Volume calculation

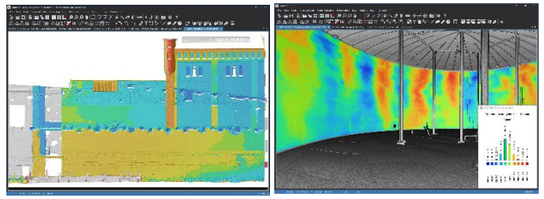
Simple and fast function for determining volumes or differential volumes.

Scan to BIM comparison

Does a building's construction on-site fit to the designed BIM? How about the CAD models created from scan data? Is the required accuracy achieved? In **LupoScan**, the surfaces of the models can be compared with the scanned data automatically. Thus, you can easily control the results.

Deformation analysis

LupoScan offers the possibility to determine deviations of scanned surfaces from specified target shapes (plane, cylinder, cone, tunnel segments or 3D meshes). Changes between measurements from different epochs can also be determined. Typical areas of application are the control of flatness from floors, ceilings and façades, control of slopes, storage tanks, tunnel, canals and other structures.



CAD interfaces

All objects created in **LupoScan** can be saved in various formats. Further more direct interfaces simplify the exchange to the most common CAD programs. For example, orthophotos can be sent at the correct scale directly to the correct position of an open CAD drawing. Objects such as lines, surfaces or solids can also be easily transferred. In addition it is possible to measure points with user definable point codes to enable an easy integration into existing work flows with surveying software.

Project management

Even processing projects with over 1000 scans is no problem for **LupoScan**. For larger projects, it is advisable to structure the data in groups. For example, the scans from different floors can be clearly organised in groups.

Areas of application

LupoScan is successfully used to analyse projects in the fields of architecture, archaeology, monument preservation, stage technology, tunnel and bridge construction, plant construction, shaft renovation and monitoring of construction progress.

Viewer / Test position

The **LupoScan** Viewer offers you the option of measuring in the laser scans and inserting texts and links.
Take advantage of the opportunity to test a time-limited full version of LupoScan free of charge.

Import

- Z+F, FARO, Leica, Riegl, Topcon
- E57, LAS, LAZ, PTB, PTG, PTX, PTS
- STL, OBJ, PLY
- Pix4D, Metashape
- Different CAD objects via the direct interfaces

Export

- CAD direct interfaces to:
  AutoCAD, BricsCAD, ProgeCAD, GstarCAD, Rhino, Palette CAD, TopSolid, Vectorworks and ArchiCAD viaBIMm tool
- PTS, PTX, PTB, OSF, PTB, LAS
- STL, OBJ, PLY, E57, DXF, VRML
- TIFF, JPG, BMP, PNG / Worldfile: TFW, PWG, JWG
- Interfaces to Scantra and VIS-All

LupoScan

Functions	Light	Basic	Pro
2D-Viewer + 3D-Viewer	+	+	+
Import / Export	+	+	+
Direct interface to various CAD programmes	+	+	+
Point measurement with code	+	+	+
Interactive modelling	+	+	+
Insertion of text and links	+	+	+
Quick-Orthophoto	+	+	+
Quick-Sections	+	+	+
Normal- and Spot Images	+	+	+
Animations	+	+	+
Image rectification	+	+	+
Filterfunctions		+	+
Orientation / Transformation		+	+
Polygon mesh		+	+
User defined sections		+	+
Adjusted solids			+
Orthophotos / Unfolded surfaces			+
Deformation analysis			+
Volume calculation			+
Orientation of photos			+
Include external photos / Panoramic images			+
Batch processing			+

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3D Point Cloud Software

LupoScan

Analysing 3D point clouds

Based on many years of experience in dealing with 3D point clouds, we have been developing the **LupoScan** software solution since 2005. Many of the innovative functions have been appreciated by users for years and are an integral part of daily analyses. The functionality and compatibility allow extremely flexible application possibilities in different areas.

Filtering of incorrect measurements

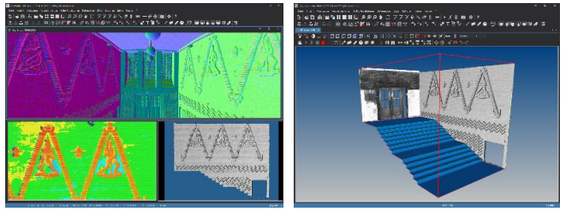
For various reasons the laser scanning data could be afflicted with errors. Different filter functions provide the effective rejection of incorrect measurements at object boundaries, caused by atmospheric noise or measurements with an steep angle of impact.

Orientation / Registration

Quick and easy determination of control and tie points. Exact determination of targets by using correlation methods. Interface to Scantra for highly accurate Plane2Plane registrations. Various tools for quality control of the accuracy of scans and registrations ensure smooth project workflows.

Creation of geometric objects

In **LupoScan**, geometric objects can be defined easily and intuitively in different views of the scans or directly in the point clouds. All objects, from height points, polylines and surfaces to solids, can be transferred to various CAD programmes via direct interfaces.

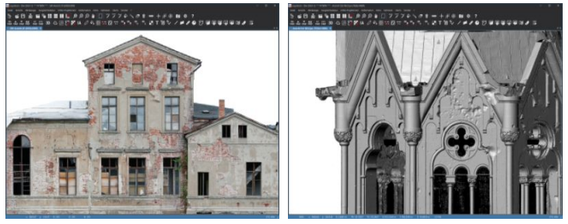


Sections

Extraction of sections in relation to any defined planes, polylines (e.g. cross-sections in relation to a route) or radially in relation to a specific axis. Automatic generation of polylines taking into account definable tolerances.

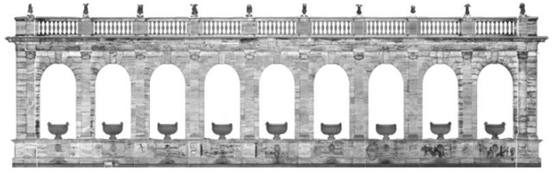
Orthophotos

The high-resolution orthophotos are stored in its own data format, which also contains the 3D information of the data. Interactive evaluation in 3D is also possible here.



Unfoldings

Surfaces of cylinders, elliptical cylinders and cones can be unfolded into the plane with **LupoScan**. For example, round towers, shafts or tanks can be represented true-to-scale in a 2 dimensional map.



Unfolding an elliptical-cylindrical arcade

Unfolding tunnels

Tunnel surfaces with different curvatures in profile and axis can also be unfolded into a plane with **LupoScan**. Among other things, the tunnel development forms a basis for damage mapping.

Manhole evaluation

Automated evaluation of wastewater manholes based on registered laser scans.

Coloured laser scans

All laser scan data can be imported with the recorded colour values. It is also possible to orientate high-resolution photos and calculate them into the laser scans, orthophotos or unfoldings.

Panoramic image mapping

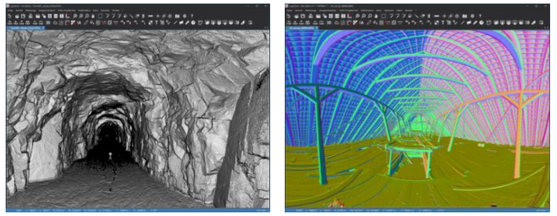
A high-resolution, coloured panorama, which was taken from the same point of view as the 3D laser scan, can be exactly calculated into the laser scan, taking into account possible rotations.

Photogrammetric image rectification

To generate a true-to-scale template for 2D CAD drawings of flat objects (e.g. facades), it is possible to rectify photos from any camera. The necessary control points can of course also be determined in the laser scans/point clouds.

Spot and Normal images / EdgeViews

With **LupoScan**, Spot and Normal images can be calculated from the scan data. These extended view options allow the user to capture surface structures more quickly and simplify the analysis many times over. Furthermore, EdgeViews can be calculated for orthophotos in order to visualise edges.

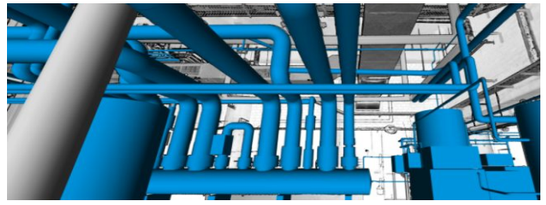


Create adjusted Planes, Cylinders, Spheres

Point cloud data can be used to calculate high-precision adjusted solids. **LupoScan** supports the calculation of adjusted spheres, cylinders and planes either from user-defined points or automatically, based on one selected starting point.

3D modelling

Connecting cylinders to pipe routes, intersecting of planes or intuitive modification of objects with objects with handles enable convenient 3D modeling of plants and buildings in LupoScan. **LupoScan**.



Meshing

Simple and fast function for triangular and quadrilateral meshing.



Animations

Point clouds, meshes and 3D objects can be easily animated by defining viewpoints or circular views. Once saved, camera movements can be easily recalled and exported as image sequences or films.