

Automated Conversion from 3D Cloud of Points to 3D Surface Model

INOVx has released a new feature of its RealityLINx software that automatically converts a 'cloud of points' acquired from laser scans into a simplified 3D model. The simplified 3D surface model is automatically produced from the laser scan point data into an optimized CAD model. The surface model essentially 'connects the dots' with poly-mesh 3D CAD geometry, while optimizing the size and shape of the geometry by eliminating redundancy to significantly reduce the file size when compared to the original laser scan cloud.

Prior to this innovation, laser scanning 3D modeling practices involved a time consuming process of converting the thousands of data points in the laser scan cloud into CAD geometry, which was then manipulated using CAD software, and to which new design can be added. This added cost and delay in creating the CAD model to utilize the data may appear to be unreasonable and therefore laser scanning may not be used on a construction project. As a result, the proven value of laser scanning is not realized and construction interferences are more likely.

This innovation is significant because it automatically creates a simplified 3D model while optimizing the file size, which facilitates the use of the captured as-built data dramatically faster and more cost effective, almost immediately after data acquisition. The INOVx-optimized surface models are automatically created and easily imported and managed in various CAD design systems, such as PDS, Microstation, and AutoCAD. Now engineering design and construction have an accurate record of the existing facility more quickly. Early access to accurate plant data enables a project to avoid interferences during the construction phase, when it is the most expensive and disruptive time to deal with this type of problem. If design interference occurs, the plans must be revised, which could lead to modified components, additional equipment, additional costs, and delayed schedules. If the delay is during a facility shut down, the owner will sacrifice potential income until the problem is resolved and the construction is completed, which could cost millions of dollars.

The benefit of this innovation is its ability to quickly superimpose new design and perform clash detection with existing plant structures. It facilitates the use of laser scanning when time or costs appear to prohibit the use of laser scanning technology. The automated 3D simplified model streamlines and significantly reduces the human-intensive work process required to create a 3D model of complex facilities, reducing cost and schedule of a construction project.

The INOVx team has employed leading-edge technologies and well documented, proven work methodologies, to dramatically improve the process of capturing existing plant conditions on over 80 projects worldwide. Follow up studies show that clients have saved 15% or more in revamp costs when including 3D models from laser scanning and photogrammetry into their project plans since much of a project's total cost was spent on unnecessary re-work and plant shutdowns due to design problems. For construction projects, this innovation has reduced the effort, costs, and schedule associated with creating a 3D as-built model from laser scanning by 40% to 50% and is an example of INOVx's long-term commitment to reducing the overall cost of capturing as-built conditions of complex industrial facilities.

This innovation has been and will continue to be used in the future to efficiently convert laser-scanning data into 3D simplified surface models. It facilitates the use of proven laser scanning technologies and reduces construction costs and schedules.

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Figure 1 - Photo of Construction Area



Figure 2 - Laser Scans of Construction Area



Figure 3 - Optimized 3D Surface Model

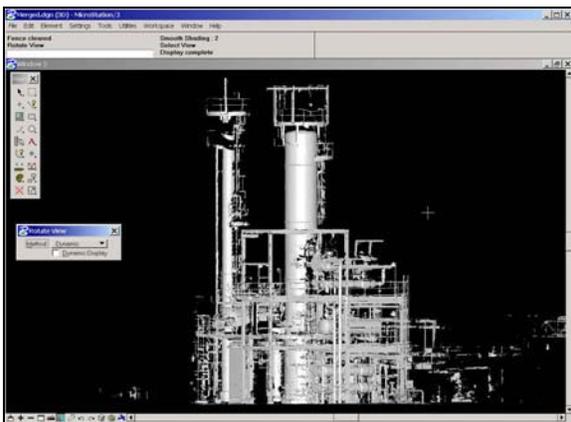


Figure 4 - Surface Model Imported into CAD to be used for clash detection on a construction project (Example is Microstation in this figure)



Figure 5 - Complete CAD Model from laser scanning (No longer needed)