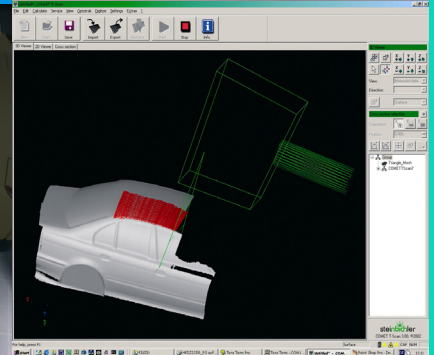
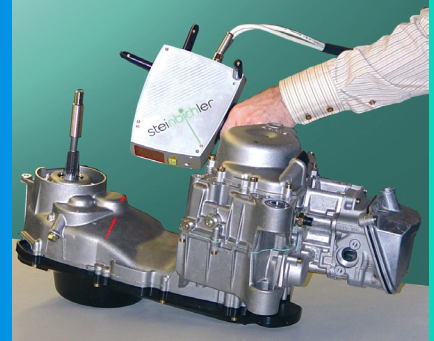
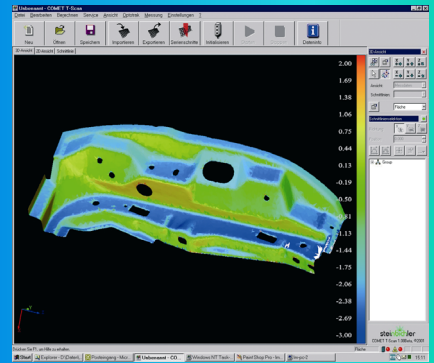




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COMET® T-Scan



3D Digitizing Technology





COMET® T-Scan

The contactless, three-dimensional measurement of surface coordinates has become an important tool during the last few years for the following industry areas: Product Development, Reverse Engineering, and Quality Control.

Now, a significant improvement comes with the easy-to-use, hand held triangulation scanner COMET *T-Scan*. One of the most important advantages of this system lies in the fact that objects can be digitized on-site in the production area or in the laboratory without time-consuming measurement preparation.

The intelligent, hand-held scanner COMET *T-Scan* can be used even by inexperienced staff. Like painting a surface with a paint brush, the scanner is moved over the object surface and acquires a high number of 3D coordinate points.

To guarantee an intuitive operation, the scanning process is displayed in real-time on the monitor.



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Hand-held 3D Digitizing Technology

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TYPICAL APPLICATIONS

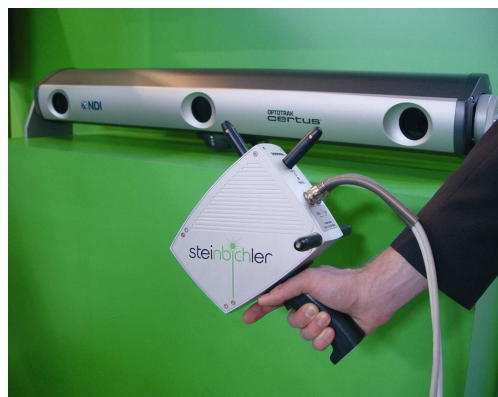
Among a great number of possible applications, the following represents some typical sectors the COMET T-Scan system can be optimally used for:

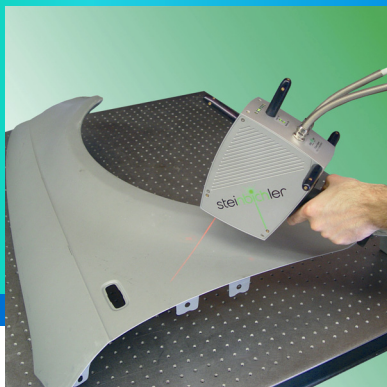
- Digitizing of design models (aerospace and automotive industry, toys, jewelry, electric appliances)
- Generation of measurement data input for the mold and tool making industry (Reverse Engineering)
- Digitizing of immobile and sensitive objects in art, restoration, and archeology
- Quality control by comparison of the digitizing data with CAD data

SYSTEM COMPONENTS

The COMET T-Scan System consists of the following components:

- Hand-held laser scanner
- Mobile, optical tracking system
- Movable rack with computer, incl. COMET T-Scan software and controllers for the laser and the tracking system



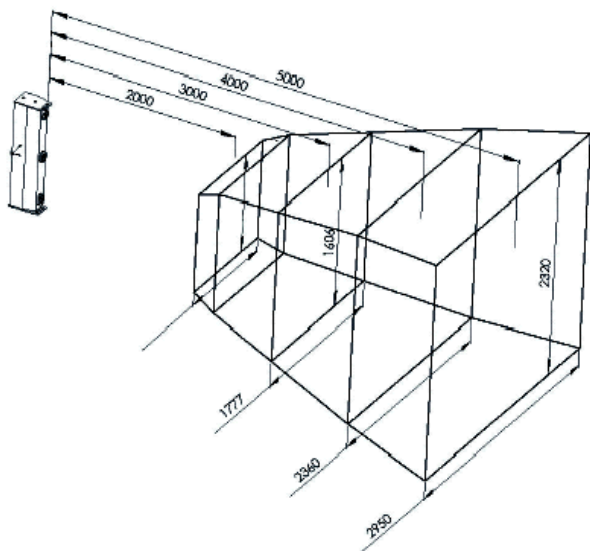


PHYSICAL MEASUREMENT PRINCIPLE

A visible laser beam (670 nm, laser class 2), which is linearly orientated by a polygon mirror, captures the surface of the object to be measured with high scanning frequency (10 kHz). Using the triangulation principle, the measurement distance is calculated from the position on the object surface where the incident laser light is reflected back to the receiving optics.

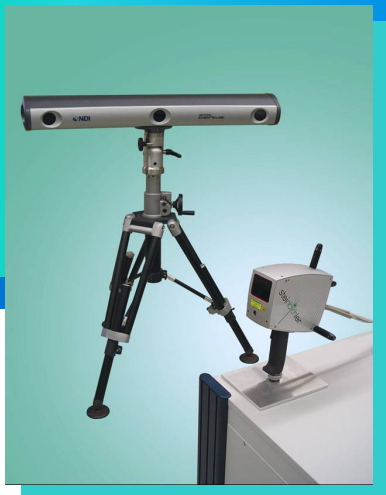
The exact spatial position of the scanner in all 6 degrees of freedom (6D: three spatial coordinates and three tilting angles) is determined by an optical tracking system which identifies at least three of the 29 infrared markers that are positioned on the scanner.

By moving the scanner, the object surface is completely captured. The measured 3D coordinates are displayed on the monitor in real-time. A pilot beam is used to guarantee the optimum distance during the scanner movement over the object surface.



MEASURING VOLUME OF THE OPTICAL TRACKING SYSTEM

SYSTEM FEATURES



High Measuring Accuracy

Owing to the high measuring accuracy (0.1 – 0.2mm) within the specified measuring volume, the system can also be used for superior measurement tasks, e.g., for quality control, without problems.

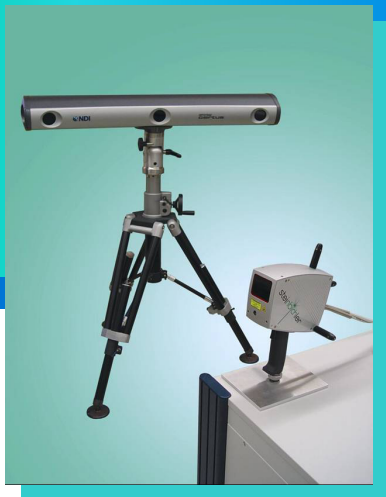
Communication with Touch Probes

By determination of defined point coordinates using a touch probe, a reference coordinate system can be easily generated.



COMET[®] T-Scan
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SYSTEM FEATURES

Large Scan Width

With a scan width of 90 mm, a fast digitizing even of large objects is achieved.

Real-Time Display

During the scanning procedure, the data is displayed in real-time on the monitor. Thus, an intuitive operation (like a paint brush) is made possible

Laser Class 2

Using a laser source classified in laser class 2, no special safety precautions are necessary.

Variable Point Density

Due to a variably adjustable point density within a scan line, it is possible to capture contour lines automatically and with high accuracy.

Point-to-Point Intensity Control

The automatic point-to-point intensity control of the laser beam guarantees a high measuring accuracy even on surfaces with varying optical structures. Thus, special object preparations are not necessary.

Absolute 3D-Coordinates Due to Pre-Calibrated Sensor

The scanner and the tracking system are delivered in a pre-calibrated condition. Thus, the user does not have to carry out time-consuming calibrations on-site.

Large Measuring Volume

A measuring volume of 3m depth supports the easy measurement even of large objects.

SOFTWARE COMET

T-Scan Vers. 3.0



The user-friendly measuring and evaluation software offers numerous functionalities:

3-2-1 Alignment

The transformation of any point cloud into the object coordinate system is done with the help of a 3-2-1 alignment. Thus, the operator can easily define any coordinate system. In addition, the comparison between measuring results and known object data is possible.

Matching of Point Clouds

Point clouds acquired from different camera positions during the measurement of large objects can be easily matched by free alignment and definition of corresponding points.

Automatic Transformation of Object Coordinates



After re-positioning the optical tracking system, actual scans are automatically transferred into the object coordinate system and displayed in real-time. The user gets an online visualization of all scans acquired from different camera positions within a common coordinate system. Thus, an easy orientation on the measured object is guaranteed in real-time.

SOFTWARE COMET T-Scan Vers. 3.0

SYSTEM DESCRIPTION



Calculation of Cross Sections and Polygon Meshes

The calculation of cross sections and polygon meshes is a frequently demanded application in practice. Due to the integration of these methods into the COMET T-Scan system the user can do without additional, expensive software packages from other suppliers.

Intelligent Data Reduction

Due to especially developed algorithms, information about curvatures and edges of the object is preserved during filtering and data reduction of point clouds and polygon meshes (stl format).

Line Tracking

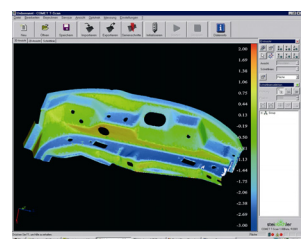
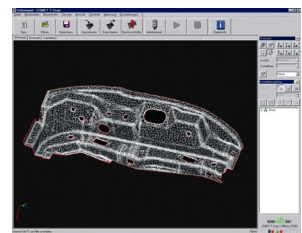
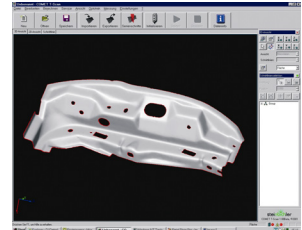
By the automatic recognition of contour lines during the measurement process, an optimal integration into the workflow is guaranteed.

Data Interfaces

The systems feature the import and export into any common data format (e.g. stl, vda, ac, ascii, igs). Thus, the data can be used for a great variety of further processing programs (e.g., PolyWorks, Catia, Metris, Paraform, Raindrop).

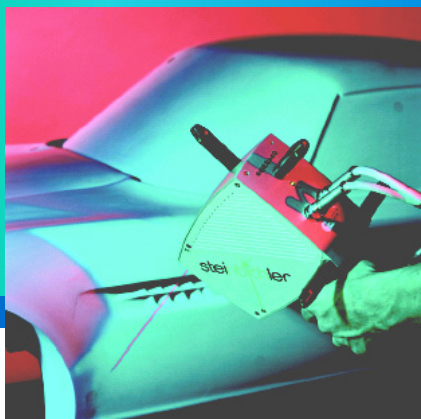
Additional Software Packages for Inspection and Extraction of Feature Lines

Data acquired with COMET T-Scan can easily be further processed with the software packages COMET*inspect* (inspection software) and COMET*plus feature* (extraction of feature lines).



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TECHNICAL SPECIFICATIONS

SYSTEM DESCRIPTION

Measuring Depth	75 mm
Scan Width	90 mm
Mean Measuring Distance	83 mm
Scan Frequency	25-250 Hz
Sampling Rate of Distance Measurement	10 kHz
Resolution of Distance Measurement	1 μ m
Accuracy of Distance Measurement	\pm 30 μ m
Point Density in Scan Direction	0.35 – 3.5 mm
Sensor Weight	1600 g
Sensor Dimensions	185 x 100 x 145 mm
Standard Cable Length Scanner –PC	9 m
Lateral Resolution	0.100 mm
Laser Type	Diode
Wavelength	670 nm
Laser Class	2