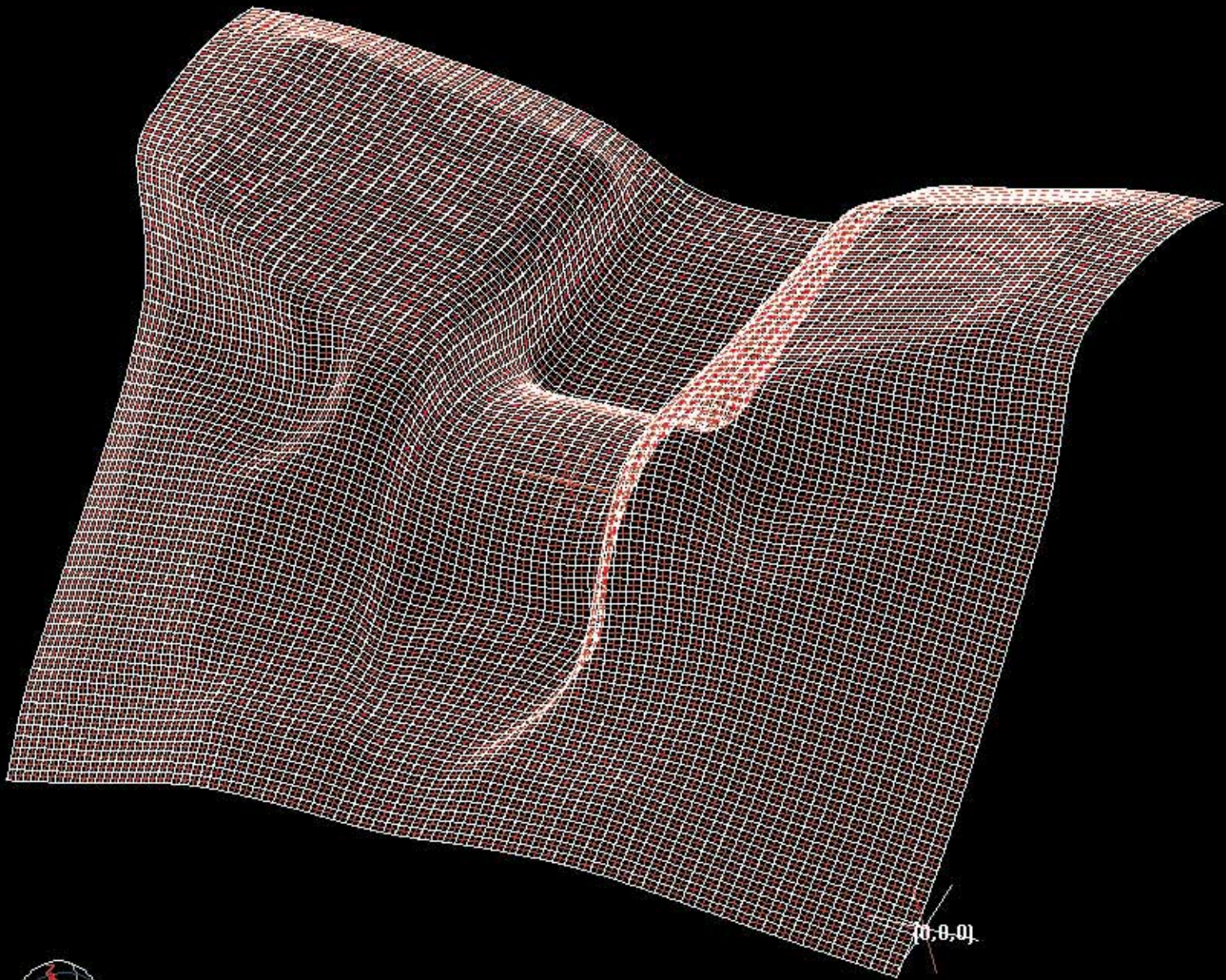


DIMENSION.

Reverse Engineering for Coordinate Measuring Machines.



SIMPLY MEASURE

DIMENSION - faster from model to tool

- ▶ **DIMENSION**
provides a direct link to manual and
CNC CMMs from Carl Zeiss
- ▶ **DIMENSION**
closes the process loop at the point
where design models are digitized or
manual model corrections determined
by partial digitization
- ▶ **DIMENSION**
permits direct integration into other
designs and eliminates the need for
manual correction of the CAD design
- ▶ **DIMENSION**
uses random point set for the
creation of surface descriptions or
triangulations to be processed in
CAD or CAD/CAM systems
- ▶ **DIMENSION**
computes trimmed and untrimmed
surfaces
- ▶ **DIMENSION**
has intelligent algorithms for
evaluating and optimizing results

Fast implementation of model changes

Carpet with DIMENSION is used for traditional measurements in mold and model making, e.g. for the development of new carbody shells. Carpet with DIMENSION allows direct, reliable and effective implementation of model corrections, partial digitization and reverse engineering, with the boundary curves being retained for integration in existing data records.



Reverse engineering with manual scanning

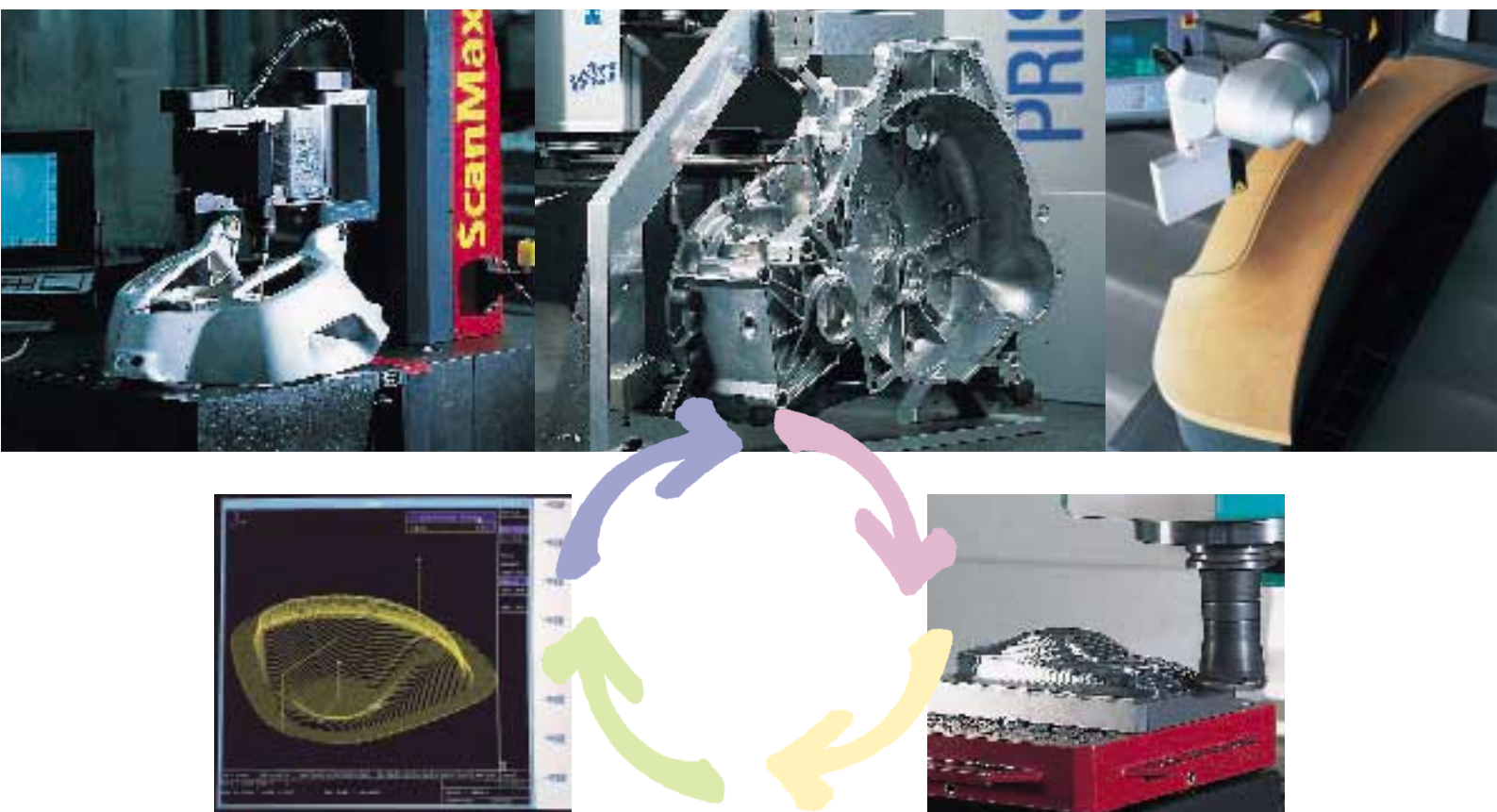
In manual scanning using ScanMax®, for example, random point sets are obtained. DIMENSION uses these to create smooth descriptions for CAD systems without prior triangulation. ScanMax® with DIMENSION can therefore be used in reverse engineering.

Direct control of the measuring machine

DIMENSION includes a direct interface so that CAD data cannot only be imported directly, but can also be used to control the measuring machine for the digitization of unknown curves. DIMENSION produces mathematical descriptions for free-form surfaces and standard geometries.

High data quality speeds up reverse surface engineering

In addition to point clouds, AutoScan, the intelligent laser scanning probe, supplies sequenced data with vectors and contour lines. In reverse surface engineering using DIMENSION, the structural lines supplied by AutoScan clearly reduce processing times.



Fast and reliable reverse engineering

Fast identification of model corrections and controlled conversion into data is an essential requirement for shortening the process loops in model and mold making. DIMENSION allows our powerful measuring technology to be also used as a highly profitable digitization system to meet these exacting demands.

DIMENSION accelerates the product creation process

With DIMENSION, idle times between digitization processes, the computation of curves and surfaces and the provision of data for a CAD system are reduced to a minimum.

DIMENSION - surface descriptions at your fingertips

Reducing the process loops in reverse engineering is essential if you want to maintain your competitive edge. To achieve this, prototypes are needed immediately in the form of actual models and CAD data. DIMENSION permits surface descriptions to be produced from digitized models or partly digitized areas of modification in the easiest way possible.

The result is a finished design.

The CAD designer gets the finished design as a data record for direct use in his existing environment. The engineering work required for this purpose is performed by DIMENSION – an advantage from which tool manufacture also benefits. CAD data can also be used directly in CAD/CAM systems for the computation of NC programs.

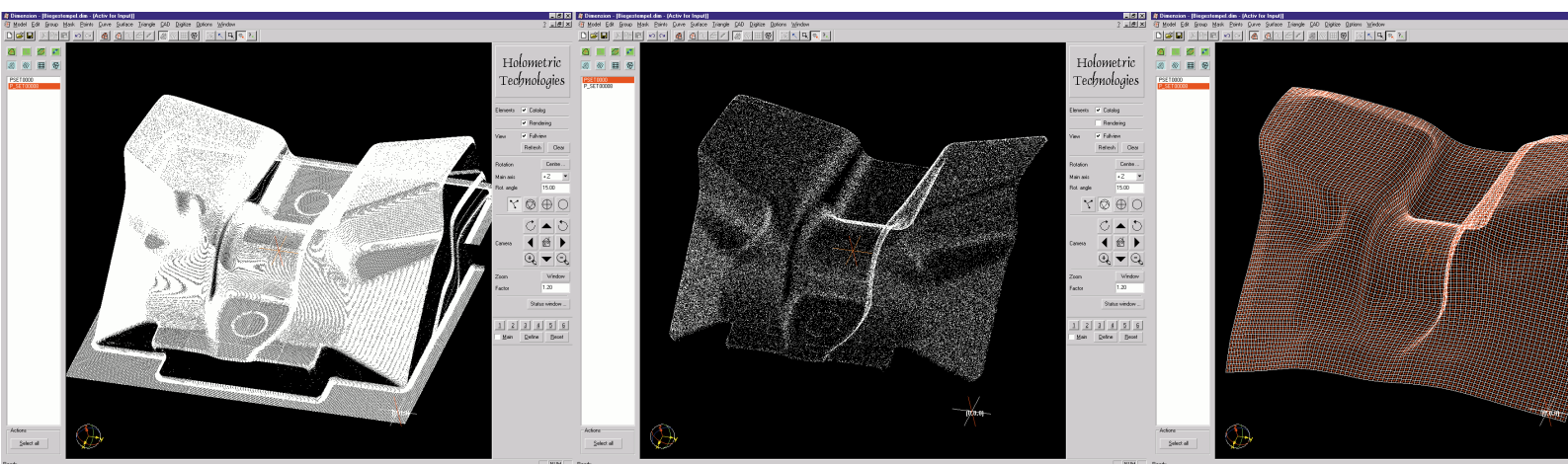
Computed surfaces instead of random point clouds

Intelligent algorithms in DIMENSION generate ultra-precise surface descriptions and curves from random point clouds. These are transferred as NURBS. Complex surfaces can therefore be described by a few segments and with small data quantities. Unlike in conventional methods, standard geometries are not described by approximations but by exact geometric elements. In addition to providing the actual model description, the algorithms smooth the surfaces to such an extent that transitions with virtually constant tangents and curvatures are obtained – a prerequisite for optimum cutting paths without the need for manual correction during production.

DIMENSION quickly processes random point clouds obtained through digitization ...

...performs curvature-related point reductions...

...and computes CAD-compatible surfaces.



Calculation of trimmed
boundary limitations.



Exact determination of boundary curves

It is not only the precise illustration of actual surfaces which is highly complex, but also, and above all, the computation of boundary curves. DIMENSION offers the computation of trimmed and untrimmed surfaces. For trimmed surfaces, DIMENSION automatically calculates a surface which is larger than the digitized area. By mathematically projecting the curve onto the calculated surface, very precise free-form curves can be illustrated as boundary limits. With untrimmed surfaces, DIMENSION calculates the measured boundaries so that the digitized model lies within the boundary curves.

Fast and precise integration of partial digitizations

The original data record, which serves as a reference surface, is combined with the newly measured data and the new surface description is computed. The result consists of the new surface calculated on the basis of the reference surface, taking into account the scanned sections. It is then very easy to determine the modifications.

...or triangulations

The model is positioned
within the boundary.



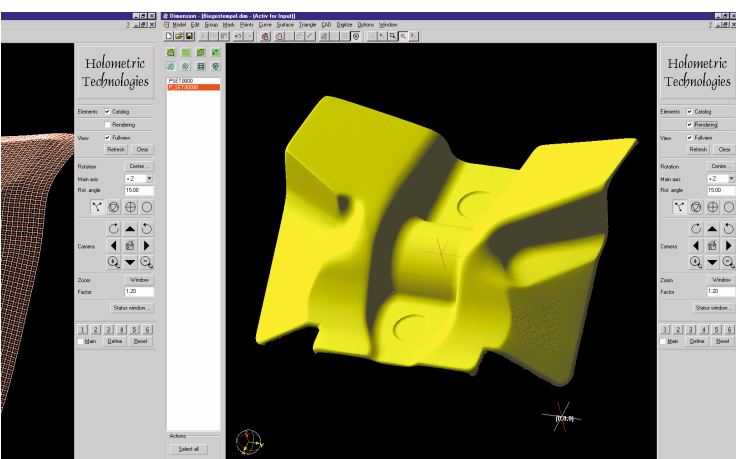
DIMENSION provides high-quality results

Depending on the surface contour, DIMENSION performs point reductions of sometimes extremely large data quantities captured in the optical or mechanical scanning mode.

For the assessment of the surfaces and smooth transitions required for calculating the cutting paths, DIMENSION offers intelligent procedures such as curvature analyses or distance computations between the point clouds and the computed surface.

DIMENSION for all model corrections directly on the CMM

DIMENSION eliminates the intricate engineering work previously performed in a time-consuming process on the CAD station, and reduces the data feedback from the digitization unit to the CAD system to a minimum.

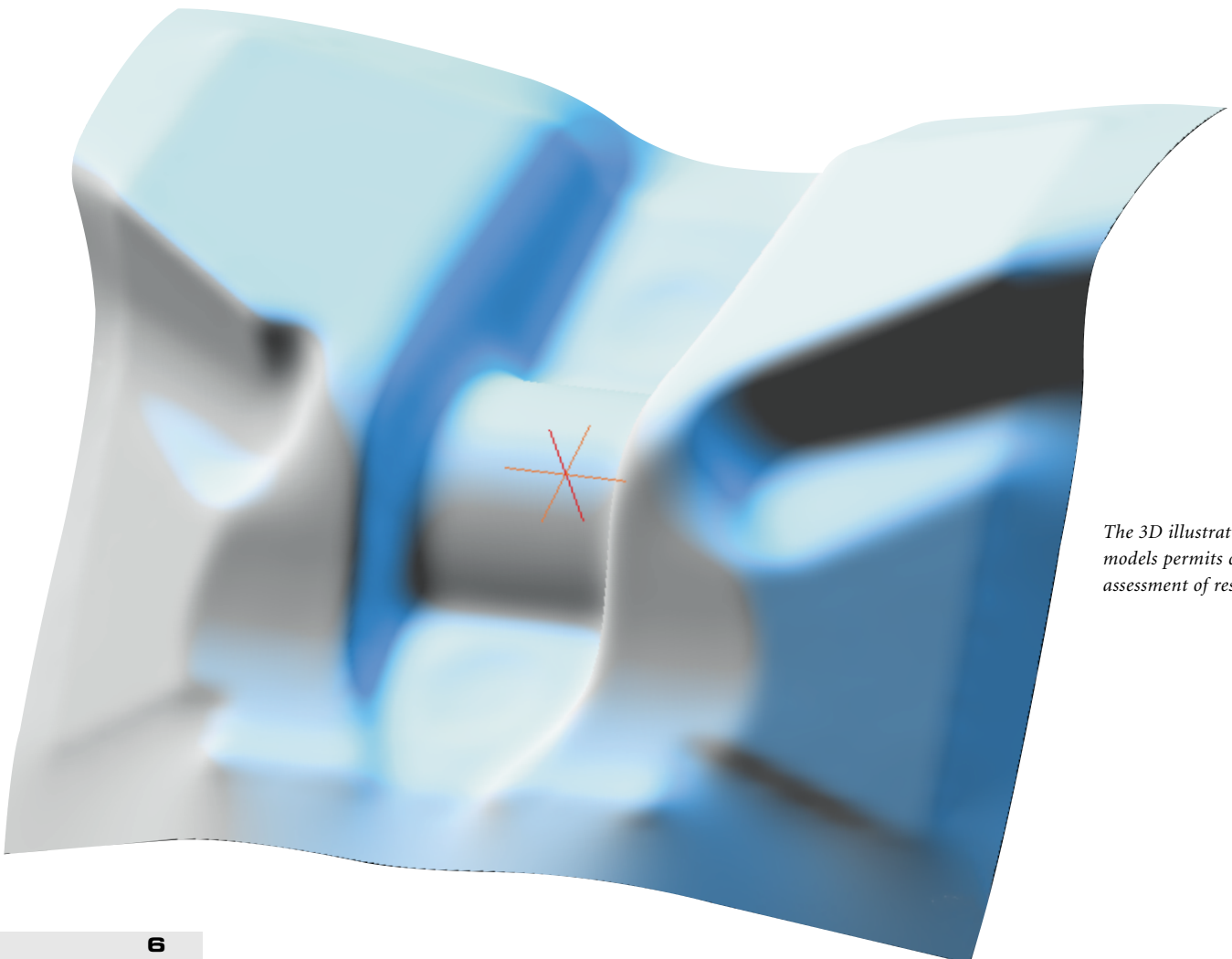


DIMENSION - easy to operate

In the past, CAD experts were needed to process the point clouds obtained by digitization. DIMENSION permits the machine operator to do this job and therefore drastically reduces lengthy data exchange procedures.

Software-driven operation

The software structure and menu terminology are in a language the metrologist understands. The minimum input requirements are prestructured and itemized on a menu page. Defaults are given for the standard input menus and undo and redo commands can be executed in exactly the number of steps the operator requires.



The 3D illustration of models permits complete assessment of results.

You see what you measure

All 2D elements can be clearly illustrated, rotated, displaced and zoomed as rendered models. Spatial light sources give visualizations an extra dimension, permitting easy assessment of the obtained results.

Elements structured on the CMM

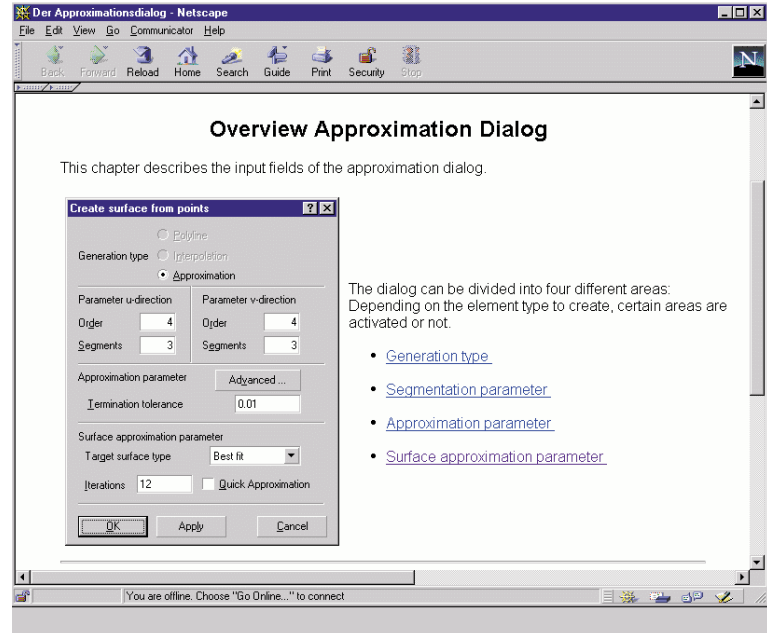
With DIMENSION, all elements can be individually structured into function groups or assemblies, computed and filed in separate administration catalogs on the machine, permitting faster and easier implementation of model corrections.

Selecting and optimizing with DIMENSION

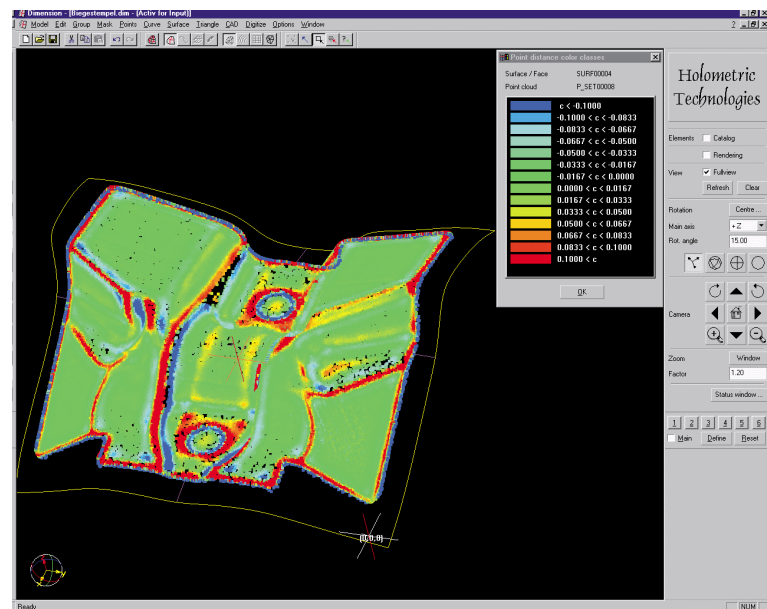
DIMENSION provides not only model computation, but also supports optimization: deleting, grouping into logical context, masking, unmasking, etc. This eliminates the need for any post-processing of the CAD design.

Task-related documentation with DIMENSION

Generally, the technical documentation is consulted if a rarely used command or the assignment of an input field needs to be looked up. Everybody knows what a frustration this can be. DIMENSION offers task-related support and supplies the required information when needed.



*All important input information is combined into understandable menus.
Task-related help functions provide information where and when it is needed.*



Intelligent analytical functions, e.g. for the calculation of distances between point clouds and computed surfaces.

DIMENSION permits reverse engineering on the CMM

DIMENSION provides convenient, on-screen operator prompting. Complex reverse engineering operations can be performed by the CMM user.

For advice, please contact:

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