



POLYWORKS[®]

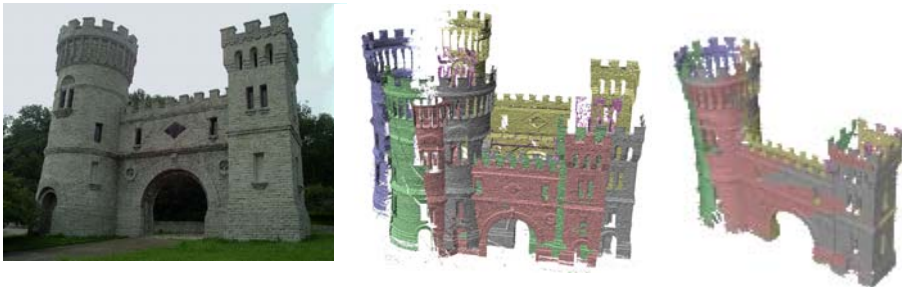
HIGH-DENSITY POINT CLOUD SURVEYING FOR HERITAGE PRESERVATION

The use of high-density 3D scanning surveys is a relatively new approach for heritage preservation. Professionals from the *cultural, artistic, and archeological* fields benefit from PolyWorks' tools for various applications:

- Creating polygonal models for visualization, file sharing, and public libraries
- Archiving for reconstruction
- Monitoring deterioration over time
- Exporting features to downstream survey software suites
- Extracting measurements directly on point clouds

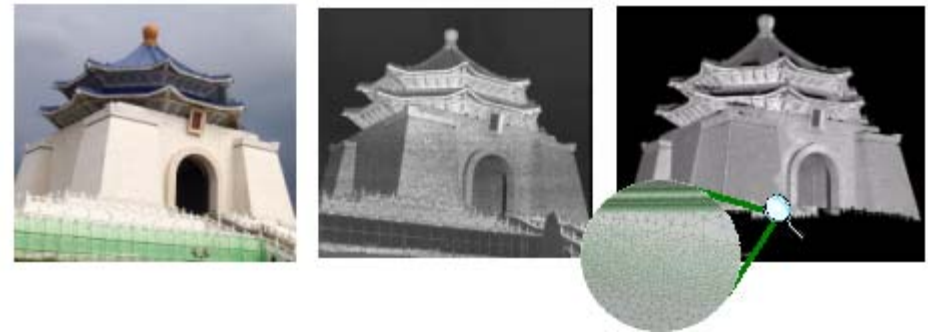
Using PolyWorks to produce survey-accurate deliverables:

1. MULTIPLE SCAN ALIGNMENT



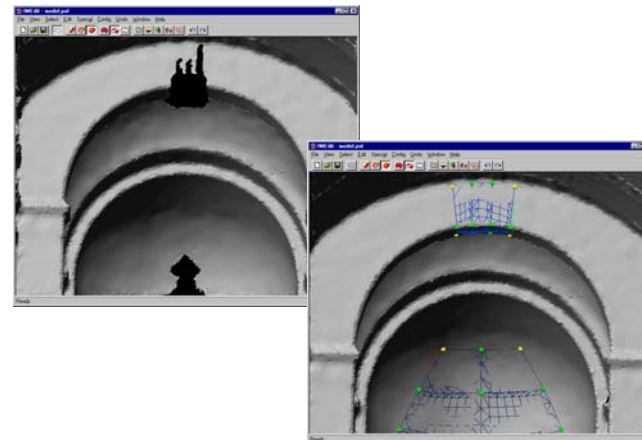
- PolyWorks combines point matching and a powerful best-fit alignment method to align scans using the geometrical shape of the scene.
- No field targets are required for the alignment. However, markers can be used in the scene to validate the alignment results.

2. POLYGONAL MODEL CREATION



- PolyWorks offers an automatic meshing technology that processes all data points, without sacrificing any points through uncontrolled subsampling. PolyWorks can efficiently handle up to 100 million points.

3. POLYGONAL MODEL EDITING TOOLS



PolyWorks provides a wide array of polygonal editing tools that optimize the polygonal model and correct problems caused by the limitations of 3D scanners, including:

- Hole filling
- Edge and Corner reconstruction
- Smoothing



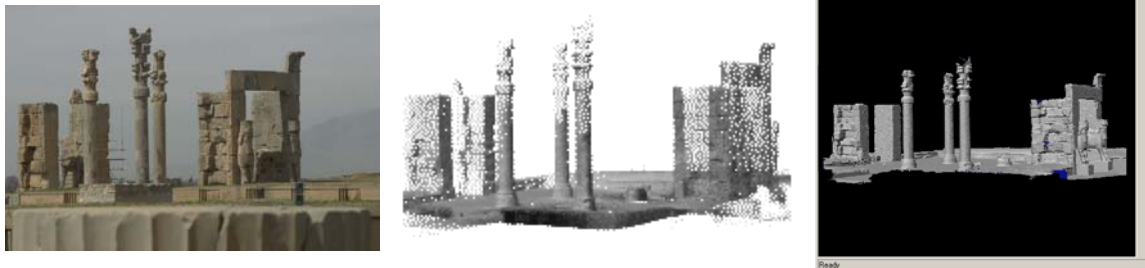
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4. FEATURE AND MEASUREMENT EXTRACTION DIRECTLY ON POINT CLOUDS



- Quickly obtain lengths, heights, angles, radii, volumes, and more, directly on point clouds. For increased productivity, surveyors and archeologists can use automated tools to extract key features such as cross-sections, sharp edges, and other feature lines (e.g. road lines, pipe center lines, electrical cables) directly on point clouds. These extracted elements can then be directly exported to DXF and IGES and/or imported into MicroStation V7 and V8.

5. VISUALIZATION AND VIDEO REPORTS



- Surveyors can visualize colored point clouds and colored polygonal models of scanned objects, and make them available for inventory databases and public libraries.
- Surveyors can easily create 3D animated videos (in AVI), or directly visualize their polygonal models with PolyWorks' free viewer.

EXAMPLE OF APPLICATION: OBJECT RECONSTRUCTION



- The artist's original work is digitized using a high-density point cloud digitizer.
- The various scans are loaded into PolyWorks and are accurately aligned in a single 3D point cloud model.



- The 3D point cloud model is meshed to create a highly accurate polygonal model.
- The polygonal file is edited, rescaled, and directly exported as a STL file to the machining equipment (CAM).
- The model is machined in foam from which a casting will be created.