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November 5th - 7th

Presentation Name: Process and Manage Point Clouds with Bentley Descartes SS3

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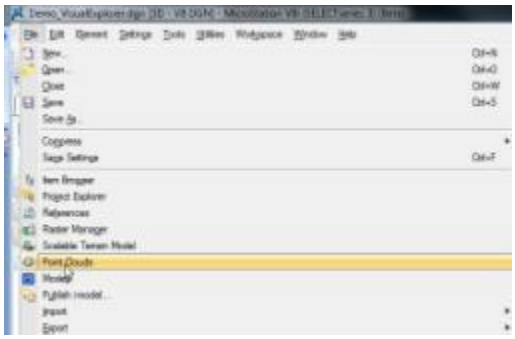
Exercise 1 - Tiling Point-cloud files with "Tile export tool"

1) Open Descartes and create an empty 3D DGN file (use a 3D Seed file such as seed3d)

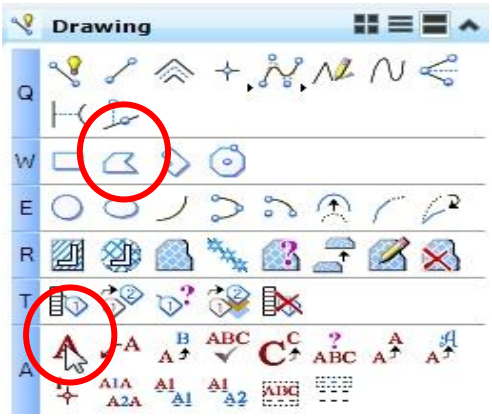
2) Open Point Cloud manager: File\Point clouds

3) In Point Cloud Manager, attach POD files



4) Select the 4 POD files in HNTB folder,

5) Keep only view one open, rotate view to Top and fit view.



6) In Point cloud manager, disable snap on all Point Clouds

7) Use Place shape tool and draw 3 polygons that will define the spatial extent of the point cloud you will generate.

8) Use Place text tool to position a text inside each polygon you created previously, the text must be exactly at the same elevation than the shape placed at previous step (this is why we disabled snapping on Point cloud, all the elements are created at the view active depth)

9) Select All point clouds

10) In Point Cloud Manager/Edit/ select Tile Export tool

11) Define your output folder and make sure the level defined is the one on which you just drawn the shapes with the filename. Follow the prompt.

Note the all the tiles you drew must be highlighted.

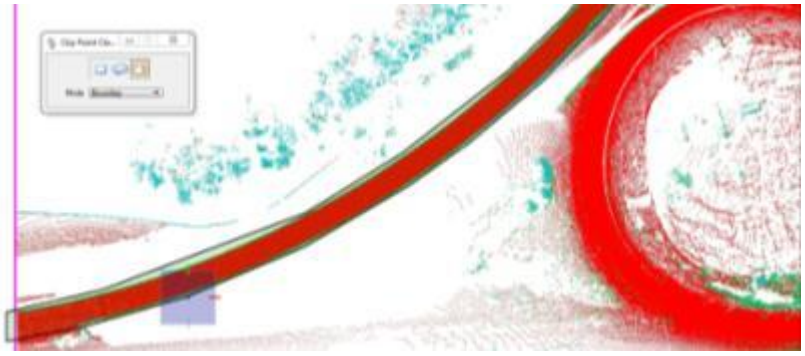
Exercise 2 - Extracting Road sections and cleaning Point Cloud

1) Open Descartes and create an empty 3D DGN file (use a 3D Seed file such as seed3d)

2) Open Point Cloud manager: File\Point clouds.

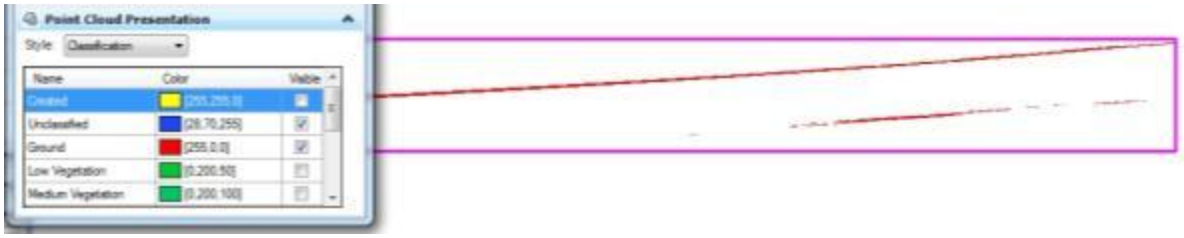
3) In Point Cloud Manager, attach 00007.pod file from HNTB folder.

4) Zoom in to the top left Interchange part of the point cloud and clip this area (Use Clip tool in Point Cloud Manager).

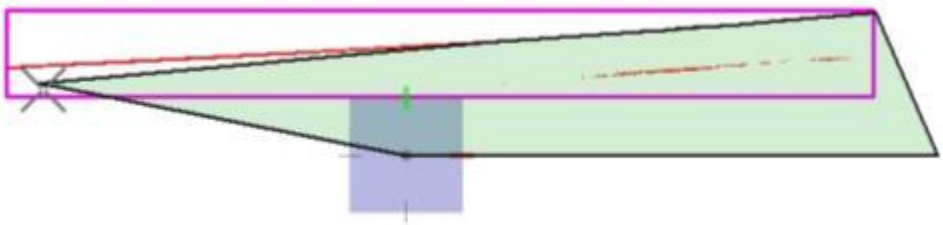


5) Zoom in to the top left Interchange part of the point cloud and clip this area (Use Clip tool in Point Cloud Manager).

6) Rotate View to Front, toggle off all classes despite Ground class and Unclassified class



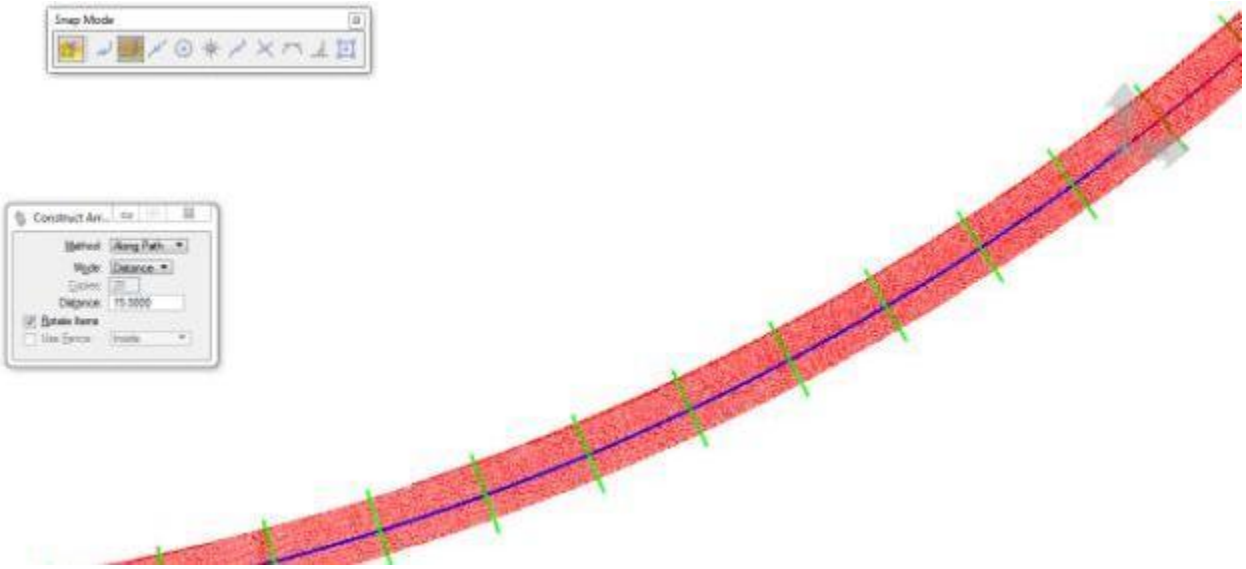
7) Select Classification tool in Point Cloud Manager, Edit Menu. Set classification tool to reclassify Ground Point into Unclassified.



8) Rotate view to Top View and set view active depth to be at a depth similar to the Point Cloud

9) Disable AccuSnap, Select Arc Tool and draw an Arc corresponding to the road axis (put it on a dedicated Level: Axis).

10) Draw a line normal to the road axis located at its beginning (place line tool, snap on the Arc beginning, Rotate AccuDraw compass to Element by pressing RE) and copy it along path using construct array tool (every 15 feet - check rotate items.) (On a dedicated level: Sections)



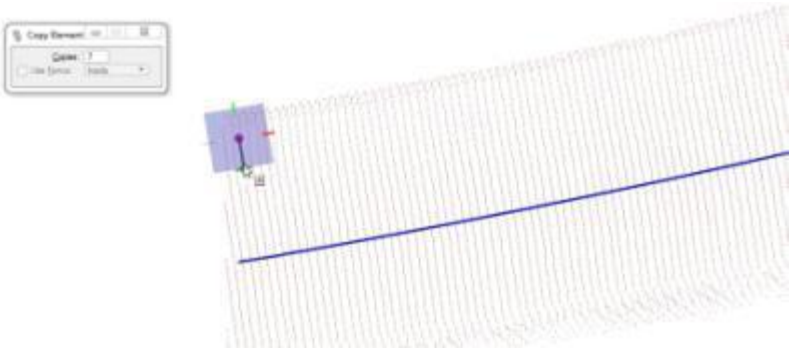
11) Select all elements in the View, Select Drape tool (Filter classes to consider only the class Ground, Set generalization parameter to 0.02)

12) Review the result.

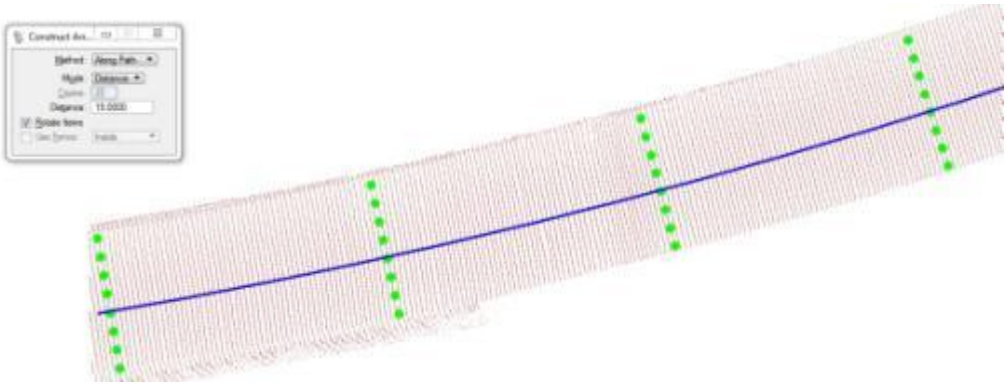
Exercise 3 Create a grid on Points on Road surface

1) Open the DGN created in Exercise 2, create a new Level "Points", set weight at 10, use Place Point tool and place a point on the road border

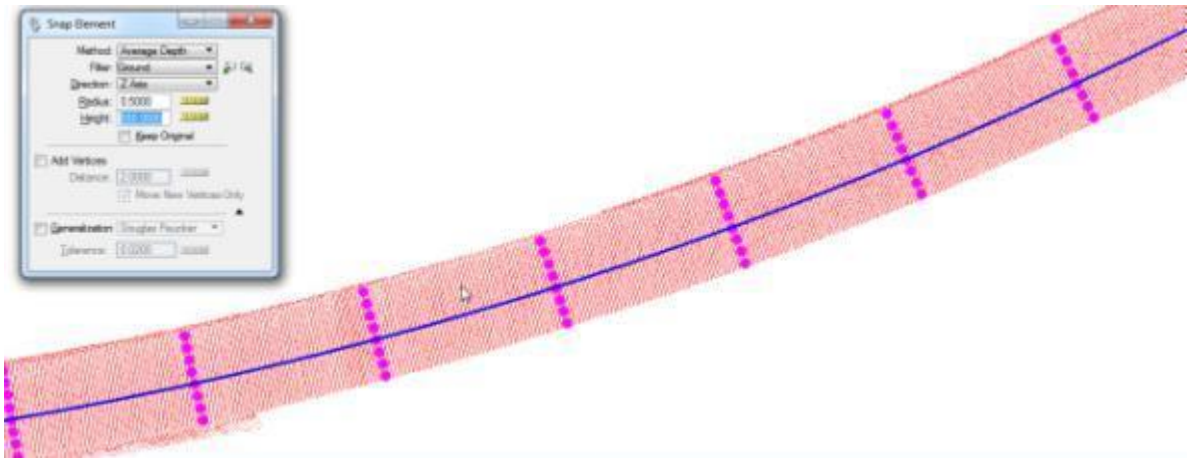
2) Use Copy tool to generate 7 copies of the initial point in a direction perpendicular to the Road axis (i.e. rotate AccuDraw to Element, use copy tool with a step of 1 meter) an alignment.



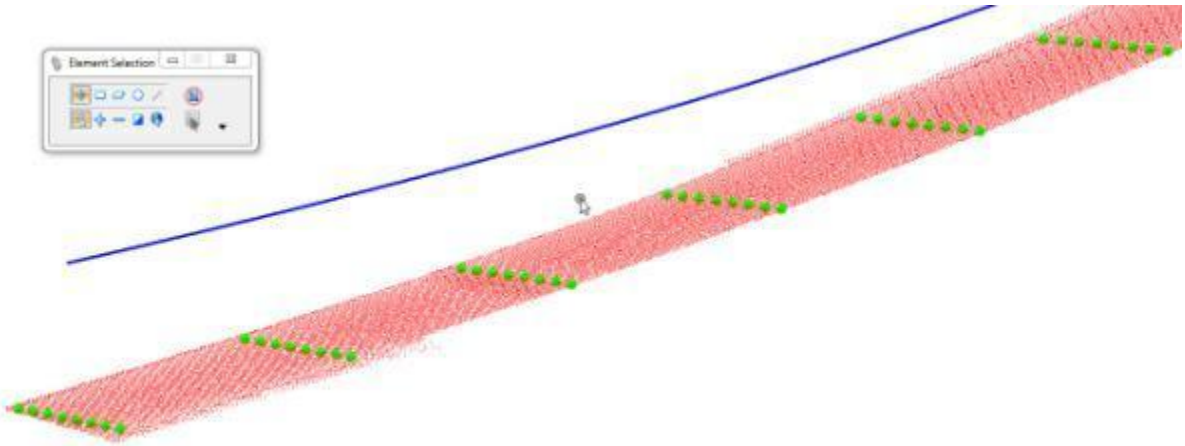
3) Use Copy Array tool to copy along path the 8 points created previously.



4) Select All the points you created as well as the Point Cloud, and Snap them using Snap Element tool (Point Cloud Manager, Edit Menu)



5) Visualize the result



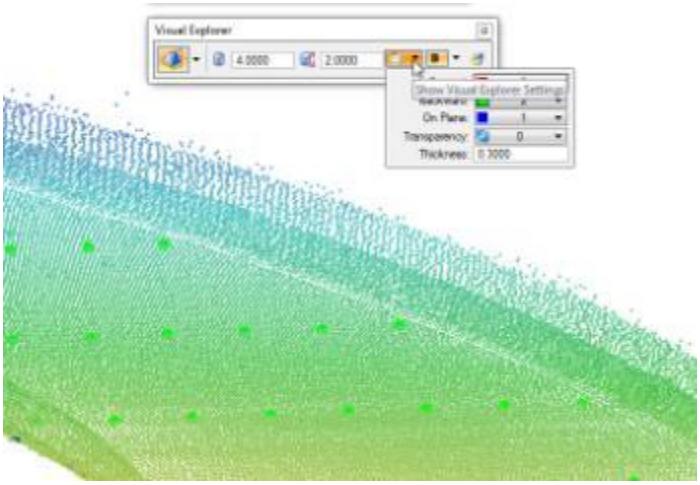
Exercise 4 Extract Breaklines with Visual Explorer

1) Keep same DGN as in previous exercise and create a new Level : breaklines , set Level color as Blue.

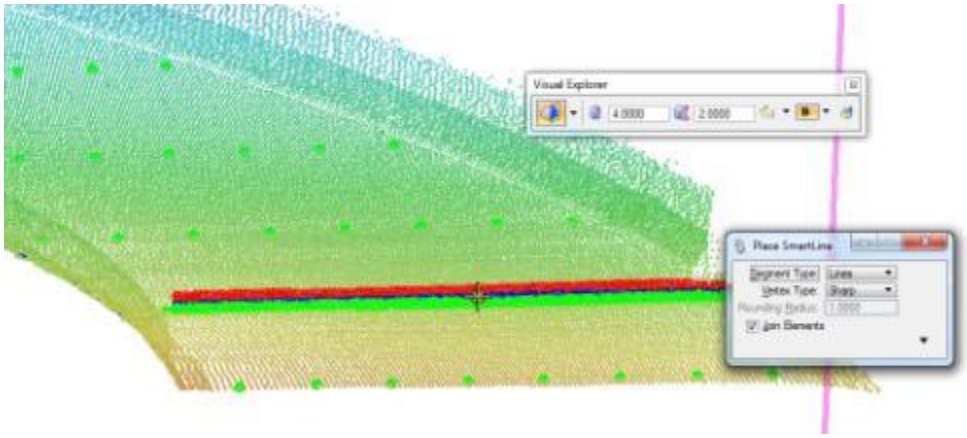
2) Set display style of Point Cloud at Elevation and Open Visual Explorer from Point Cloud manager, Setting Menu.

3) Set the parameters:

   - Radius at 4 meters
   - Height at 2 meters,
   - Forward color as red,
   - Backward color as green,
   - On plane color as Blue
   - Thickness as 0.30 meter
   - Transparency at 0

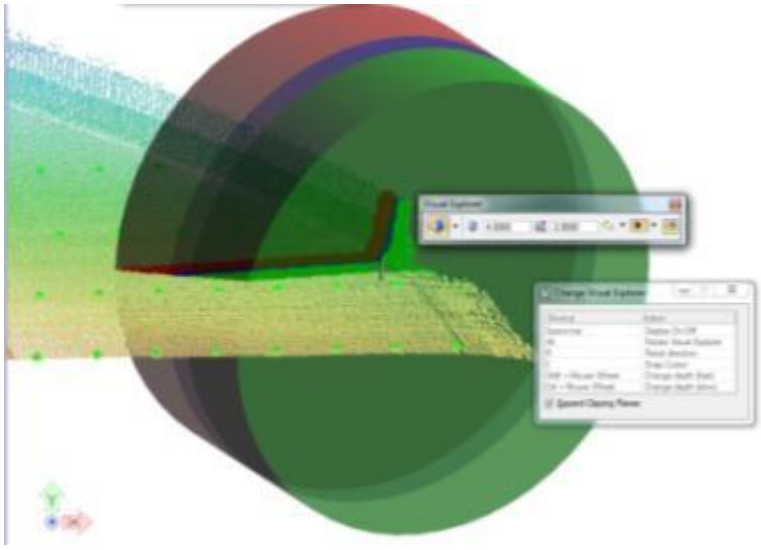


4) Enable AccuSnap, Select Place SmartLine tool and move the cursor over the Point Cloud, you should see some points recolored.



5) Rotate the view to look at road border with a 45 degree angle

6) Press the "Change Visual Explorer" button, and then press the space bar. A 3D Cylinder is shown and represents the area considered by Visual Explorer. Align the Cylinder with the road axis by pressing the Alt key and moving the mouse.



TIP : Map the following key-in " pointcloudadv visualexplorer change" to a F key in order to access "Change visual explorer" mode in a faster way

7) Exit the Change Visual Explorer mode by doing a left click.

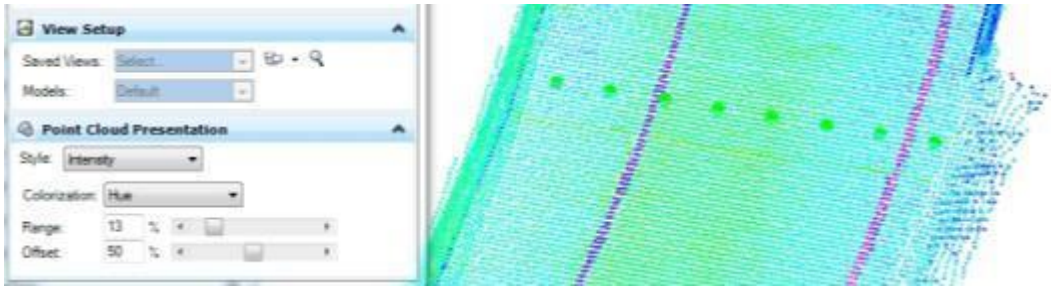
8) Follow the alignment and digitize the breakline.

TIP: use Alt + Mouse mid button to trigger Dynamic Rotation of the view

Exercise 5 - Extracting paint lines

1) Keep same DGN as in previous exercise and create a new Level : Paintlines , set Level color as red.

2) Set View Point cloud display Style at Intensity.



3) Rotate View to Top View, Set Active Depth to be at the same elevation than points in the north east area of the clipped point cloud.

4) Disable AccuSnap, Select Place Point or Stream Curve Tool (Method Points:), and digitize the XY location of the paintlines from the top view.

5) Select the 2 curves you created and facet them using Tools / Curves / Curves Utilities / Facet Curves - Max Chord height to line string, parameter set at 0.02. (Keep original unchecked.)

6) Use Snap Element Tool with All Classes (we could consider only the ground class but it is not required here). Parameters set as:

- Highest Depth
- Filter: All classes
- Direction: Z axis
- radius 0.5
- Height: 1000