



PolyWorks/Modeler's™ Process Overview

Software



3D OBJECT DIGITIZING

MULTIPLE POINT CLOUD ALIGNMENT

ADAPTIVE MESHING

POLYGON EDITING

APPLICATIONS

PolyWorks/Modeler processes all 3D digitizer & CMM data organized as 3D meshes, such as:

- Structured-light optical systems;
- Moiré-based digitizers;
- Plane-of-light laser systems;
- Automated CMMs.

PolyWorks also supports 3D digitizers that produce high-density unorganized point clouds, such as hand-held digitizers. PolyWorks/Modeler offers a unique Auto-Organizer technique that automatically creates organized point clouds from hand-held digitizer data.

PolyWorks/Modeler uses an automatic alignment technology to unify multiple point clouds, expressed in different coordinate systems, into a single coordinate system.

PolyWorks/Modeler's best-of-class point cloud alignment algorithm helps reducing mechanical errors produced by articulated arms. It also detects point clouds misaligned by photogrammetry and realigns them. PolyWorks/Modeler's huge point cloud handling capabilities makes processing up to 100 million points possible.

PolyWorks/Modeler merges multiple aligned 3D point clouds into a highly accurate polygonal model, eliminating overlapping areas by using intelligent averaging. Based on a user-defined tolerance, PolyWorks/Modeler adapts the polygonal mesh to the surface curvature, preserving high resolution over edges and fillets, while creating larger triangles in flat areas.

PolyWorks/Modeler's unique adaptive meshing technology supports huge datasets through the use of subdivision and parallel processing, without uncontrolled point sampling.

PolyWorks/Modeler offers a direct approach to polygon editing. Users have access to a wide range of sophisticated tools for digitized models, such as:

- NURBS-based hole filling;
- Sharp edge & corner extraction and reconstruction;
- Boundary smoothing;
- Mesh optimization etc.

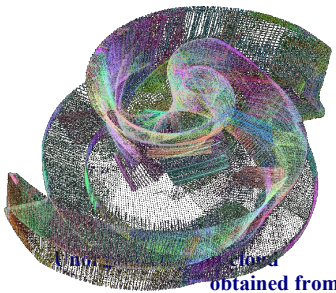
In addition, PolyWorks/Modeler offers a unique set of CAD operations for polygons, enabling fully-polygonal manufacturing processes:

- Capping and dowels;
- Extruding;
- Filletting;
- Offsetting.

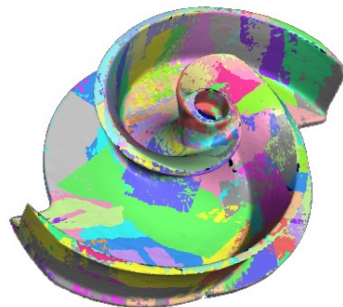
Finally, PolyWorks/Modeler's editing module offers a comprehensive set of techniques for creating networks of Bézier curves and cross-sections over a polygonal mesh.

PolyWorks/Modeler polygons, curves, and cross-sections are used for a wide variety of applications such as:

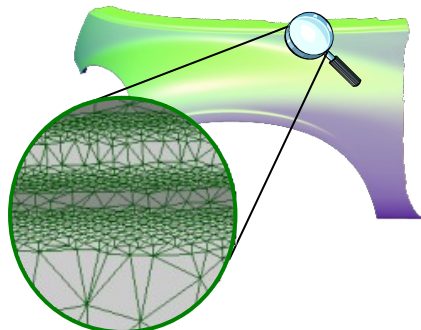
- Machining;
- Rapid prototyping;
- Reverse-engineering in CAD software;
- Aerodynamic simulation;
- Finite-element analysis;
- Advanced visualization.



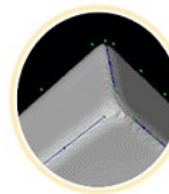
Point cloud obtained from hand-held digitizer



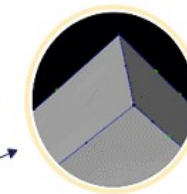
Point cloud after the auto-organizer process



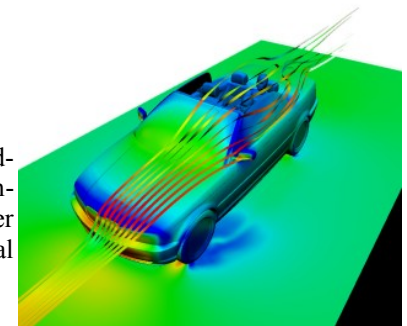
Polygonal mesh with resolution intelligently adapted to curvature of the object



Five best-fitted edge curves



The polygonal model after corner reconstruction



Aerodynamic simulation