

Functions

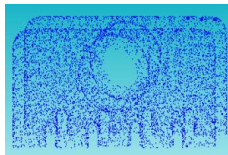
The scanned copy of the component is read by the PointMaster as PointCloud. The Base Module is used to handle the PointCloud and to shape it into the desired form. Basic Module can perform

- 1) Handling of Point Clouds
- 2) Point Cloud conversion
- 3) Fill holes
- 4) Reconstruction of pixel data
- 5) Handling STL data.

Handling of Point Cloud

The Point Cloud produced by the scanner is not always perfect so it needs some modifications.

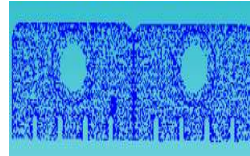
- The unnecessary points produced around the pointcloud should be deleted as a first step
- Data transformations like translation, rotation, mirroring and scaling can be performed.



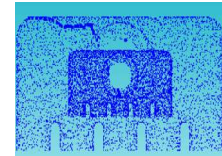
Translation



Rotation

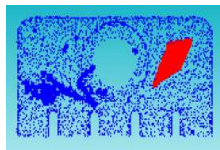


Mirroring



Scaling

- Data Filtering operations like partial deletion, merging, smoothing, outline removal can be performed on the pointcloud.



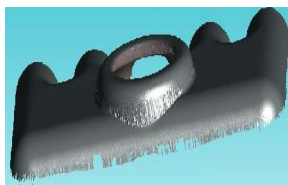
Partial deletion



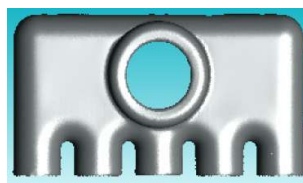
Smoothing

Point Cloud Conversion

The PointCloud is converted into a polymesh automatically using Triangulate 2.5D and Triangulate 3D options. The Triangulate 2.5D is for testing whether a polymesh can be generated from the given pointcloud. This is an 2D polymesh, the pointcloud is assumed to be in an 2D plane. Triangulate 3D is the actual polymesh from which a surface can be generated. This option treats the pointcloud to be in 3D plane and no undercuts are produced. This is done automatically and this command produces polymesh with fewer triangles within less time.



Triangulate 2.5D



Triangulate 3D

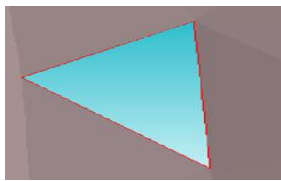


Single line joins all points of pointcloud

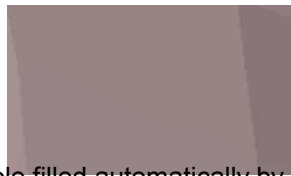
- Calculation of cuts by axially parallel or arbitrary planes and by hands free polylines.
- Calculation of axially parallel NC paths.
- The pointcloud can be converted to a single polyline.

Fill Holes

The polymesh produced after triangulation is left with holes and they need to be filled. The surface cannot be generated. PointMaster uses three different methods automatically like 1) Fill hole flat, 2) Fill hole smooth and 3) Build bridge.



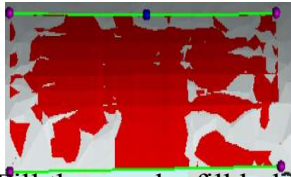
Hole in STL file



Hole filled automatically by fill hole flat method



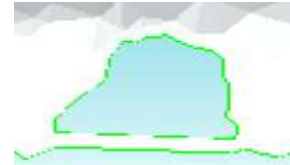
For edge holes



Fill the area by fill hole smooth method



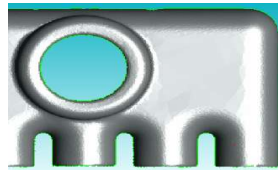
Alternative for edge holes



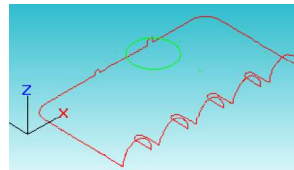
Use Build bridge method

Reconstruction of pixel data

- Raster – Vector conversion
- Extrusion of pixel data on the basis of colour data
- Calculation of Borders
- Extract polylines



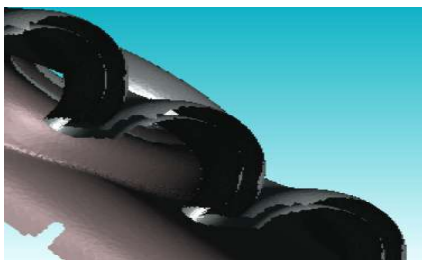
Borders



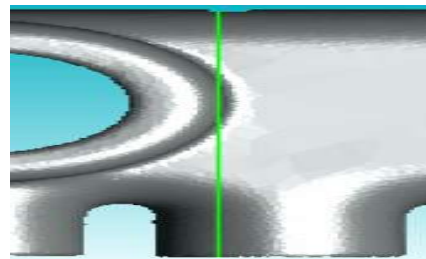
Polylines

Handling STL data

- Data transformations: translation, rotation, mirroring, scaling
- Data filtering : partial deletion, merging
- Calculation of cuts with axially parallel planes
- Outlines tools for sketch processing
- Powerful reconstruction tools for reconstruction of sharp edges
- Handling of STL meshes
- Offset calculations can be performed
- Converts STL file to PointCloud
- Intersection lines can be drawn



Offset



Intersection line for checking the orientation of object in space

PointMaster Surface Module

Reverse Engineering and Quality Inspection



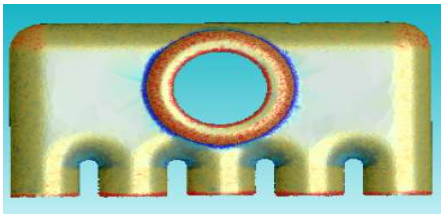
Functions

The polymesh generated in the base module is used as a first step in surface generation. The user interactively sketches a topological edge. Then the geometry navigator of PointMaster automatically calculates the perfect curves and edges. A net is drawn over it and PointMaster automatically generates the surface along the net. The main functions of surfacing are:

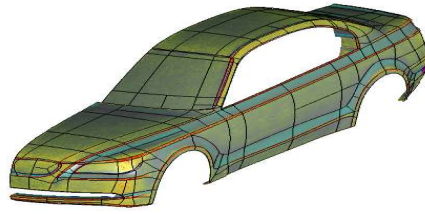
- 1) Manual Surface Construction
- 2) Virtual Clay Modelling
- 3) Network Editing
- 4) Fully Automatic Surface Construction
- 5) Interfaces to other CAD-systems

Manual Surface Construction

- An advantage of PointMaster is the visual support
 - Curvature plot can be seen in order to have better visualisation of the edges and the curves present in the model.

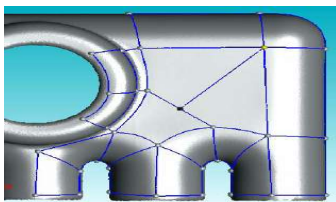


Curvature plot



Coloured Curvature Segments

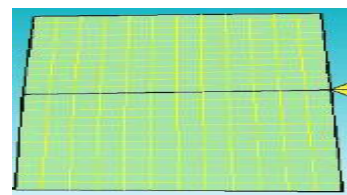
- Net is manually drawn along the polymesh
- Perfect to get high quality surface
- C2 continuity along the whole surface
- Sharp edges can also be obtained
- Computing of "Concept Styling Surfaces"
- Surface can be generated even though the net is incomplete.
- Surface can be viewed in patches and can check singular points



Net



Surface for the above Net



Patches

Network Editing

- Net can be edited easily using edit net and delete net
- Copying and Mirroring operations can also be performed on the net
- For symmetrical objects drawing half net is sufficient
- Net can be saved individually and can be attached to the polymesh when desired
- Singular points, triple points, and T knots can be easily differentiated.
- U x V parameter can be changed from 6 and 12 which effects the resolution of the surface
- Automatic and manual repair of polymeshes.

Automatic Surface Construction

- Automatic approximation on clouds of points " perfect for Toolscanners"
- Automatic approximation on polymeshes " perfect for Finite Element Data"

Interface to other CAD systems

- The surface can be saved, exported and imported in IGES format.
- IGES, STL

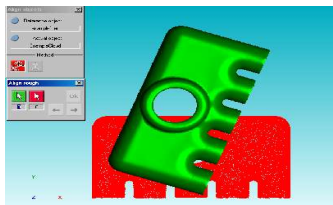
Functions

In order to provide quality inspection and the accuracy for a surface there should be some tools to measure and check. This is provided in this module. For this purpose we at least need two objects. The selected two objects, whatever may be their orientation in space can be combined and merged easily in the Alignment Module. This distance and deviation of this merged object can be measured and displayed as a plot in different colours in Analysis Module. The main functions in this module are:

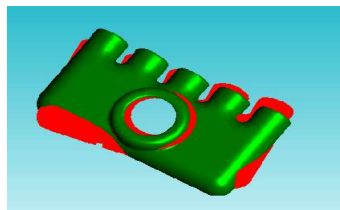
- 1) Align objects
- 2) Analysis (Measure)

Alignment

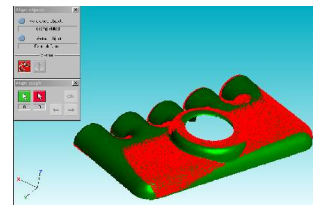
- Two different bodies can be imported and can be aligned
- Fine alignment or rough alignment can be used for this process
- This feature supports alignment of pointclouds, STL or IGES data
- Efficient algorithms for best alignment



Before alignment



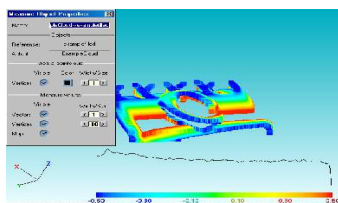
After first iteration



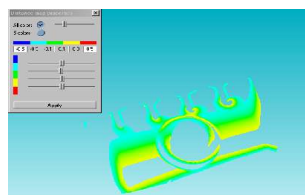
After alignment

Analysis

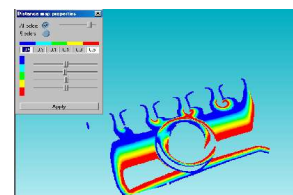
- The actual distance between the two bodies can be measured
- Displays the deviation in the form of a graph
- The aligned objects can be measured by a single mouse click
- Measurement is done by considering the normal direction of a particular point between . . . actual and reference object
- Provision for angle tolerance between the normals can also be provided
- Custom colours can be defined for displaying the map
- Labels can be added, moved and can be deleted during the measurement
- Auto arrangement of labels can be done
- Measurement can be exported in both HTML as well as CSV format



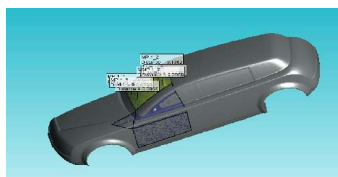
Measurement Map



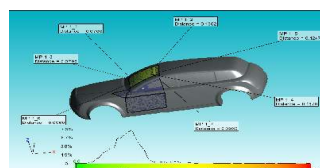
Custom colors



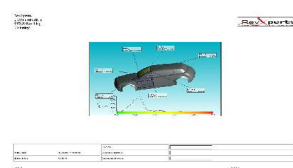
Custom colors



Labels



Arrangement of labels



HTML format

Efficient solutions with innovative products