PointSense Plant

From 3D Laser Scans to Consistent Plant Models

PointSense Plant Supports 3D Laser Scan Processing

Plant managers can process point clouds directly in AutoCAD®. Piping systems, steel construction elements are efficienty modelled. The resulting models can be exported to plant planning programs such as Plant 3D, MEP, CADWorx®, AutoPLANT etc. PointSense Plant has all the tried and tested tools to model, manage and process 3D scanner data in AutoCAD.

Walk The Run – The Intelligent Pipe Run Tracer

Automation and pattern recognition are the basis for the efficient processing of 3D laser scanner data, however too much automation can lead to expensive mistakes. The “Walk The Run“ function guides the user through the pipe system, the pattern recognition, on the basis of a catalog, suggests types and positions for recognized pipes, bends, tee-pieces and fittings. These procedures give the user full control over the modelling process and ensures geometrical and technical workmanship. The thickness of the insulation is taken into account in pattern recognition. Pre-calculated cylinders accelerate this user-controlled workflow.

Apply Constraints – The Way to Compatible Models

Plant design software requires coaxial centerlines for fittings and pipe bends must be coplanar. The function “Apply Constraints“ creates pipe runs that fit in the point cloud and satisfy the consistency conditions of the plant design software. In the same way Stacked Steel is supported, proper axis configuration is found automatically, beams are aligned coplanar or perpendicular without overlapping and can be evaluated to “waterproof” axis models.

Fittings Catalogs

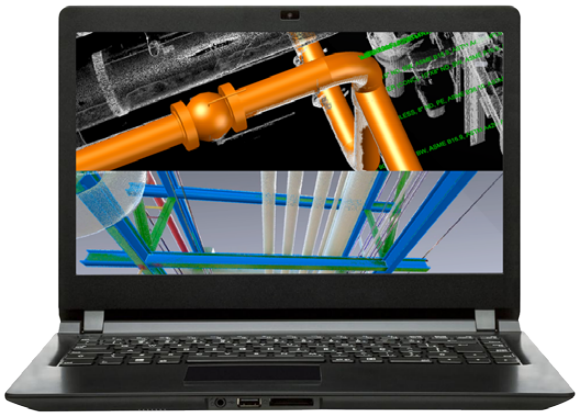
FARO 3D Software provides a standard catalog of fittings and steel. Plant 3D and Advanced Steel catalogs can be directly imported. In cases where the fittings are missing or special fittings (out of spec) are needed, the user can create customized fittings or even full catalogs. The software then uses these components in the pattern recognition process.

Determine Tie in Points

If precise tie-in points are required, they can be surveyed in and marked - without any modelling.

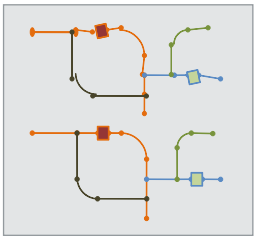
Planar Views from Scans

The photo like view of the scan data that is provided by PointSense allows a more intuitive navigation compared to a CAD environment.



Reverse engineered piping system. Type recognition and best-fit of steel members

- Intuitive sequence of steps for modelling piping systems and steel constructions from 3D laser scans for further processing in planning software, for edge interference models and visualization
- Snap planes, corners or edges directly in the point clouds with SmartSnaps
- Extendable catalogs control pattern recognition
- Determine the tie-in points on flanges for alterations and extensions
- Analysis of cylinders, elliptical truncated cones and planar surfaces for distortions
- Unrolling and volume calculations with deadwood subtraction
- All in the usual AutoCAD environment



Schematical illustration of the function “Apply Constraints“

Export Pipe Centerlines and Fitting Information

After creating a piping system it can be converted into AutoCAD Plant 3D objects, 3D solids or a labelled centerline layout. The standard AutoCAD objects can be used afterwards in any plant software systems. The same applies to steel structures and the interaction with Advance Steel.

Analysis of Cylinders and Truncated Cones – Tank Tools

Tanks, boilers or containers can be checked for deformations and the results are elevation plans, and lists that can be visualized by 3D heatmaps. It is possible to precisely compute volumes including taking the internal subtracted volume (deadwood) into account. Cylinders, elliptical and circular truncated cones are all supported.

Important Features

Point Cloud Management

- Import of orthophotos (Reconstructor, Trimble RealWorks)
- Definition, editing and management of slices and regions of point clouds
- Import oriented images from Riegl projects
- Collision analysis
- Analysis of planes, cylinders and truncated cones
  - Deformation analysis
  - Calculation of (partial) volume
  - Deviation coloring in 3D
  - Unrolling of the point cloud and profiles
  - Lists
- Elevation plans
- Orthoimages of point clouds
- 3D distance dimensioning
- Flatten the drawing

2D Modelling

- Line/polyline fitting - with constraints
- Automatic polygon fitting in multiple slices
- Draw UCS independant arcs and circles through three points

3D Modelling

Piping Systems

- Snapping of planes, corners or edges directly in the point clouds
- Automatic recognition of pipes, bends, flanges, valves, reducers, tee-pieces, etc., pre-calculated cylinders accelerate user-controlled workflow
- Precise location of the tie in points of all fittings
- Pattern recognition based on the predefined catalog and/or self defined fittings
- Support of Cutback elbows
- Import of catalogues from Plant 3D
- Conversion of the fittings to Plant 3D
- ESAin import and export
- Properties palette is supported for plant objects
- Fittings can be displayed as blocks
- Support of line numbers
- Export annotated centrelines for further processing in other plant software
- Export as standard AutoCAD® objects, e.g. 3D solids
- Adjusts the diameter of insulated pipe runs
- Assures the consistency (coaxial and coplanar centrelines) of the total piping system
- Flexible textural and graphical marking of any point cloud regions (e.g. for asset management);organised in a flexible tree structure; table export

Structural Steel Work

- Steel beams (T, H, L, U profiles and any user defined profile) can be fitted with just two clicks.
- The profile type is automatically recognised.
- Batch processing for capturing complex steel cosntructions through copying and pattern recognition
- Good axis configuration is found automatically
- Assures the consistency (coaxial and coplanar centerlines, orthogonality)
- Coplanar or perpendicular aligned beams without overlapping
- “Waterproof” axis models
- Advance Steel import and export, ESAin export, SDNF export

Tie in Points

- Precisely determine tie in points on flanges and dimension them (flange centr, centreline and rotation)

Plane

- Plane fitting - with constraints
- Plane fitting with only one click
- Automatic determination of plane boundaries
- Various construction methods using planes

Planar View

- Displays the scan data in a photo like, planar view
- Transfer coordinates from the planar view into the AutoCAD drawing
- Freely defined AutoCAD command macros
- Distance and coordinate picking
- Colors of the scans according to intensity, distance or original RGB

Technical Requirements

Platform	PointSense Plant is compatible with AutoCAD and associated products for versions 2015 and above. Seemless workflows with Plant 3D and Advance Steel. Should older Autodesk® products be used, please contact your FARO representative.
Operating System	Dependent on the version of AutoCAD being used, 64-bit systems only.
Recommended Hardware Requirements	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 job in hand.
Data Requirements	Registered, that is to say the scans are oriented to each other.
Supported Scan Data Formats	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).

For more information, call 800.736.0234
or visit www.faro.com

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