TUNNEL EXCAVATION SURVEYING WITH HANDHELD SCANNER SYSTEM

The very first employment of the photogrammetric tunnel scanner system in the year 1998, and the introduction of the laser scanning technology in 2003 were milestones of the tunnel surveying development. Today the requirements in tunnel construction only allow shortest interruption at the tunnel face.
The dibit handheld scanner system has been developed to comply with these short timeframes: SMALL-SIZED – LIGHTWEIGHT – MOBILE – FAST.

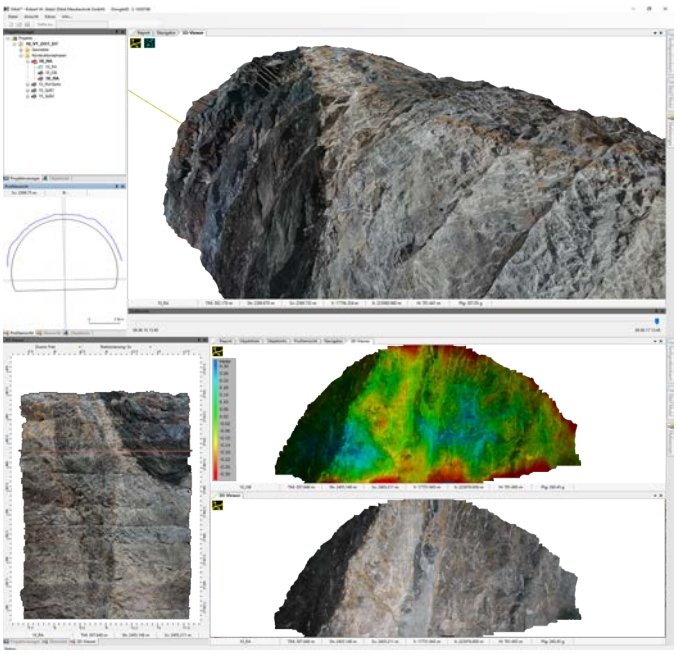
The system is based on a consumer digital camera, and has been developed with our know-how in photogrammetry, laser scanning and traditional survey. Equipped with a lightweight tripod, easy handling enables the mining crew, foremen or geologists to scan the excavated area around the tunnel face. Wireless and instant transfer of the images to a tablet enables the user to map all geological observations directly and spot-on into the true-color tunnel face picture.




APPLICATION

Excavation Scanning

- ☐ analysis of excavation using dibit software
- ☐ profile check of the excavated perimeter
- ☐ quantity survey of geological overbreak
- ☐ profile check of the initial shotcrete layer
- ☐ determination of actual shotcrete thicknesses
- ☐ documentation of installed support measures
- ☐ recording tunnel face
- ☐ export of tunnel face data for further use in special geological software
- ☐ true-color image documentation
- ☐ geological mapping



Geology-Tool

- ☐ digital, geological documentation
- ☐ mapping of geological observations on true-color tunnel face picture
- ☐ processing of object-polydata into the geo-referenced, high-resolution 3D model
- ☐ measurement of lengths and areas of geological objects

DIBIT TSC - TUNNEL SCANNER HANDHELD FSC 5100 SRsF1

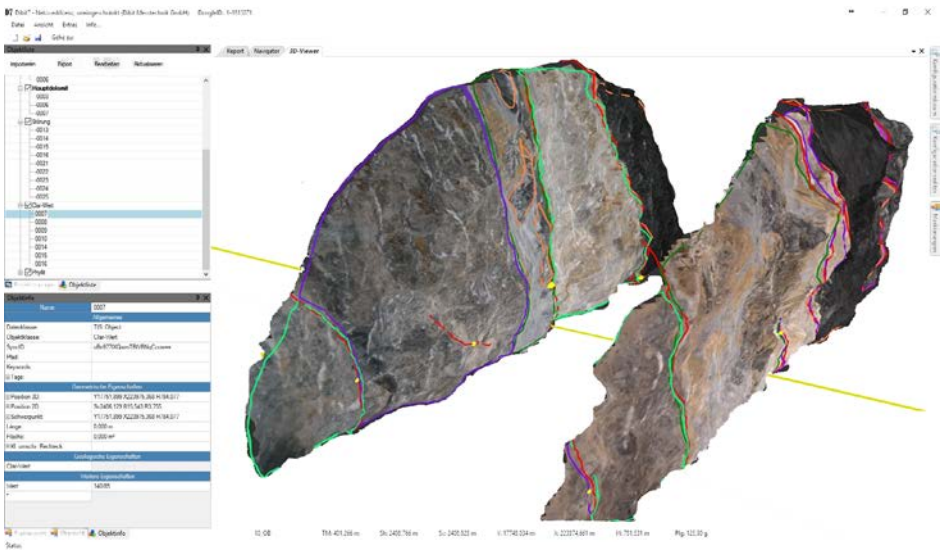
TECHNOLOGY

Our years of experience in the field of tunnel scanning technology revealed the importance of highest mobility of the scanner system, to implement quick and efficient surveys. For this reason we reduced our scanner hardware to a minimum – a high-resolution, digital color camera.

The dibit handheld scanner system FSC 5100-SRsF1 is optimized for comprehensive surveys of tunnel drives, especially of excavation. The combination of the high-resolution digital color-camera and efficient processing software enables the implementation of tunnel scans at the tunnel face with highest possible mobility. The complexity of the system has been shifted from the hardware into the processing software.

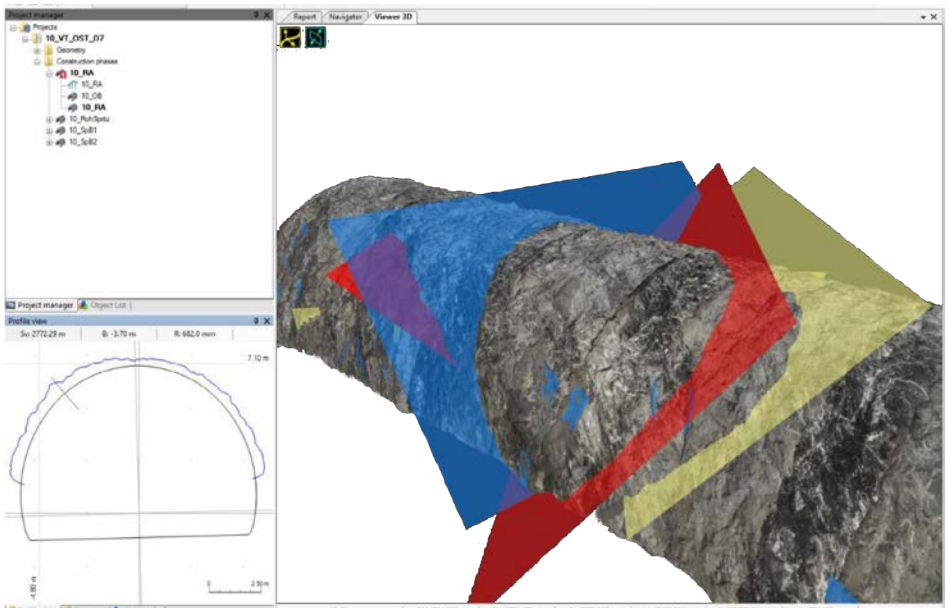
TECHNICAL DATA

- ☐ monoscopic photogrammetry-system
- ☐ digital color-camera with fisheye lens, extrem wide-angle field of view
- ☐ 16 megapixel, contrast ratio 1 : 4096 (12 bit)
- ☐ recording distance from 1 to 20 m
- ☐ absolute measurement accuracy ± 10 mm
- ☐ true-color and high resolution up to 1 mm
- ☐ set up and measurement time at the tunnel face are reduced to 2 minutes



RESULTS

- ☐ comprehensive true-color 3D model
- ☐ cross sections
- ☐ contour maps
- ☐ ortho-images
- ☐ volumes of overbreaks and shotcrete-layers
- ☐ areas, lengths and distances of geological objects, i.e. joints and faults
- ☐ clar-value calculation of planes



ADVANTAGES

- ☐ highest mobility and easy handling
- ☐ very short recording time
- ☐ high profile precision ± 5mm
- ☐ high-resolution documentation of excavation and geological conditions with color-images
- ☐ representative presentation of geological and geotechnical structures