PointSense family:

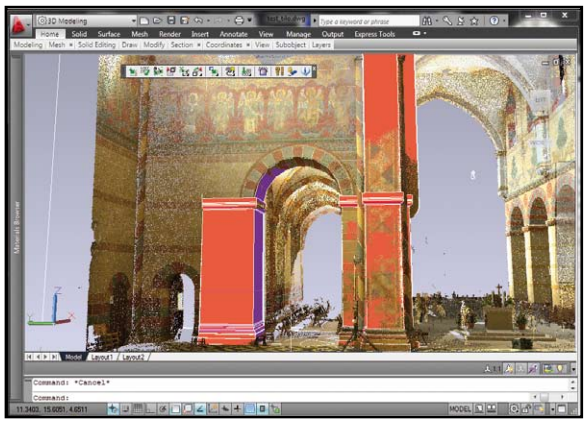
PointCloud and PointCloud Pro

3D laser scan data within AutoCAD

PointCloud and PointCloud Pro are member of the kubit PointSense family. They provide several tools for the management and processing of laser scan data within AutoCAD and support the import of almost all currently available 3D laser scan data formats into AutoCAD.

Management of point clouds within AutoCAD

The Section Manager is a straight-forward tool designed for managing and controlling how point cloud sections are displayed. These sections can be selected or generated automatically; either parallel to a UCS (user coordinate system) or along a designated path. For fast processing new point cloud sections can be created from existing ones with just one click by merging or inverting them. Thus, for example trees that obscure façades can be clipped out without losing points of the building.



Evaluating the 3D scan data

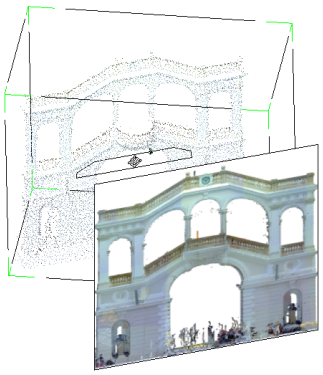
PointCloud Pro adds useful tools for modeling and analyzing 3D laser scan data in AutoCAD. Geometric objects such as polylines, planes and cylinders may automatically be fitted to parts of the point clouds. A spatial join of these objects produces corners, edges and peaks. By fitting polygons and lines to point cloud slices layout plans and elevations can be created quickly. Furthermore, new designed objects can be analyzed for clashes with existing objects represented by the scans. Also tools for deformation analysis are provided.

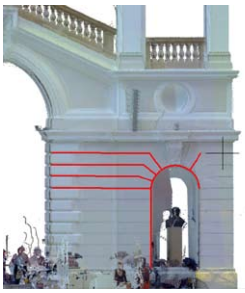
Planar view of Scans

The planar view of PointCloud provides a clear photo-like image of the single scans and allows a much more intuitive navigation than the one inside of point clouds. Snapping background points by mistake is impossible in this view.

Orthoimages of a point cloud

The user can create orthoimages of the point cloud from any desired direction. In the resulting raster image all objects that are parallel to the projection plane are to scale. This way the orthoimage can be used as image plan and if needed combined with AutoCAD vector graphics and supplemented with dimensions.





Laser scanning – Data acquisition precise, fast and efficient

- Import of almost all 3D scan data formats into AutoCAD
- Efficient management of point clouds: masking, dividing, joining
- Combination of scan data, CAD and photos
- Fast construction of 3D wireframe models and solids
- Automated fitting of polylines, cylinders and planes to point cloud sections
- Cylinder line creation for the transfer to other design programs
- Ortho images with X-ray function
- Clash detection analysis between scan and drafted CAD objects
- Deformation analysis and elevation map
- Photo-like planar view of scans
- Higher resolution by combining scan data and photos
- Integration of photogrammetric functions

Universally usable

- PointCloud software can help many different AutoCAD workflows
- Inventory documentation in the preservation of monuments and historic buildings
- Construction supervision
- Archaeological excavation documentation
- Crime scene documentation and preservation of evidence

kubit GmbH has been developing software since 1999. kubit programs enable users to transfer data accurately and efficiently from various measuring devices/sensors into AutoCAD. The software then offers numerous functions for an efficient analysis, evaluation and documentation of the data within CAD. This way, kubit combines the field-proven solutions of sophisticated measurement technology with the well-tried CAD functionality for a wide range of users.

From Real World to CAD

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Requirements

Operating system	depends on the used AutoCAD version, a 64-bit Windows operating system commended
Platform	AutoCAD and all AutoCAD based verticals, e.g. Civil 3D, Architecture or Map 3D starting from version 2010. Please contact the kubit sales department if you are using older Autodesk products.
Hardware requirements	computer: graphics board as suggested by Autodesk, processor at least 2.5 GHz, RAM at least 3 GB; laser scanner: type depending on the tasks camera: common digital camera
Data requirements	registered, meaning toward each other, oriented and geo-referenced scans
Supported point cloud formats	kubit PTC and Autodesk PCG
Supported external scanner data formats	Riegl RiScanPro projects (RSP), Leica (PTZ, PTS, PTX), ASCII, with AutoCAD 2011 and higher also LAS, E57, Zoller&Froehlich (ZFS, ZFPRJ), Topcon (CL3, CLR) Leica (PTG) and Faro (FLS, FWS)
Supported image formats	all image formats supported by AutoCAD, e.g. TIF, BMP, JPEG, PNG oriented images from Riegl, RiScanPro projects, Trimble RealWorks Survey Orthophotos, Reconstructor Orthophotos
Required reference information (image orientation)	at least nine control points or just four control points and the camera parameters

Comparison of the functions of PointCloud and PointCloud Pro

Functionality	PointCloud	PointCloud Pro
Managing point clouds	x	x
Importing various scan data formats	x	x
Importing orthophotos (Reconstructor, Trimble RealWorks)	x	x
Defining, processing and managing of slices and sections of point clouds	x	x
Importing oriented images from Riegl projects		x
Clash detection		x
Deformation analysis	x	x
Elevation map	x	x
Ortho images	x	x
3D distance dimension	x	x
Flattening of drawings	x	x
2D modeling		
Fit line/polyline – with restrictions		x
Fit polygon		x
Drawing arcs and circles through three points UCS independently		x
3D modeling		
Cylinder		
Fit cylinder		x
Joining cylinder		x
Inserting reducer		x
Process cylinder		x
Generate cylinder axis and AutoCAD solids		x
Generate cylinder run		x
Plane		
Fit plane – with restrictions		x
Draw plane		x
Edit plane – extend (two planes)		x
Edit plane – intersection line (two planes)		x
Edit plane – intersection point (three planes)		x
Edit plane – intersection lines (three planes)		x
Edit plane – change boundary		x
Working with images		
Insert oriented image (kubit ORI format)		x
Insert raster image		x
Manage control points (define, import, adapt size)		x
Set UCS according to view		x
Image orientation		x
Camera view and navigation		x
3D drawing with oriented images and surfaces (point cloud, plane, cylinder)		x
3D drawing – with two oriented images (two-image evaluation)		x
Planar view		
Display of scan data within a photo-like, planar view	x	x
Coordinate transfer from the planar view into the AutoCAD drawing	x	x
Freely definable AutoCAD command macros	x	x
Distance and coordinate tap	x	x
Coloring of scans according to intensity, distance or original RGB	x	x

Trial versions

You may test the programs without obligation, free of charge. You will find more information including a request form at www.kubit-software.com. Or just send an e-mail or call us!

References

kubit PointCloud programs are being used worldwide throughout multiple industries:

- ***Lockheed Martin***
- ***OJSC "VNIPIgazdobycha"***
- ***Sightline***
- ***HOCHTIEF Consult IKS Energy***
- ***ThyssenKrupp***