

Tunnel Scanning by Vehicle in Finland

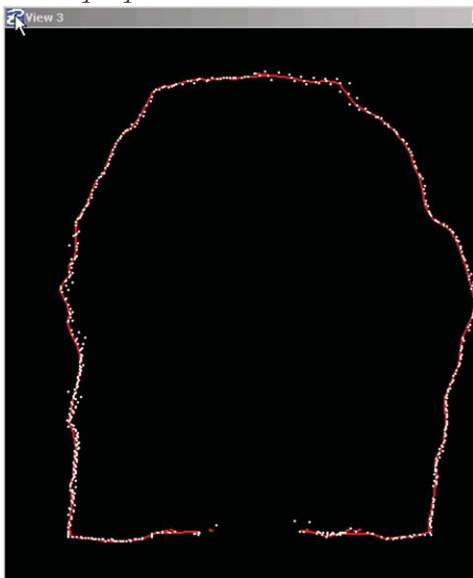
Terrasolid Ltd. in co-operation with AL-Engineering from Finland has carried out several surveys of railway and road tunnels in Finland in 2006. All the tunnels are excavated in rocky base and therefore their shape is irregular. Due to continuous traffic the survey must be done very quickly at night times and weekends.

A vehicle based, continuous laser scanning was selected for survey method. The scanner – developed by AL-Engineering – was mounted on the roof of a van. PCs and all other electronic were installed inside the car. In railway tunnels the car was placed on a wagon.

The survey speed varies from 3 to 5 km per one hour. In tunnels, where the survey distance is typically 10 m or less, the point density was 10...20 cm. In some parts the tunnels were so wet that not reflections was detected. Such places were surveyed later on by a 3D terrestrial scanner and the results were combined to the point clouds from the vehicle scanner.

The most difficult part of the survey is to determine the location of the moving vehicle. The simplest way for positioning is to bound the location of the vehicle to the 3D alignment line of the centerline of rails if such exists. Another possibility is to use two robot total-stations, which are following the moving survey system. The AL-Engineering survey system measures and records only the rotation angles of the scanner to determine its internal position. Therefore any expensive IMU system is not needed. However after the experience the results are really good.

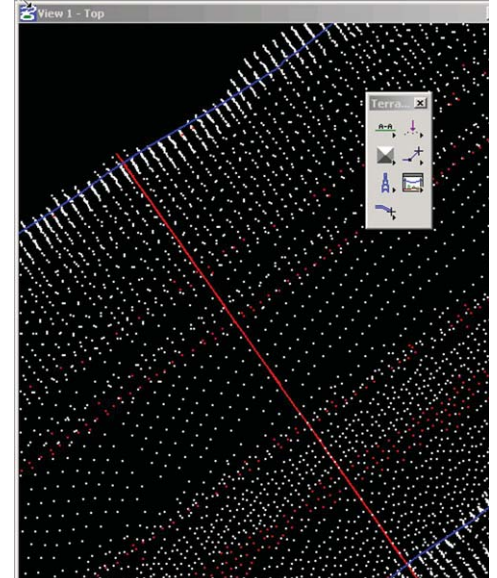
After pre-processing the data is read-in by TerraScan. TerraScan can create vectorized elements from laser points for design and control purposes.



TerraScan can create vectorized elements as sections from laser points.



These sections are useful aid for designing and controlling the shape of the tunnels.



The point density is 10..20 cm.



The vehicle scanner from AL-Engineering is very robust, advantageous to purchase and easy-to use.

For any further information,
please contact Terrasolid.

 **Terrasolid**

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