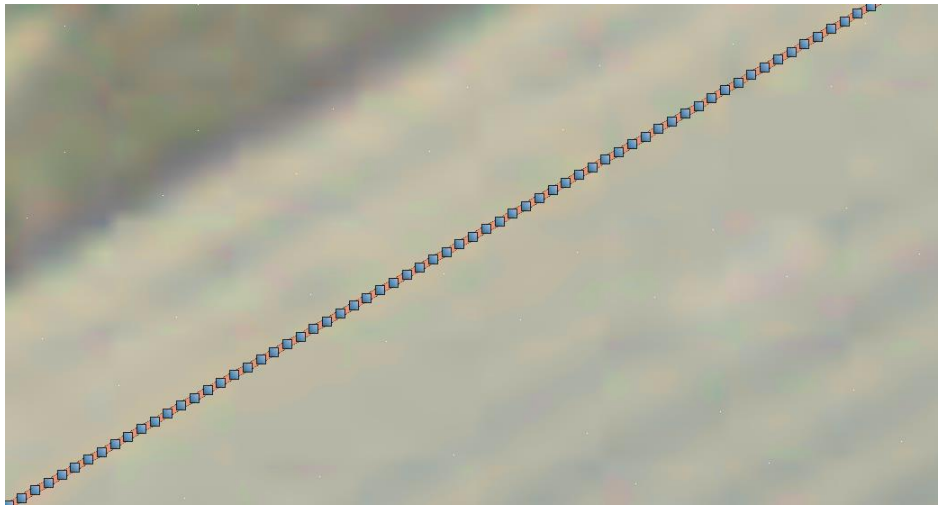


The Add Stroking Vertices dialog box will open.



In the Add Stroking Vertices dialog change the max vertex spacing to 1.0 ft. Either select the line then press process or use the VBA select valid elements (it will select any line in the file and add vertices) then press process.

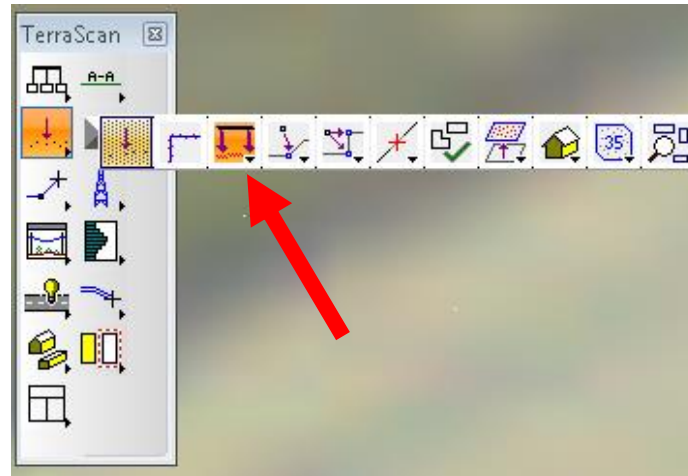
Once completed a dialog will alert you to when the process is complete. Press OK.



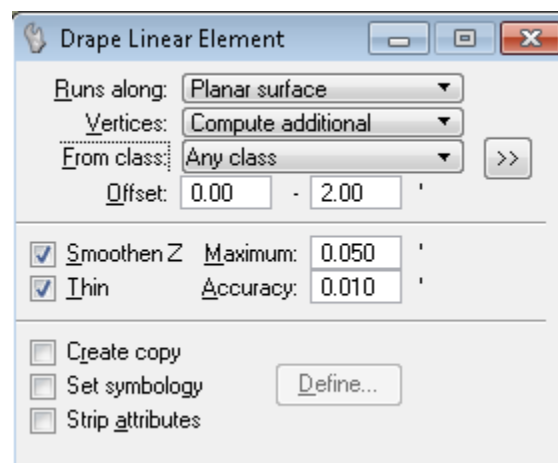
Draping Smart Line to Point Cloud

Select the line you want to drape.

Under the TerraScan Toolbar (vertical toolbar) press and hold on the draw feature tool to expand the toolbar. Select the third tool from the left drape linear element.



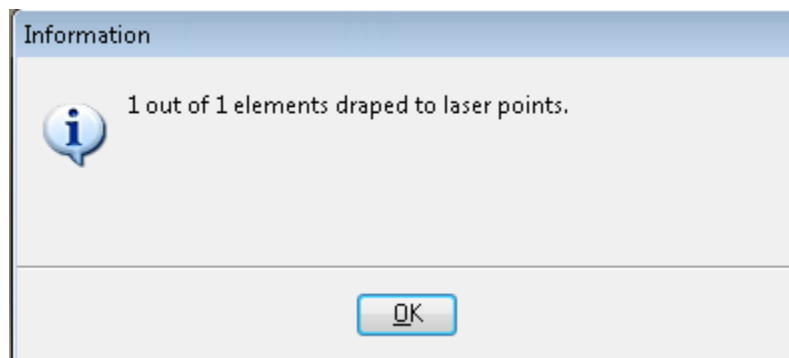
The Drape Linear Element dialog box will open.



Change the From class to Any class. (.xyz data does not have class metadata). Use the defaults for draping.

Data click (left click) to process the line.

A dialog box will appear with the results.

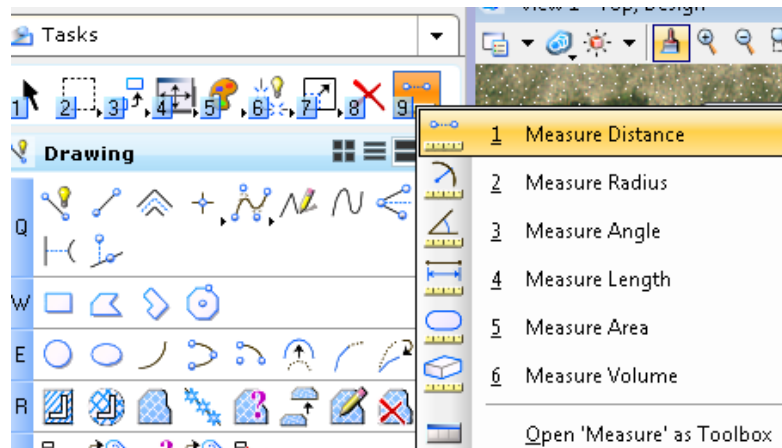


Press OK.

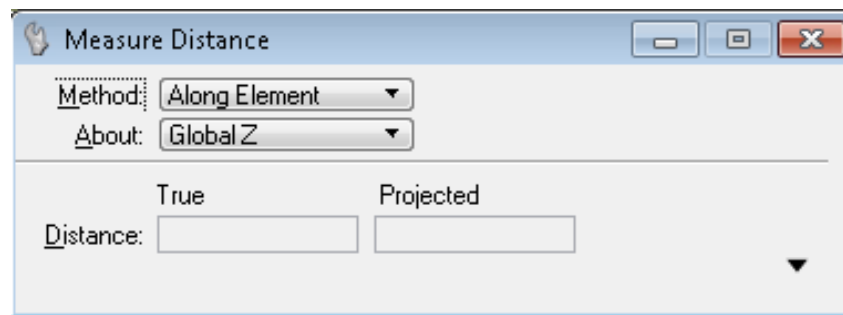


Measure Initial Line

To measure our initial line, use the Measure Distance tool under Task → Measure Toolbox

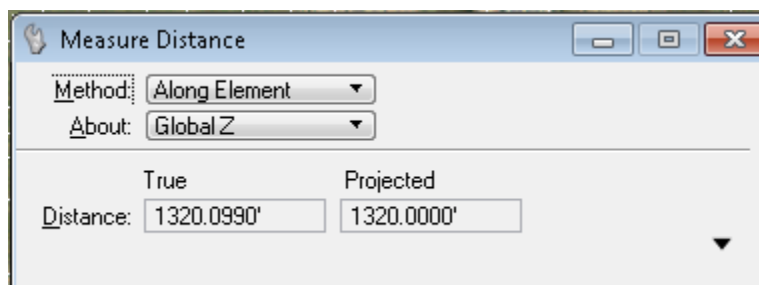


The Measure Distance tool dialog will appear.



In the Method setting select Along Element. Leaving the About Global Z as the Default.

Click on the beginning of the line (snap) and click on the ending of the line. In the Measure Distance tool dialog two distances will appear.

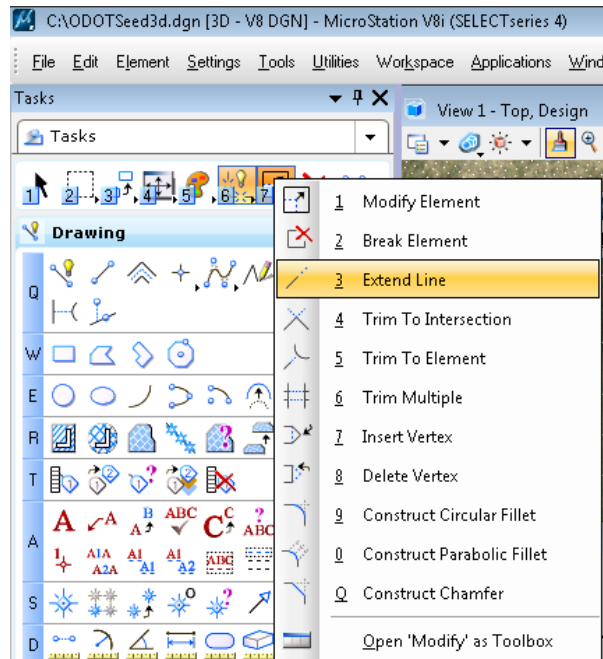


The Projected distance is the “grid” planar distance while the True distance is the distance along the ground.

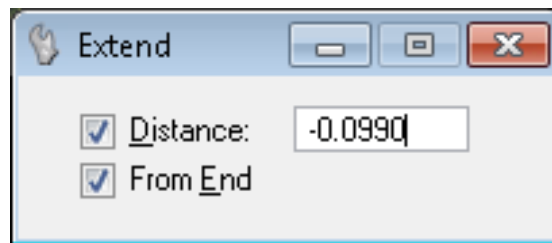


Trim the Excess Line

Using the Extend Line command we are going to trim the line the difference between the planar “grid” distance and the “ground” distance.



The Extend tool dialog box will appear.



Check on the Distance and enter in the grid ground differences.

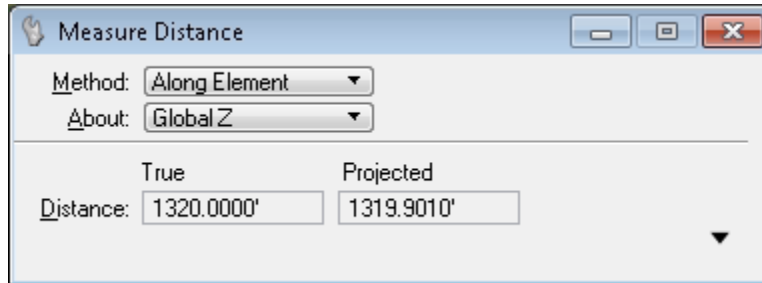
Check on From End (or select the end you would like trimmed).

Select the line to trim.

Data click (left click) to Accept the selection.

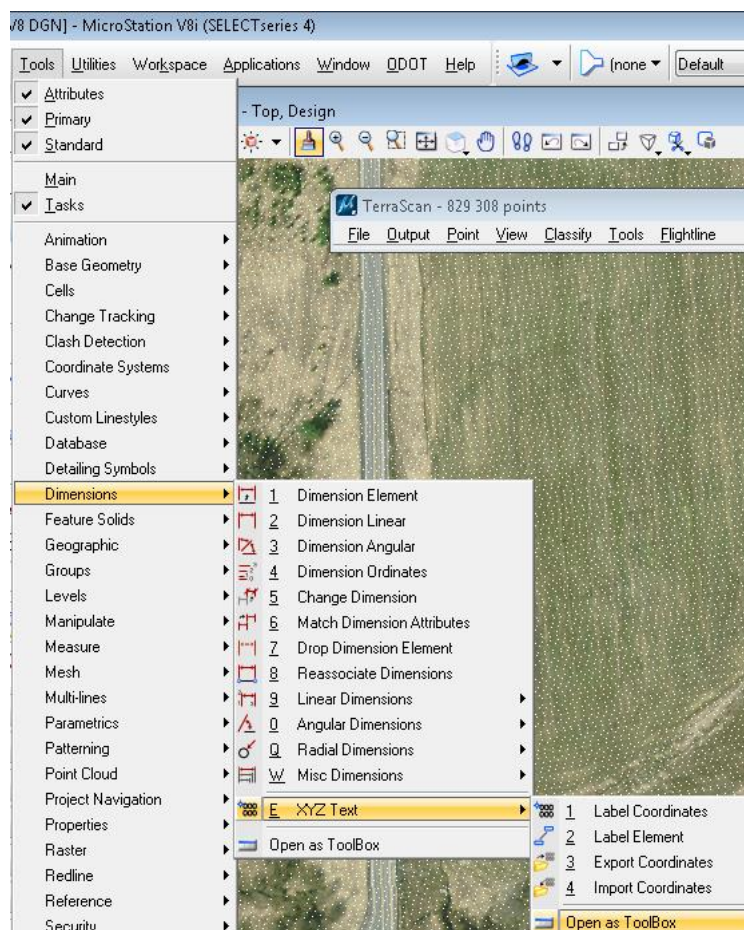
Re-Measure the Trimmed Final Line

Using the Measure Distance tool again, measure the line by snapping to both ends. The True distance should now be the required ground distance.



Exporting Coordinates

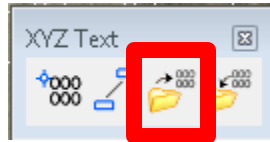
To export the coordinates of the correct ground length line. Utilize the XYZ text tool. This tool is found under Tools → Dimensions → XYZ Text → Open as Toolbox.



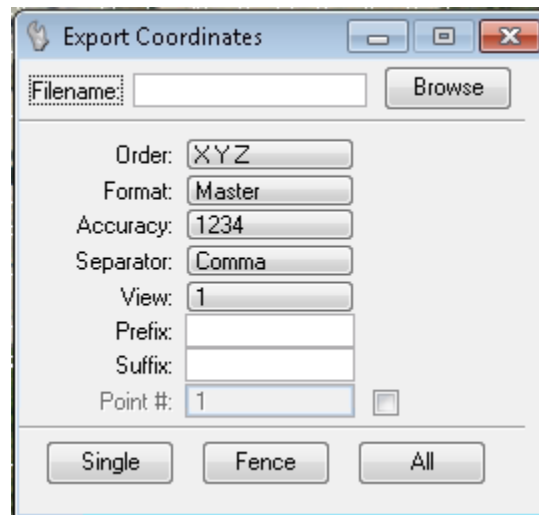


The XYZ Text tool dialog will open.

Select the Export Coordinates tool (boxed in red below)



The Export Coordinates dialog will appear.



Browse to the location the file should be stored (name the file .txt or .csv) and click save.

Select the line to be exported and click single in the Export Coordinates dialog.

Open the .txt file just created and delete all coordinates except the first and last.

Import to data collector and stakeout to them in the field.

*To check the coordinates use the Import Coordinates tool from the XYZ Text toolbar and import the coordinates to the file (change the color and line weight for better viewing)