

# PointSense Heritage

Rapid 3D Modeling by Integration of Point Clouds and Photos



## High-tech Documentation in AutoCAD® of Historical Buildings and Archaeological Sites

PointSense Heritage makes functions available for laser scanner data originating from documentation of built heritage conservation and archaeological excavations (such as image plans, floor plans, sections and 3D models, etc.), and where applicable photo like results, can be generated. This combination, from within AutoCAD, of laser scanning and photogrammetry offers interesting possibilities together with the possibility of high definition and precise results.

## Planar Views from Scans

The planar view of the scan data offered by PointSense produces a photograph like clear picture of the individual scans and allows a significantly more intuitive navigation of the scan data as in the depiction of the point cloud. The unintentional snapping of underlying points is not possible in this view.



## Fast Construction of 3D Models

PointSense Heritage extends AutoCAD by adding photogrammetrical functions. High definition, oriented photos support the processing of the laser scanner data and allow the fast construction of 3D wireframe models and surfaces. The photos from commercially available digital cameras are oriented and embedded into the drawing. The geometric objects drawn over these photos are placed automatically in the correct place in the point cloud.

## Classical Photogrammetry in AutoCAD

Identical points in at least two photos taken from different points can be interpolated by alternately selecting the points in the photos. PointSense Heritage calculates the 3D coordinates of the points. Therefore, it is possible to conveniently carry out modelling in space without having to use laser scanner data.

## Create Real Orthophotos

True orthophotos are computed through the combination of point clouds and photos and can be used as the basis for image plans. In the computation the point cloud provides the precise surface information while the color information used in the image produced is gained from the photos. True orthophotos usually have a higher resolution and are denser than the orthophotos produced solely from point cloud data.

## Unrolled Image Plans

By unrolling point clouds and photos of towers, vaulted ceilings, ceiling paintings, facades, roofs, etc. detailed, true to scale image plans can be generated, that can be additionally supplemented with further CAD information and dimensioning.

## Areas of Application

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- PointSense Heritage is suitable for documentation in built heritage conservation, archaeological history research, as well as for complex three dimensional archaeological excavations. Meaningful and detailed image plans can be created or 3D models can be constructed from laser scan data and photos.

## Special Features

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- Fast construction of 3D models thanks to the integration of point clouds and photos
- Photogrammetrical functionality as a supplementary tool
- Computation of real orthophotos
- Generation of detailed image plans in a plane, of point clouds and photos of towers, vaulted ceilings, ceiling paintings, facades, roofs, etc...
- Automatic image orientation from ReCap™ Photo and AgiSoft PhotoScan import

## Classical Features

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- Intuitive navigation in the planar view
- Combination of scanner data, CAD and photos
- Efficient Data management: Isolation, coloring, masking and naming of point cloud regions

# Important Features

## General Features

- Point cloud management and clipping
- SmartSnap: Snapping of corners, edges, planes, highest and lowest point directly in the point cloud
- Fitting of 3D profiles along a point cloud
- Import of various scan data formats
- Definition, editing and management of slices and regions of point clouds
- Deformation analysis
- Elevation plans
- Orthoimages of point clouds
- 3D distance dimensioning
- Create rotated door and arch plans

## Analysis Tools

- Analysis of planes, cylinders and truncated cones
  - Deformation analysis
  - Calculation of (partial) volume
  - Unrolling of the point cloud and profiles
- Deformation analysis of arbitrary surfaces with customizable deviation coloring in 3D

## 2D Modelling

- Line/polyline fitting - with constraints
- Polygon fitting with a variable number of nodes
- Automatic polygon fitting in multiple slices
- various construction tools

## 3D Modelling

### Cylinders and Truncated Cones

- Cylinders and truncated cones fitting
- Convert cylinders and truncated cones into solids

### Planes

- Plane fitting - with constraints
- Plane fitting with only one click
- Automatic determination of plane boundaries
- Extend (two planes)
- Intersection: line (two planes), point (three planes), lines (three planes)
- Change boundaries

## Working with Images

- Image orientation
- Insert oriented image (kubit ORI format)
- Clip oriented image
- AgiSoft PhotoScan and ReCap™ PhoTo imports (fast, automatic image orientation for mono-plotting, true to scale image plane and orthophotos)
- Insert raster image
- Control point management (define, import, adapt size)
- Define the UCS in respect to current view
- Camera view and camera navigation
- 3D drawing with oriented images and surfaces (point clouds, planes, cylinders)
- Photogrammetrical multi image processing
- Computation of real orthophotos
- The unrolling of point clouds and photos, cylindrical and prismatic objects onto the plane (result is a plane raster image)

## Planar View

- Displaying the scan data in a photo like, planar view for easier navigation and understanding
- Transfer coordinates and commands from the planar view into the AutoCAD drawing

## Trial Versions

- PointSense programs can be tested free of charge and without obligation. You can find a request form on [www.faro.com](http://www.faro.com). Or simply call by phone.

## References

- PointSense software is used worldwide and industry wide:
- National Parks Service
- T. Baker Smith, LLC
- SNC-Lavalin Inc.
- JE Dunn
- ...and many others too.

# Technical Requirements

<b>Platform</b>	PointSense Heritage is compatible with AutoCAD® and associated products such as Civil 3D, Architecture and Map 3D for versions 2015 and above. Should older Autodesk products be used, please contact your FARO representative.
<b>Operating System</b>	Dependent on the version of AutoCAD® being used, 64-bit systems only..
<b>Hardware Requirements</b>	Computer: Graphics card as recommended by Autodesk®, RAM at least 8 GB, better 32GB and more, processor at least 2.5 GHz, better 3-4 GHz and 4-8 cores, SSD for larger projects; Laser scanner - type to suit the job in hand; optionally a commercially available digital camera.
<b>Data Requirements</b>	Registered, that is to say they are oriented to each other, and if applicable oriented photos.
<b>Supported Scan Data Formats</b>	E57, ASCII, LAS, FARO (LSPROJ, FLS, FWS), Leica (PTZ, PTS, PTX), Zoller&Fröhlich (ZFS, ZFPRJ), Topcon (CL3, CLR) Leica (PTG) and Riegl RiScanPro-Projects (RSP)..
<b>Supported Image Formats</b>	All AutoCAD® supported image formats, e.g. TIF, BMP, JPEG, PNG, Agisoft PhotoScan format (XML), ReCap Photo (RCP).

For more information, call 800.736.0234  
or visit [www.faro.com](http://www.faro.com)