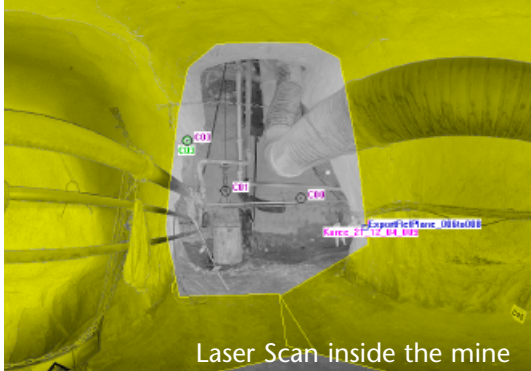


THE MEASURE OF SUCCESS

## Going underground; mining in South Africa

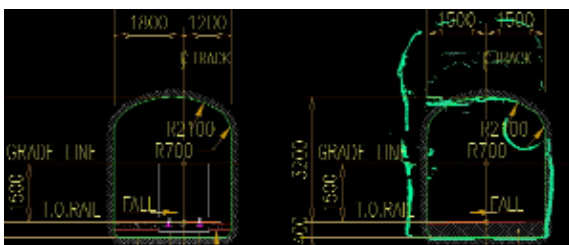
In confined, enclosed environments the advantages of a phase shift scanner really come into their own. The compact and robust nature of the Laser Scanner LS enables the tough conditions inside tunnels and shafts to be rapidly scanned. In South Africa the scanner has already been used extensively in mining. Scanning at a rate of 120,000



Laser Scan inside the mine

points per second a scan of 28 million points is complete in approximately 4 minutes. Multiple scans can be rapidly completed and later referenced together thereby minimising disruption to the mine. The application is simple. Profiles of the tunnels can be taken and evaluated to assess the tunnel profile and quantity of rock extracted. Mining firms often pay contractors on the basis of the amount of rock removed when excavating new tunnels so extracting

too much rock proves unnecessarily expensive. Alternatively if too little rock is removed the tunnels will be too small to allow equipment to be installed. So precision is essential. The +/- 3 mm accuracy of the Laser Scanner LS allows scans to be taken within the tunnels themselves and registered together using specific reference spheres. Surveying of these spheres allows the point clouds to be aligned precisely within the mine geo-reference coordinate system This creates a 3D point cloud environment accurately detailing the internal form of the mine. Bolts are sometimes shot into the roof of the mine to increase stability. Examining the position of the bolts in the point cloud makes it easy to confirm the bolts have been correctly spaced. Should there be a collapse in the mine the scanner can be used to document and assess the stability and new form of the tunnel. Slices generated from the point clouds create cross sections each displaying a profile of the internal tunnel surface, which then can be exported into most CAD software packages. Using these CAD packages the profiles can be positioned over the original plans and a comparison, as shown below,

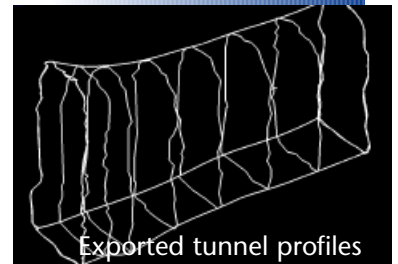


between the idealised tunnel drawing and the actual tunnel profile highlights any deviation between plan and reality. The cross sections can also be positioned relative to one another allowing a CAD model of the tunnel profile to be constructed. Using the CAD model of the internal form of the shaft accurate calculations for the quantity of concrete required for lining the mine can be made. By applying the correct thickness and form to the tunnel minimum resources are used providing the best results. Through this practical in-depth analysis of the mine repeat scanning can always ensure that the mine is performing to its optimum, and that any differences between the actual tunnel and the design drawings can be corrected or accounted for as quickly as possible. This means that equipment can be installed in the mine without encountering unforeseen problems.

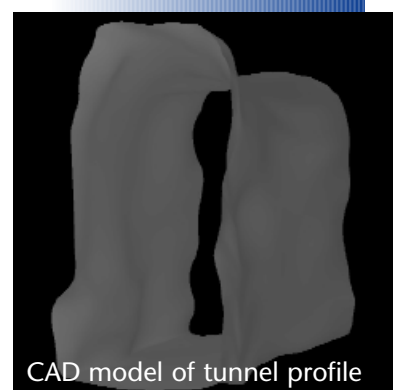
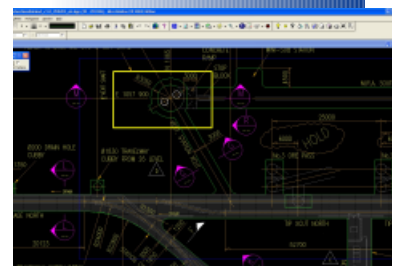
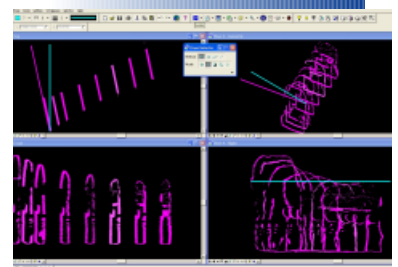
With more than 7,500 installations and approximately 3,800 customers globally, FARO Technologies, Inc. (NASDAQ: FARO) and its international subsidiaries design, develop, and market software and portable, computerized measurement devices. The Company's products allow manufacturers to perform 3-D inspections of parts and assemblies on the shop floor. This helps eliminate manufacturing errors, and thereby increases productivity and profitability for a variety of industries in FARO's worldwide customer base. Principal products include the FARO Laser ScanArm; FARO Laser Scanner LS; FARO Gage and Gage-PLUS; Platinum, Digital Template, Titanium, Advantage FaroArms; the FARO Laser Tracker X and Xi; and the CAM2 family of advanced CAD based measurement and reporting software. FARO Technologies is ISO 9001 certified and ISO-17025 laboratory registered. Learn more at [www.faro.com](http://www.faro.com).



Profile viewed in FARO Scene



Exported tunnel profiles



CAD model of tunnel profile

FARO EUROPE Ingersheimer Straße 12 D-70499 Stuttgart

[www.faro.com](http://www.faro.com)

Registergericht Stuttgart  
HRA 13211  
UST-ID-Nr.: DE 201407206

Geschäftsführung:  
FARO Verwaltungs GmbH  
vertr. d. W. Scharbach / S.Buss

Deutsche Bank AG Stuttgart  
Kto.: 163020100 BLZ: 600 700 70  
S.W.I.F.T.-Code: DEUTDE33

Tel.: +49 (0) 711 22 22 4-0  
Fax.: +49 (0) 711 22 22 4-44  
info@FaroEurope.com