

REAL TO VIRTUAL TO REAL. DIGITIZED DATA PROCESSING AND HYBRID MODELING WITH TEBIS.



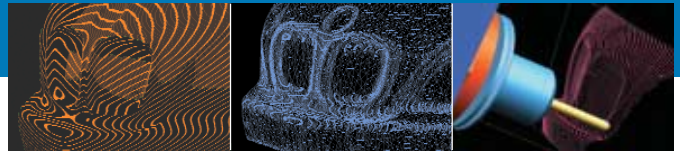
Digitized data
processing

The Digitized Data Processing module gives you CAD tools for further processing optically or mechanically digitized surfaces. It is a very powerful software tool for quickly converting a physical model to the CAD environment, where you can modify it and return it to the real world later on in a different and expanded form.

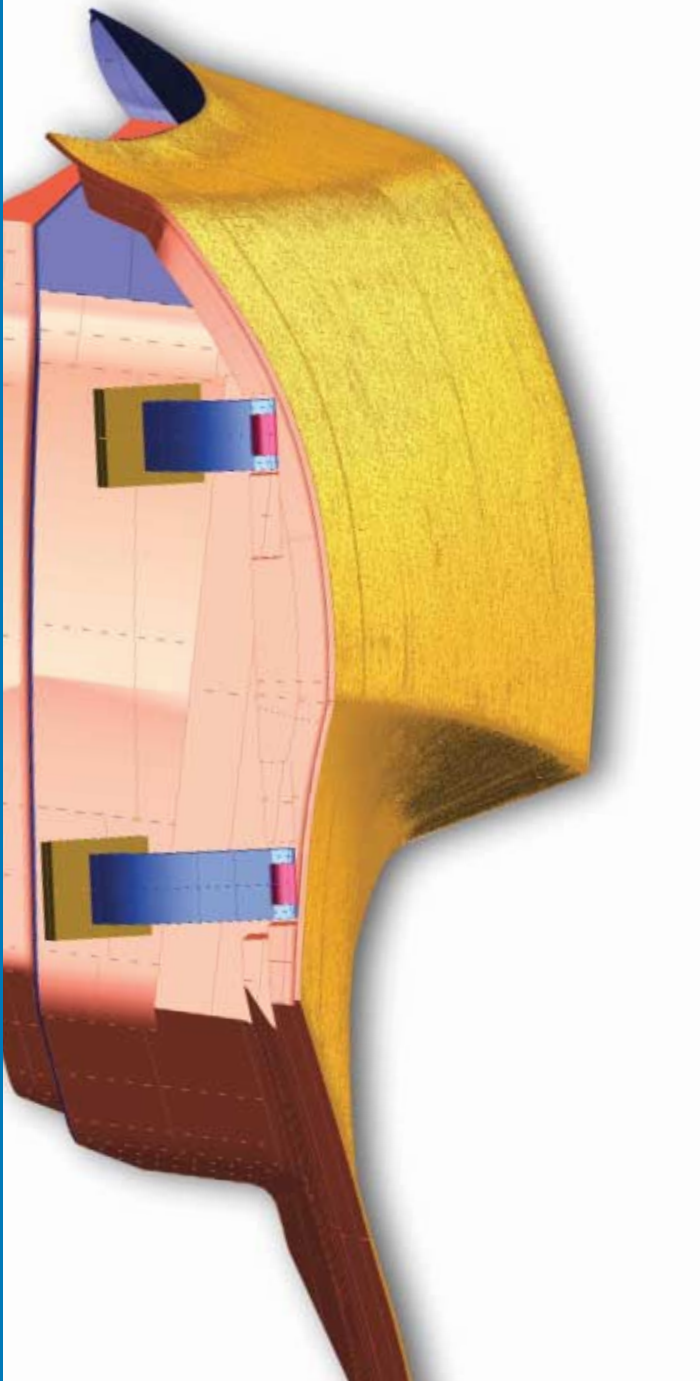
Tebis reads both your original digitized data and any precalculated STL files, turning them into high-quality CAD mesh surfaces that you can then process further as you wish, using Tebis design commands.

The Tebis hybrid technology supports any combination of mesh data and surfaces, giving you the benefit of maximum flexibility: you design with meshes wherever these elements are useful. Just add exact-surfaces wherever the component requires add-ons or corrections.

To convey virtual CAD results to the real world quickly and precisely, just use the Tebis CAM modules, which work on mesh and hybrid models as efficiently as they do on surface data.



DIGITIZED DATA PROCESSING: PROCESSING DIGITIZED SURFACES.

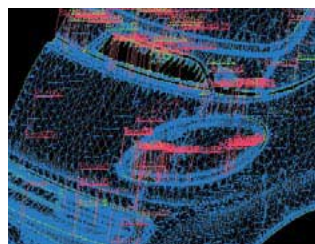


Precision is the basis for high-quality processes. A tiny error or inaccuracy in one step tends to escalate through each successive level, so Tebis implements a whole raft of functions for optimizing scan data. The return on time invested at this stage is enormous, because this is the basis for the next, crucial step in CAD processing – conversion into triangle-mesh constructs of the part. The computing and filter routines in the Tebis Mesh Triangulator module are so sensitive and precise that the digitized surface is modeled perfectly in the CAD workspace.

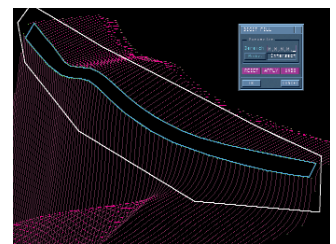
Maximum flexibility for processing digitized surface – right through to NC programming.

The Tebis manipulation and analysis functions then come into play for modifying the digitized skin of the part. It can be stretched, smoothed and cut, and fitted to contiguous curves and surfaces. Tebis is the hybrid modeling system that allows you total freedom to combine meshes and surfaces in a common data model. You decide where mesh quality is sufficient, and where to integrate surfaces. You also decide how far to take modified areas away from the original scans.

This advanced flexibility and control capability extends all the way through to NC programming. The milling strategies can be selected with the same extensive range of choice as the tools and stock allowances. All Tebis commands work on meshes and hybrid models, with full collision protection as a matter of course.



Holes in input STL files are closed automatically.

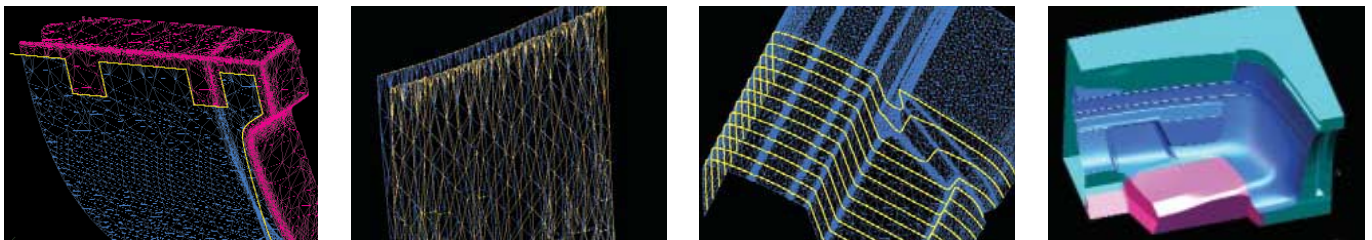


Edges that were not digitized cleanly enough can easily be repaired.

Tebis has a complete toolset for modifying meshes.

Imported or system-generated meshes are cut open along reference curves to harmonize with predefined installation requirements. Original meshes (yellow) can be manipulated to obtain, for example, a tangential with a precision edge to fit snugly against a defined

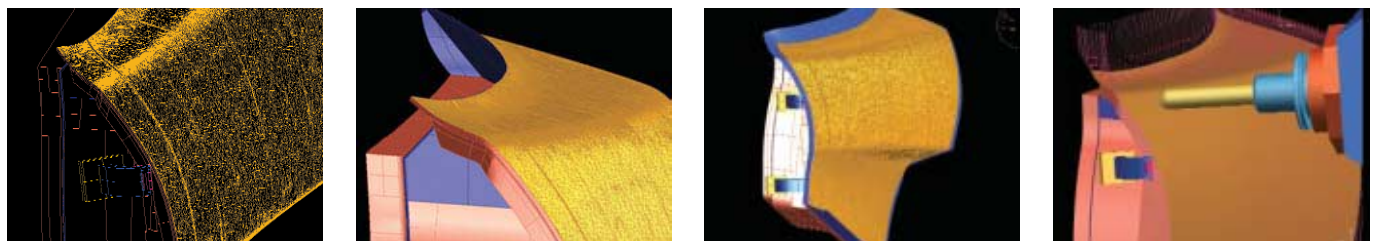
surface or a curve (blue). Follow-up processes sometimes call for more precision than meshes can supply, so polynomial surfaces can be constructed on the basis of automatically generated curves of intersection. This is the time-saving way of modeling complex mold blocks as combinations of meshes (blue) and surfaces (green).



Hybrid surfaces through reengineering and surface structure design.

As the example of this vehicle door shows, surfaces may be added anywhere to mesh surfaces. Surfaces generated with reengineering techniques (blue strips) on the outside rest directly against the

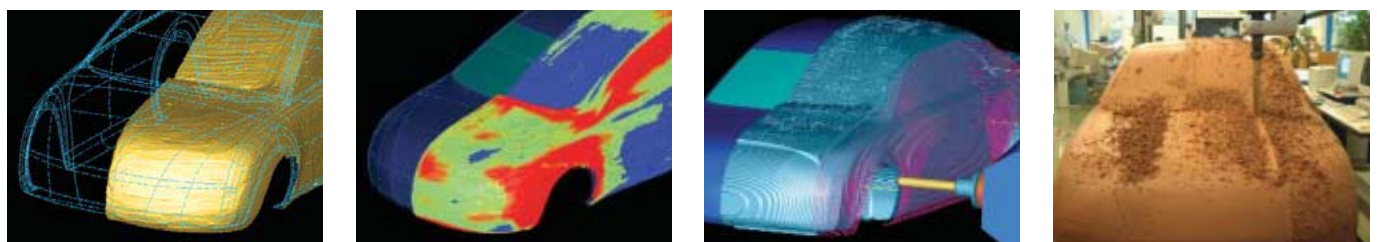
optimized mesh surfaces, while exact surfaces on the inside (red and blue) are design using curves and sections. The Tebis CAM modules are always reliable, whether you are working with mesh and hybrid surfaces or exact surfaces.



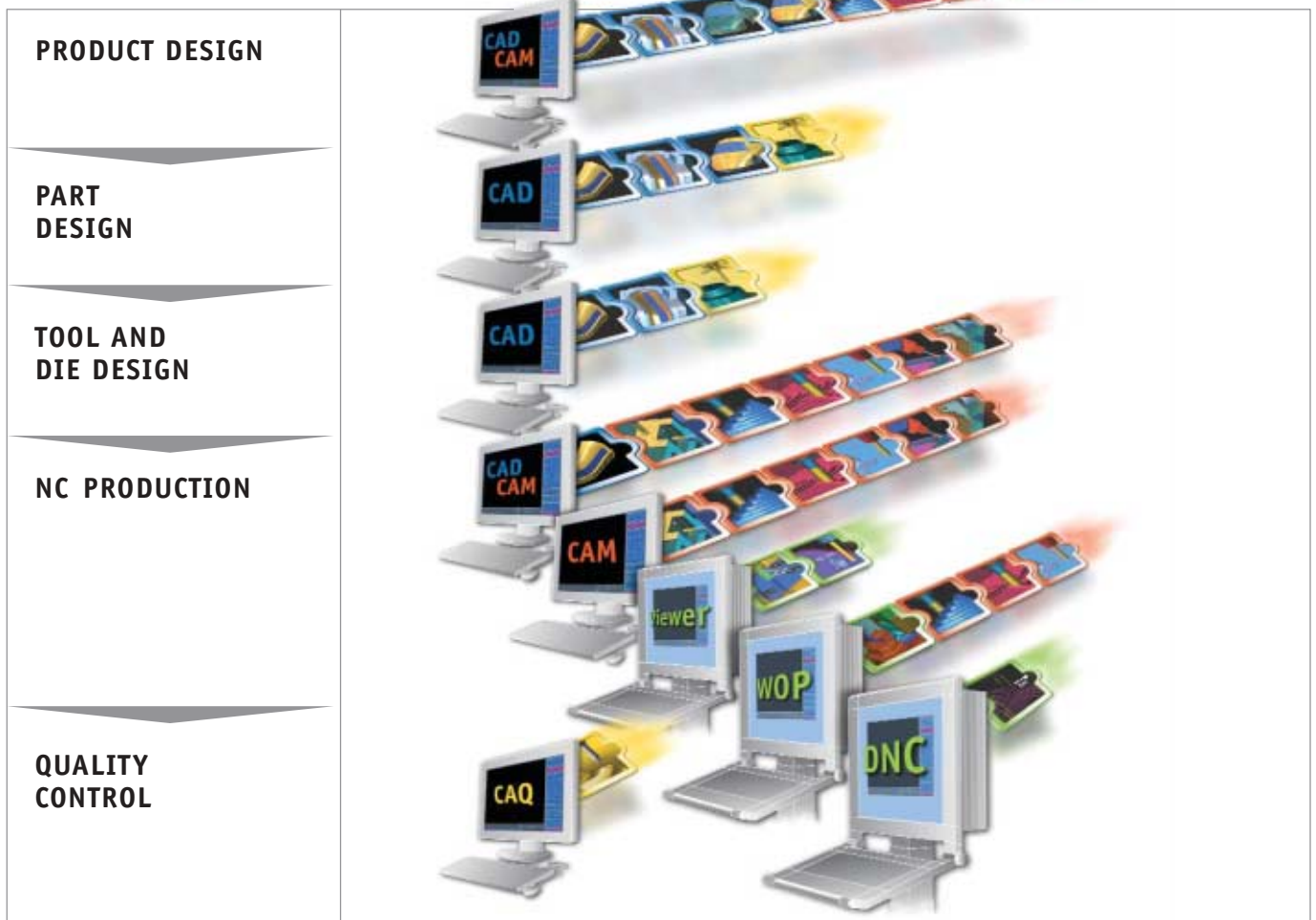
Preparing the blank geometry for roughing.

The CAD module for digitized data processing works hand in hand with the Tebis CAM modules for calculating 3- to 5-axis milling programs. The blank geometry is being prepared and analyzed for roughing (photo 1, yellow), based on a digitized clay model. Virtual measuring determines the stock allowance compared to

the nominal geometry for the whole model. The NC programmer derives this important information from color codes and direct measuring points (photo 2). Thus, milling programs may be calculated with optimal milling parameters on the basis of existing geometries and processed on the machine.



PROCESS CHAIN STATIONS AND TEBIS MODULES



Over 1,000 companies throughout the world use Tebis workstations. Users in a wide variety of industries, from independent engineers to globally operating car manufacturers with several hundred licenses, depend on the powerful capabilities of their Tebis systems.

The range of software applications and related requirements are equally diverse. Tebis meets these strict and frequently special requirements by providing a broad spectrum of universally compatible software modules that can be combined in any configuration. We supply CAD/CAM solutions for every phase in the process chain:

- **Product design:** Stylists design their studies and versions directly on the Tebis screen or count on their craftsmanship.
- **Part design:** Here, designers work out the details of individual component designs, using Tebis CAD modules.
- **Tool and die design:** Using Tebis CAD functions, designers derive the molds and dies needed for manufacturing processes from the part geometry – from injection molding dies to complete sets of sheet metal dies.

- **NC production:** Here, designers first prepare CAD components for NC processing, then calculate the NC programs and finally perform 3- to 5-axis machining operations on the appropriate, milling, drilling and laser cutting machine. Depending on how the customer's processes are organized, these functions are distributed among Tebis CAD/CAM and Tebis CAM systems as well as Tebis Viewer, Tebis WOP and Tebis DNC stations.
- **Quality control:** This is where the finished surfaces are compared to the underlying CAD data and the generated models and dies checked for dimensional accuracy.

All Tebis software packages are fully compatible. Powerful standard and direct interfaces ensure effortless integration of Tebis process chains into higher-level processes.

THE CAD/CAM EXPERTS.