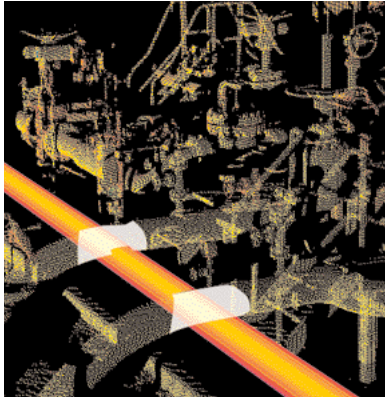


Cyclone CloudWorx 3.1 – FOR AUTOCAD

Software Application That Let's Users Take Advantage of Rich 3D Point Clouds Directly Within CAD

Cyclone™ CloudWorx 3.1 for AutoCAD delivers 3D point clouds created by High-Definition Surveying (HDS™), or 3D laser scanning, systems directly into the hands of the designers and engineers who need accurate, detailed field conditions.



Interference Checking

CloudWorx provides immediate productivity, enabling users to easily visualize and work with 3D point cloud data, create accurate as-builts, check proposed designs against existing site conditions and compare construction progress with design plans in the familiar AutoCAD environment.

Powerful Performance and Visualization – 3D laser scanners capture existing conditions in the field to generate a highly visual and accurate representation of reality as 3D point clouds. CloudWorx uses *Cyclone* technology to efficiently display point clouds in AutoCAD - merging sophisticated rendering performance, visualization, data management and data interrogation with popular CAD tools.

Point Cloud Display Control – Easy-to-use tools define specific areas of 3D point clouds to display, to focus on particular areas of interest. For improved visualization, segments of point clouds can be selectively hidden using fences and user-defined cutplanes or slices through the point cloud data.

Spatial Navigation with 3D Limit Box – Project data can be organized into 3D Limit Boxes. The Limit Box Manager enables users to navigate spatially through the database quickly loading and viewing data as-needed.

Accurate Building Documentation – Slices through point cloud data facilitate the creation of planimetric and elevation drawings. 2D lines, polylines, and arcs can be best-fit to point cloud slices to provide accurate results. Cross sections of point clouds can also be plotted

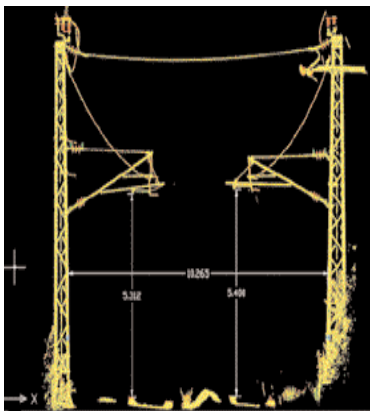
directly, introducing an entirely new, accurate "deliverable" and reducing project cycle time.

As-built Piping Models – CloudWorx's powerful pipe fitting tool enables users to quickly create accurate, intelligent as-built piping models, best-fit to the 3D point clouds, with the help of tools in applications like Bentley AutoPLANT and COADE CADWorx. Tie-in locations for proposed retrofit designs can also be easily identified and marked. Planar surfaces can also be modeled from the point clouds using CloudWorx's fitting and 'region growing' tools.

Detailed Information for Retrofit Projects – Engineers can use CloudWorx in retrofit design projects to check proposed designs for potential interferences with the point clouds that represent the actual "as-built" or "as-is" conditions. The unparalleled detail provided by point clouds allows engineers to create 2D or 3D designs based on accurate, comprehensive information, providing time- and cost-savings throughout a project's various construction phases.

Civil Engineering Applications – CloudWorx integrates with applications like Autodesk Land Desktop to bring solutions in civil engineering projects - from transportation infrastructure to land development, bridge models and more. The user can extract 3D coordinates to represent site features that are easily identifiable in detailed point clouds. Original ground points can be extracted for topographic modeling.

Cyclone CloudWorx Product Modules – *Cyclone* CloudWorx is available as two distinct products for different user and organization needs. CloudWorx Pro is the full-featured product for generating 3D and 2D deliverables from point clouds in the AutoCAD environment. CloudWorx Basic provides a reduced subset of features and is suited primarily for generating 2D deliverables.



Point-to-Point Clearance Measurement



Accurate 2D Elevation from Point Clouds

Leica
Geosystems

CloudWorx Basic Features

Cyclone CloudWorx Basic and Pro 3.0 provide the following features.

Large Point Cloud Support

Efficient loading

Visualization

Navigation

Cyclone Object Database Client/Server technology

- Fast data processing
- Efficient data management

Rendering

Level of Detail (LOD) graphics

Intelligent memory management

Visualization

View point clouds with:

- Intensity mapping
- True color

Display Control

Control over:

- Displaying point clouds
- Snapping to point clouds

Flexible point masking:

- Fence
- Section (half-space)
- Slice
- Limit box (volume clipping)

Point Cloud Management

Limit Box Manager

Cutplane Manager (sections, slices)

Hide Regions Manager (fences)

Layers in *Cyclone* database

Measurement

3D point coordinate

Point-to-point

Point-to-design entity

Modeling

Tracing

Output

Ability to plot points

Point Cloud Archiving

Point clouds as historical as-built record

CloudWorx Pro Features

In addition to Basic features, CloudWorx Pro 3.1 provides the following features.

Point Cloud Management

By scanner location

Modeling

Pipe Modeling:

- Least-squares fitting
- Fit points inside fence
- Grow from pick
- Grow a piping run from picks
- Connection of piping run
- User-defined error tolerance

Planar surface (patch) modeling:

- Least-squares fitting
- Fit points inside fence
- Grow from pick
- User-defined error tolerance

Best-fit 2D lines, polylines, arcs:

- Fit 2D lines, polylines, arcs to point cloud slices
- User-defined tolerance

Interference Checking

Check designs for potential interferences with point clouds

Highlight interfering points

User-defined parameters

Benefits

Easy to Learn and Easy to Use

Integrated into existing AutoCAD design and work processes

Short learning curve

Fast, Accurate, Comprehensive, Reality-based

Comprehensive as-built data

Efficient modeling and information extraction tools

Higher confidence as-built projects through sophisticated software algorithms.

Supports Wide Range of Plant, Civil, Architectural Applications

Accurate 2D planimetric and elevation drawings

3D as-built models

Engineering planning

As-is condition assessment for range of applications including retrofit and revamp projects

Verify Designs with Detailed Point Cloud Data

Facilitate adjustments to proposed retrofit designs for clash-free installation

Support construction monitoring

Minimize or Eliminate Site Revisits

Detailed point clouds archived in *Cyclone* database provide data on as-needed basis

Workgroup Support

Data sharing in network environment with

Cyclone-SERVER

System Requirements

Microsoft Windows XP (SP1 or higher), Windows 2000 (SP2 or higher)

2 GHz Pentium 4, or higher

512 MB RAM (1GB or more recommended)

SVGA or OpenGL accelerated graphics card

Ethernet network card, for licensing

Cyclone Workgroup Software Solution

Leica Geosystems HDS offers a suite of software products to meet a wide variety of user needs. *Cyclone* – for scanning, registration, 3D modeling and information extraction; *Cyclone* CloudWorx – for point cloud use in the CAD environment; and *Cyclone* SERVER – for simultaneous workgroup access to data sets for collaborative engineering.



Leica Geosystems HDS LLC

4550 Norris Canyon Road

San Ramon, CA 94583

+1 925-790-2300

www.hds.leica-geosystems.com

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Cyclone CloudWorx 3.1 15 March 2005 v1.0