

Geospatial Modeling & Visualization

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Leica Cyclone – Creating a Mesh and Modeling Surface Topography: Creating the Topographic Mesh

This series will show you how create a mesh and model surface topography in Leica's Cyclone

Hint: You can click on any image to see a larger version.

9. **Select Points** when dealing with large areas, selecting several points results in more surface points being sampled in the surface. **Region Growing and Subdivision** Create Object -> Region Grow -> Smooth Surface -> Cyclone runs the region grow by default settings in the initial view and the dialogue box – Adjust Surface Characteristics and click 'Restart' to preview results -> Click **OK** when satisfied with preview:

Hardtop Surface (this is generally chosen for fairly uniform areas with paved or hard surfaces; if dealing with rolling unpaved terrain, uncheck this option). Viewing the point cloud with color from scanner or hue intensity is recommended for this process Per Cyclone 7.0 Glossary: "This command is used to segment a selected smooth surface in a point cloud. The points representing the smooth surface are merely segmented from the point cloud; no object is inserted. This command is not available for use with a pcE file (pcE cloud)."

10. **Decimate Mesh** (per Leica Trainer July 2010 current bug in meshing command) -> Select Mesh -> Tools -> Mesh -> Decimate -> Maintain 100% of original triangles, vertices, and exact boundary edges -> Decimate allows pre-view -> OK to accept

11. **Subdivide areas by breaklines** -> Select Boundary Breaklines and Mesh -> Tools -> Breaklines -> Extend Polylines to TIN -> (NOTE: This command extends a polyline onto a TIN object, creating edges in the mesh based on the projection of the polyline vertically onto the mesh – although polyline itself does not change. The edges are stretched vertically to conform to the polyline's shape – If select command through Breaklines submenu, polyline will be converted to breakline on the mesh; if select command through polyline submenu, resulting line will be a geometric object

NOTE: If errors appear 😞 1) Select Mesh -> Tools -> Mesh -> Verify TIN -> If TIN is not valid, the number of invalid faces will be listed and the faces will be selected -> Tools -> Mesh -> Delete Selection -> Repeat this verification and deletion process until TIN successfully verified; (2) If errors regarding polylines overlapping -> Select Polylines -> Tools -> Drawing -> Align vertices to axes

12. **Re-insert break lines** (copied in Step V) -> Copy from temporary location -> Paste into working mesh MS

13. **Editing Triangles and Spikes** -> In layers dialogue box -> View As tab -> Apply to **Mesh -> Wireframe -> Apply & OK ->**

14. **In top view, fence in problematic triangle(s) causing spike** -> Fence -> Delete Inside -> Select hole (highlights cyan) -> RC -> Mesh -> Fill selected hole

15. **Exporting 3D Lines, Mesh, Point Cloud** -> There are several options for exporting topographic features. The objects created through tracing and meshing can be exported or the point cloud itself can be exported.

A. Export the lines, polylines, arcs -> Use the properties manager (Shift + L) to turn off the visibility/selectability of the point cloud -> Select All -> File -> Export

DXF R12 Format –This retains 3D information (in this case the z-coordinate for the lines); Do not select 2D DXF R12 Format

Objects may also be exported as ASCII or XML file types here

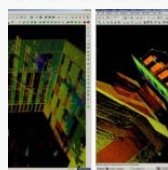
Once exported, the .dxf file can be opened in CAD, imported into Sketchup, or converted for use in multiple software.

B. Export the mesh -> Select mesh -> File -> Export -> Select file type for destination software

C. Export the Point Cloud -> Newer versions of Autodesk products (2009 and beyond) support point clouds. If you do not have Cyclone but you do have CAD, use Cyclone to export the points and then trace/model in CAD software much as we have done in Cyclone. The main issue is file size when importing into CAD; in general, point clouds must be broken into smaller pieces to allow them to be imported. See the CAST workflow, 'Reducing Point Clouds for Autodesk Applications' for more details.

NOTE: In general, a .PTS file with a maximum size of 4mb will import into CAD

Create new layers for the breaklines and features (Shift + L) -> Review the area to be modeled identifying where the surface changes and/or where the user wants a clean break or difference between adjacent surfaces. Create layers for primary and secondary features as needed.



You are reading the series: [Leica Cyclone - Creating a Mesh and Modeling Surface Topography \(2.5D\)](#)
[Leica Cyclone – Creating a Mesh and Modeling Surface Topography: Setting Up the Model Space and Break Lines](#)
Leica Cyclone – Creating a Mesh and Modeling Surface Topography: Creating the Topographic Mesh

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