

TUTORIAL 5

LASER SCANNER DATA IMPORT

In this tutorial, you will become familiar with the process of importing a laser scanner dataset to reconstruct and generate a 3D model in **ShapeMetriX's ModelEditor** tool.

The ModelEditor is a convenient tool for:

- Generating 3D models from existing *.e57 laser scanner or *.obj datasets
- Converting models from previous ShapeMetriX versions in the *.*jm*3 file format to the new ShapeMetriX v5.0 compatible *.*jm*3x file format
- Editing existing 3D models by trimming and confining it to the area of interest

TOPICS COVERED IN THIS TUTORIAL

- Laser Scanner Data Import
- 3D Model Reconstruction and Saving

FINISHED PRODUCT

The finished product of this tutorial can be found in the downloaded **Tutorial 5 – Model Files > Finished Product** folder.

1.0 IMPORTING A LASER SCANNER DATASET

If you have not already done so, run the **ShapeMetriX (SMX)** program by double-clicking the **ShapeMetriX** icon on the desktop or in your installation folder, or by selecting **Programs** > **ShapeMetriX** in the Windows Start menu.



When the program starts:

1. Select **ModelEditor** to run the ModelEditor tool.

Whenever the ModelEditor tool runs, a default blank work page opens as shown in the image below.



Blank ModelEditor work page

This tutorial will use an example Open Pit Mine dataset to demonstrate the laser scanner import feature. The openpitmine.e57 file (© *Copyright 2011, Riegl LMS GmbH*) can be found in the downloaded **Tutorial 5 – Model Files > Input Files** folder.

To import the Laser Scanner data:

- 1. Select File > Import 3D Model > Import from E57.
- 2. Select *openpitmine.e57* in the downloaded folder.
- 3. The **Import from E57** dialog will open and the laser scanner dataset will be imported.



The list of imported scans is presented at the bottom of the **Scans** tab, indicating the name and the number of points for each scan, if any associated colour data is included in the scan, and the scanner's position in space.

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Import from E57 dialog and imported Open Pit Mine dataset (© Copyright 2011, Riegl LMS GmbH) in Scans tab

Any images associated with the scan data are also imported under **Images** tab. Select the **Images** tab and review the images (texture information) provided with the import.



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Import from E57 dialog and imported Open Pit Mine images (© Copyright 2011, Riegl LMS GmbH) in Images tab

2.0 3D MODEL GENERATION

The **Import from E57** dialog requires **Reconstruction** and **Referencing** inputs to run the reconstruction and generate a 3D model.

The **Reconstruction** tab (in the **Scans** tab) includes the following inputs:

- **Preset:** to define the resolution of detailed object geometry including a detailed point cloud, surface mesh and the texture projected onto the 3D model (if colour data and/or images are available with the scan). There are three presets available:
 - **Fast** dense construction preset generates low resolution topography and low-resolution texture (can be used for volume calculations, etc.).



- Normal dense construction preset is the default preset option and generates medium resolution topography and high-resolution texture (can be used for blast design, single faces and benches for rock mass characterization, etc.).
- **High** dense construction preset generates high resolution topography and highresolution texture (can be used for rock mass characterization, etc.).
- Use Texture: to enable/disable the texture projected onto 3D model, if colour data and/or images are available with the scan.
- Trim: to trim the point cloud in the 3D viewer.



Note:

If there is no colour data and/or images available, the **Use Texture** and **Texture Quality** features will be inactive, and the 3D model will be generated without texture information.

Tip: The imported point cloud, extension of the point cloud and the scanner positions can be hidden/shown using the **Point Cloud**, **Bounding Box** and **Scanner Positions** checkboxes in the **Scans > View** tab. The size of the displayed scanners can also be adjusted by using the **Scanner View Size** slider in the View tab.

The **Referencing** tab includes the following inputs:

- **Referencing:** to choose the referencing mode.
- Coordinate system: to select the coordinate system if a specific coordinate system is to be used.

2.1 Reconstruction

- 1. Set the following inputs in **Reconstruction** tab:
 - a. Preset = Normal
 - b. Use Texture = ON

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	Name Points 110613_165007 4,438,419 110613_165955 2,478 110613_17059 4,114,758	Colours yes yes yes	Errors - -	z Scanner position 552,369, -745,033, 3049,4 552,389, -745,033, 3049,4 3863, 3174,07	Reconstruction Referen Preset: Normal	ncing View	
	Name Points 110613_165007 4,438,419 110613_165995 2,478 110613_171059 4,114,758 110613_172251 5,367,979	Colours yes yes yes yes	Errors - -	Scanner position 552.369, -745.033, 3049.4 552.369, -745.033, 3049.4 386.3, -1832.01, 3071.07 315.903, -2958.61, 3080.75	Reconstruction Referen Preset: Normal Use Texture:	ncing View	
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	Name Points 110613_165007 4,438,419 110613_165955 2,478 110613_171059 4,114,758 110613_172251 3,867,979 110613_174259 2,526 110613_175510 4,032,245	Colours yes yes yes yes yes yes	Errors - - - -	Z Scanner position 552.369, -745.033, 3049.4 552.369, -745.033, 3049.4 552.369, -745.033, 3049.4 386.3, -1832.01, 3071.07 315.903, -2958.61, 3080.75 315.903, -2958.61, 3080.75 -613.012, -2588.3, 3032.76	Reconstruction Referen Preset: Normal Use Texture: Trim: X	ncing View	
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	Name Points 110613_165007_4438_419 10613_156955_2478 110613_171059_4,114,758 110613_172551_5367,979 110613_172551_526 110613_17510_4032_245 110613_17510_4032_245 110613_118622_4023,614	Colours yes yes yes yes yes yes yes yes	Errors - - - - - - -	Z Scanner position 552.369, -745.033, 3049.4 552.369, -745.033, 3049.4 386.3, -1832.01, 3071.07 315.903, -2958.61, 3080.75 -613.012, -2588.3, 3082.76 -613.012, -2588.3, 3032.76 -613.012, -2588.3, 3032.76 -941.336, -1270.18, 3056.23	Reconstruction Referen Preset: Normal Use Texture: Trim:	ncing View	

Entered inputs in Reconstruction tab

2.2 Referencing

- 1. Set the following inputs in Referencing tab:
 - a. Referencing = Referenced (generic E, N, H)
 - b. Co-ordinate system = Generic, Meter [m]



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e Ø	Name Points 110613_16507_438_419 110613_16555_4278	Colours yes ves	Errors	Scanner position 552,369, -745,033, 3049,4 553,269 - 745,033, 3049,4	Reconstruction Referencing View Referencing: Referenced (generic E, N, H)	
e Ø	Name Points 110613_165007 4,438,419 110613_165555 2,478 110613_17059 4,114,738	Colours yes yes yes	Errors -	Scanner position 552.969, 745.033, 3049.4 552.269, 745.033, 3049.4 3562.01, 3071.07	Reconstruction Referencing View Referencing: Referenced (generic E, N, H) Co-ordinate system: Generic Meter Im1	
	Name Points 110613_165007 4,438,419 110613_165955 2,478 110613_177059 4,114,788 110613_1725 3,536,797	Colours yes yes yes yes	Errors - -	Scamer position 552.86, 745.033, 3049.4 352.369, 745.033, 3049.4 386.3, 1482.01, 307.107 315.003, 295.61, 31880.75	Reconstruction Referencing View Referencing: Referenced (generic E, N, H) Co-ordinate system: Co-ordinate system: Generic, Meter [m] Generic, Meter [m]	
	Name Points 110613_05507<4.438_419	Colours yes yes yes yes yes	Errors - - -	Scanner position 552,369, -745,033, 3049,4 552,369, -745,033, 3049,4 3865,3, -1832,01, 3071,07 315,503, -2595,61, 3080,75 315,503, -2595,61, 3080,75	Reconstruction Referencing View Referencing: Referenced (generic E, N, H) Co-ordinate system: Generic, Meter [m]	
	Name Points 110613_165007_4438_419 110613_165955_2478 110613_17059_4_114_758 110613_174259 110613_174259_2326 110613_17516_4032245	Colours yes yes yes yes yes yes	Errors - - - -	Scanner position 552,369, -745,033,3049,4 552,269, -745,033,3049,4 552,269, -745,033,3049,4 366,3, -1832,01, 3071,07 315,630, -2586,61, 3880,75 315,530, -2596,61, 3880,75 315,530, -2596,61, 3880,75	Reconstruction Referencing View Referencing: Referenced (generic E, N, H) Co-ordinate system: Generic, Meter [m]	
	Name Points 110613_16007_4.438,419 110613_165955_2.478 110613_17759_4.114,738 110613_17725_1_5.367,979 110613_174259_2.536 110613_10532_5.345 110613_10532_2.534	Colours yes yes yes yes yes yes yes	Errors - - - - - - - - -	Scanner position 552.369, -745.033, 3049.4 552.369, -745.033, 3049.4 386.3, -183.20,1, 3071.07 315.030, -2958.61, 3080.75 315.503, -2958.61, 3080.75 -613.012, -2588.3, 3032.76	Reconstruction Referencing View Referencing: Referenced (generic E, N, H) Co-ordinate system: Generic, Meter [m]	
	Name Points 110613_165007 4,438,419 110613_0709 110673 110613_17059 4,147,345 110613_17221 5,367,979 110613_17224 5,367,979 110613_17224 5,367 110613_172510 4,032,245 110613_1622 4,032,245 110613_1622 4,032,245	Colours yes yes yes yes yes yes yes yes	Errors - - - - - - - - - - - - -	Scanner position 552,369, 745,033, 3049,4 552,369, 745,033, 3049,4 552,369, 745,033, 3049,4 563, 1432,01, 3071,07 315,503, 2-955,61, 3300,75 315,503, 2-955,61, 3300,75 315,503, 2-956,61, 3300,75 315,503, 2-956,61, 3300,75 315,503, 2-956,61, 3300,75 315,503, 2-956,61, 3300,75 315,503, 2-1270,18, 3022,76 -613,012, 2-588,3, 3032,76 -613,012, 2-588,3, 3032,76	Reconstruction Referencing View Referencing: Referenced (generic E, N, H) Co-ordinate system: Generic, Meter [m]	

Entered inputs in Referencing tab

Click Import to confirm the inputs and choose the directory on your computer to save the 3D model .*jm3x* file.

The progress window will appear and reveal the status of the 3D model generation including a live display of progress.



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3.0 3D MODEL OUTPUT

Once the 3D Model Generation process is completed, a 3D model with texture is generated. An output model file (.jm3x) and reconstruction log are automatically saved in the previously selected directory. The resulting 3D model is displayed in the 3D viewer.

Inspect the generated 3D model in 3D Model Viewer and click **Close** to leave ModelEditor.



Generated 3D model in 3D Model Viewer

This concludes the tutorial for Laser Scanner Data Import.