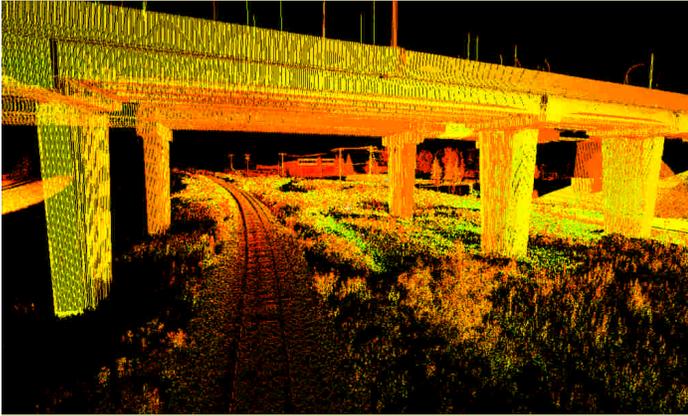


High Definition Surveying



Point cloud of Barlow Trail looking east, Calgary, Alberta

Benefits through the use of HDS

Safety

Allows field personnel to maintain safe distances from sites and structures that may otherwise put them in harms way. This is also true for workers that do not have to negotiate around survey crews.

Detail

HDS provides a means of storing a "physical reality" on the desktop. This allows Engineers/Designers to have easy access to critical data and provide specific site information to guide decisions and optimize the value of any given Plant or Facility in the following areas:

- Field Data Analysis
- Critical Component Analysis
- Identification of potential components that could result in performance loss
- Main equipment conversion, modification and upgrades
- Process redesign and engineering
- Maintenance plan analysis

The Leica HDS 3000 also has a bore-sighted digital camera for calibrated photo overlays. This serves to view the site for additional detail and also provide photo rendering of the point cloud data. Accuracies achievable to 6mm at 50m.

110, 3030 - 3rd Avenue NE
Calgary, Alberta, Canada
T2A 6T7

Phone: 1-403-207-0303
Fax: 1-403-248-0466
E-mail: general.delivery@tronnessurveys.com

What is High Definition Surveying?

High Definition Surveying, or HDS, is a combination of Terrestrial based laser scanning, computer technology and often high precision control networks. Instead of surveying one point at a time on a single line, we can collect thousands of points per second with a very high degree of accuracy. Tronnes Surveys has invested extensively in training staff with Leica Geosystems and Spatial Technologies. We have developed methods and procedures in house for using HDS in the field. HDS is a very useful technology in surveying Oil & Gas related projects such as Gas Plants, Compressor Stations, Well Sites (Well Heads, Gathering Systems) and Water Handling facilities.

When can we use HDS?

As in all surveying, it is important to use the right methods and equipment as is appropriate for the successful completion of a project. HDS is suitable for certain types of sites, structures and projects.

- Structures that have a geometrical complexity
- Sites that are relatively clear of vegetation
- Sites or structures with a great amount of detail or congestion
- Surfaces that are difficult to reach
- Sites that require active and continuous use
- Sites that are not in close proximity to the client or surveyor
- Sites that are unsafe to occupy

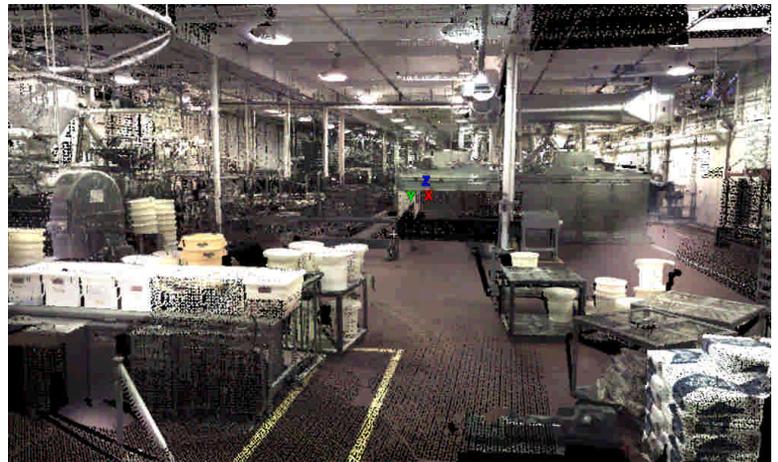
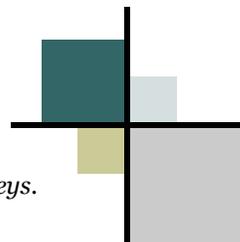


Photo rendered scan data of food processing plant



TS
Tronnes Surveys

Benefits through the use of HDS (cont'd)

Hard to reach surfaces

Both horizontal and vertical – We measure between multiple points or features without ever having to physically contact such points or features. Sometimes it is difficult, or even impossible, to reach features such as ducting or piping. It may be due to height and location restrictions or it may be that plant operations cannot be halted to allow for safe access to these features. As long as the feature is not fully enclosed, we can most often obtain measurements to the feature from a safe and convenient location on the ground. We can even establish pipe size if half of the diameter of the pipe is exposed. The image to the right shows actual point cloud data that has been photo rendered for easier recognition of features. It can be fully dimensioned and imported to AutoCAD.



Point Cloud data showing clearance dimensions to pipe.

Disruption concerns

For Oil & Gas related surveys, HDS can be used to capture 3D data about gathering and boosting, gas pipeline, storage, metering and reduction, gas treatment and processing auxiliary systems, oil and gas power generation and geothermal and steam generation without having direct contact with any of the facilities. The alternative would be a series of plant operation closures over the period of time. Scanning data offers high efficiency in field data collection and can produce a reduced delivery time to the Engineer or end user.

Time

To the field, in the field and through to delivery. Scanning data offers high efficiency in field data collection and can produce a reduced delivery time to the Engineer or end user.

Accuracy

Accuracies achieved to 6mm at 50m. Tronnes Surveys can integrate scan data with local and provincial control systems to provide highly accurate projected data sets. Tronnes Surveys uses Leica 1230 GPS systems, the latest in real time GPS equipment, for precise control. Vertical ties are checked through differential leveling.



Typical Gas Plant Site

What are the Deliverables?

The deliverables are purely defined by the client. Tronnes Surveys combines HDS data with data collected conventionally to provide a complete product. The delivered format is client dependant. We provide traditional point and TIN data from the HDS data in AutoCAD Land Development Desktop (LDD) format. We can also provide final registered scan data to those clients currently working with Cloudworx and COE AutoCAD add-ons. With a 360° horizontal field-of-view (FOV), 270° vertical FOV, a tremendous amount of data can be collected and stored. The images alone represent >100 mega pixels of spatially rectified, true-color image data. All this amounts to a physical snap shot of conditions at that date. The data alone represents a significant milestone for a project, whether it represents the beginning, middle or end.

Please contact us for further information

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