



CATIA PLM Express

CATIA - Reverse Engineering

The most complete reverse engineering solution to speed-up the early phase of product design

The use of numerous systems to develop digital products from physical prototypes is complex and costly, leading to delays in product development. Companies require intuitive environments that are ergonomic and fully integrated to achieve a rapid ROI.

Overview

CATIA - Reverse Engineering makes it possible to quickly capture physical prototype shapes in order to enhance their style, making the 3D virtual model the design reference. It provides powerful technologies in the CATIA environment enabling to easily manipulate clouds of points and quickly transform them into high-end 3D surface shapes.

Customer Benefits

- Integrated in the CATIA design environment, it helps reduce project costs and streamline design iterations
- Flexible manipulation of clouds of points and meshes in order to optimize the definition of digitized shapes
- Intuitive shape sculpting environment, especially for non-CAD specialists
- Robust inspection process to improve the quality of the digitized models before surface reconstruction
- Provides real freedom to engineers so that they can modify their models at any time

Key Capabilities

Import and export clouds of points in various standard formats

User can import almost all natives measuring machine makers. Data can be of different types - meshes, grids, scans and clouds of points. Imported data can be of different formats: Standard formats - IGES, free ASCII and STL, or, digitized data imported with native measuring machine makers - GOM, HYSCAN, KREON, STEINBICHLER. The user can preview, scale, trim or change measuring units of the imported data.

Smart & advanced tools to manipulate interactively clouds of points

User can keep a sub-part of a digitized data defined by 3D box, by filtering the number of points or by cleaning up a part of the data. It is so easy to create curves of digitized data using projections of curves, planar sections or 3D curves. These curves can be smoothed by the user to control the quality. The user can create tessellated meshes to be used in CATIA V5 DMU product, using 2D or 3D mesher computation methods.

Powerful mesh creation from clouds of points

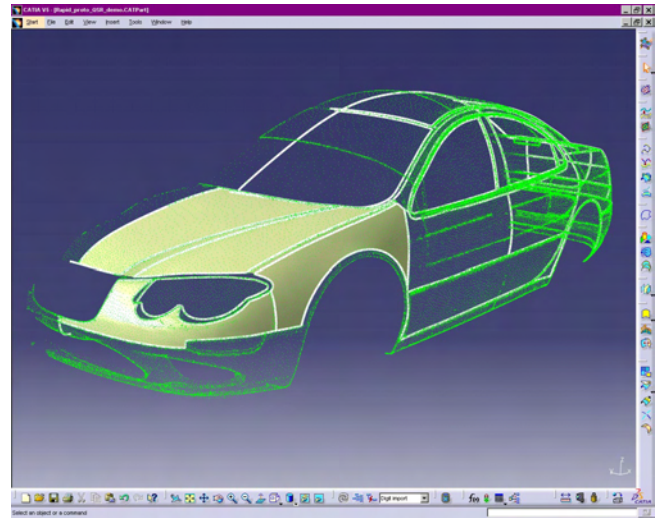
Easy creation of curves and surfaces on meshes

Thanks to powerful algorithms, users can easily create surfaces including free form and mechanical shape from the digitized data. CATIA - Reverse Engineering offers several approaches to recover surfaces depending of the shape's type :

- For free form shapes by fitting on a domain delimited by an n-sides 3D curve and constraints on boundaries
- For mechanical shapes by identifying and preserving editable features (plane, cylinder, sphere, cone)
- Recovering virtual sharp edges by extending and trimming primary surfaces
- Editing fillets along edges
- For sweeping surfaces using a loft command

Robust alignment and deviation checking for inspection processes

CATIA - Reverse Engineering provides immediate visual quality control through extensive and associative real-time surface diagnosis. These tools include :



Screen capture of CATIA - Reverse Engineering

- Deviation checking between surfaces or curves and underlying polygon
- Connect checker between surfaces allows to visualize eventual deviations during the joining of several surfaces in passage, tangency and curvature
- A set of powerful capabilities to strengthen the alignment process

Powerful polygon modeler for unequalled virtual clay modeling

It provides a set of intuitive polygonal modeling and sculpting tools that work like clay modeling. It is particularly well suited to shape designs when surfacing becomes complex. Several tools allow polygon to be split the in pertinent surfacic domains. This capability allows users generate sections or characteristic lines useful in recovering surfaces with the appropriate method :

- Extraction of sub-cloud area or characteristic domain boundaries by curvature or iso-slope analysis
- Interactive definition of characteristic lines by smoothing 3D curves on points picked on the cloud or polygon
- Automatic definition of clean contour from a set of curves including unwanted discontinuities such as gap or tangency deviation

Automatic surface generation from meshes

Easy creation of closed meshes from solids and surfaces for rapid prototyping

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