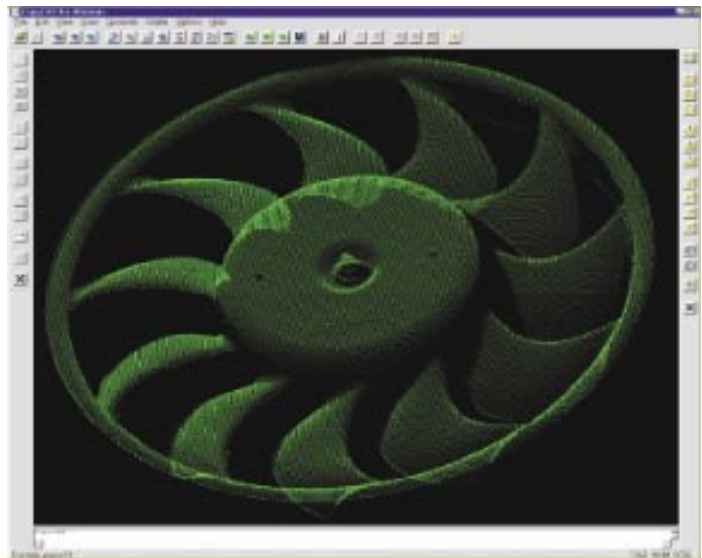


3D digitisation sensor

- Full-field non-contact technique
- Dense cloud of points
- Reverse engineering applications
- Dimensional control
- Comparison with CAD definition



Digitisation of a fan Valeo Thermique Moteur.

APPLICATIONS

Direct milling based on the cloud of point

The clouds of point given by the 3D sensor are dense. The high quality of the cloud allow to use it directly for a milling process or for rapid prototyping.

Steps of the copy of a small statue



*The initial object
Dimensions : 200 x 200 x 80 mm²*



The cloud of point of the 3D digitised object. Several 3D views are merged to obtain the complete object.



A triangulation is done that can be used for milling or rapid prototyping.



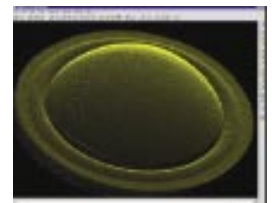
The post-processing of the clouds of points have been done by DELCAM using COPYCAD and POWER MILL software.



A 3D optical sensor.



Digitisation of a tweeter membrane AUDAX



3D digitisation of a vase with texture mapping.

APPLICATION TO DIMENSIONAL CONTROL CHECKS

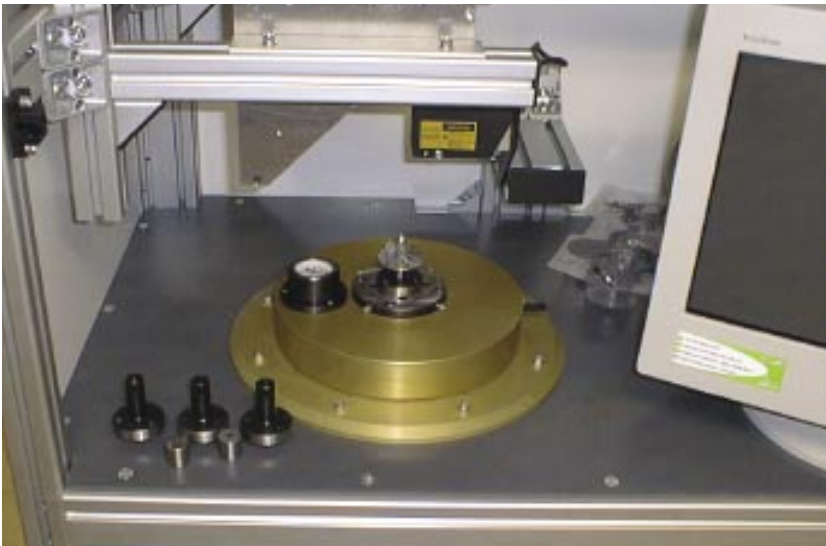
Quick control of complex geometry

Optical 3D digitisation produces a cloud of dense and ordered points on the surface of the part to be examined. In-factory calibration of the sensor and a series of verifications using geometric calibrations allow a proper estimation of the uncertainty on the points measured.

The point cloud can be used for dimensional control checks in two different ways:

- Extraction of geometrical measurements from the cloud (distances, average plane, average sphere, parallelism, perpendicularity etc).
- Direct comparison of the cloud with the numerical definition of the part, using special software.

Control checks on turbine wheel geometry – Garrett



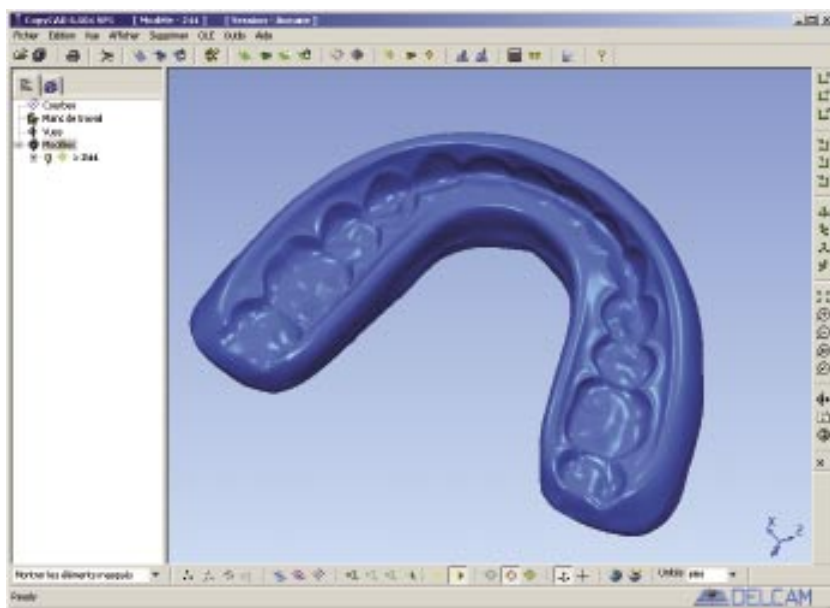
- Control time: 1 minute
- Up to 300 control points
- Repeatability interval: 10 micrometres

The components of the 3D Sensor are, an optical head which may be mounted on a tripod, a computer and the software DIGITIZER 3D for the data acquisition and optical head driving.

Quickly installed, the system can be used for the 3D digitisation of objects on site. The driving software has only a few functions and can then be used by every operator.

Optical head

- Non-contact 3D digitisation by fringe projection
- The sensor is calibrated in factory. The 3D data are given in the sensor co-ordinate reference
- The part to be digitised has only to be placed within the calibrated volume of the sensor
- Dense cloud of points : up to more than 1 000 000 de points for each view
- Digitisation of complex object can be done using several views which are merged
- Acquisition time : 5 seconds for each view



Four sensors having different measurement volumes have been developed.

Model number	Measurement volume	Measurement accuracy	Working distance	Dimensions of the sensor
S	40 x 30 x 10 mm ³	0,008 mm	100 mm	340 x 280 x 160 mm ³
M	220 x 150 x 80 mm ³	0,04 mm	400 mm	480 x 260 x 120 mm ³
L	400 x 300 x 180 mm ³	0,15 mm	1 000 mm	700 x 340 x 220 mm ³
XL	1 300 x 1 000 x 250 mm ³	0,35 mm	4 000 mm	Not defined

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Driving unit

- PC computer, Windows system
- Frame grabber and driving board in the PC

Software

- Driving of the optical head
- Acquisition and saving of the clouds of points
- Export of the points in ASCII file
- Display of video pictures seen by the camera at 25 Hz
- 2D display of the 3D clouds of point using false-colour pictures with several LUT.
- XYZ display of the point at the mouse cursor in real time
- Display and handling of clouds of points (translations, rotations, zooms)