

# TUnIS Navigation Double Shield

TUnIS Navigation Double Shield is a navigation system specially designed for Double Shield TBMs. Based on a total station and a target unit, mounted inside the TBM shield, the navigation system determines the actual TBM position.

In addition, the system has appropriate sensors and software modules that are tailored to the particular conditions of use. For this purpose, a laser target is mounted in the gripper shield of the TBM along with a measuring camera, which is aligned to a set of marker plates in the front shield.

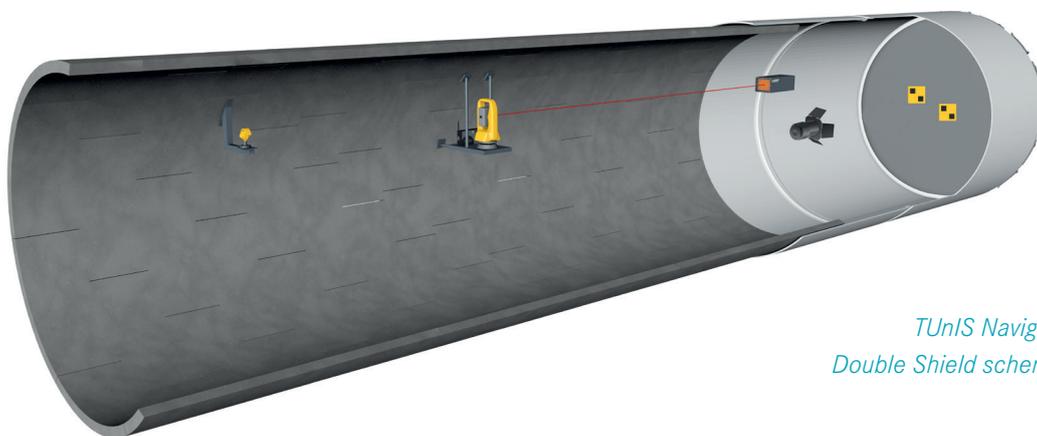
The system provides complete documentation of the shield run in a database. Based on this information, data may be prepared, for example in the form of reports, data exports (CSV, XLSX) and others.

All hardware components are designed for the demanding use in the tunnel. A visible laser beam (class 3R) from the total station to the laser target is used to determine the position of the gripper shield. The measuring camera identifies the marker plates and determines the position of the front shield at a high frequency.



## Benefits

- ▣ Real-time determination of position for all machine parts
- ▣ Space-saving installation of the components due to the active laser target and compact measuring camera
- ▣ Permanent determination of position of the TBM even when visual contact with the total station is interrupted, such as during ring building
- ▣ Easy handling of relocating the total station minimizes working time



*TUnIS Navigation  
Double Shield schematic*

The visualization can be used to analyze the machines' drift, which can be used to compensate the steering and in ring selection. A significant assistance offers a TUnIS software routine for automation and reporting the relocating the total station. This procedure is of big advance especially in machines with limited or small laser windows as even at short-time interrupts of the laser beam it is possible to calculate the position and indicate it to the machine driver continuously.

Another mode of visualization is the display as "Track Chart" which shows all calculated positions of the Gripper shield.

## TUnIS Navigation Double Shield

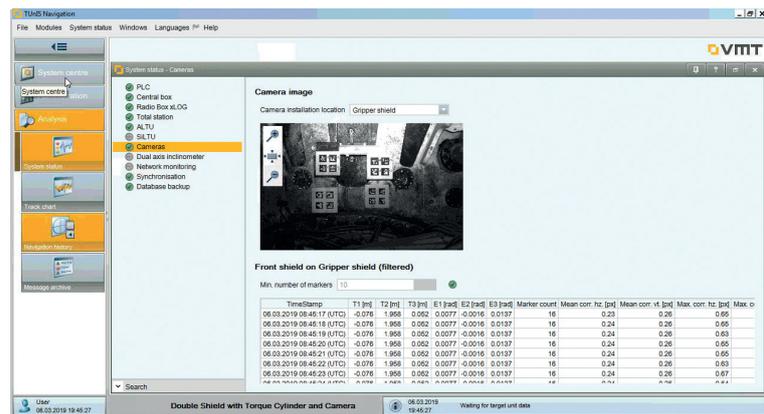
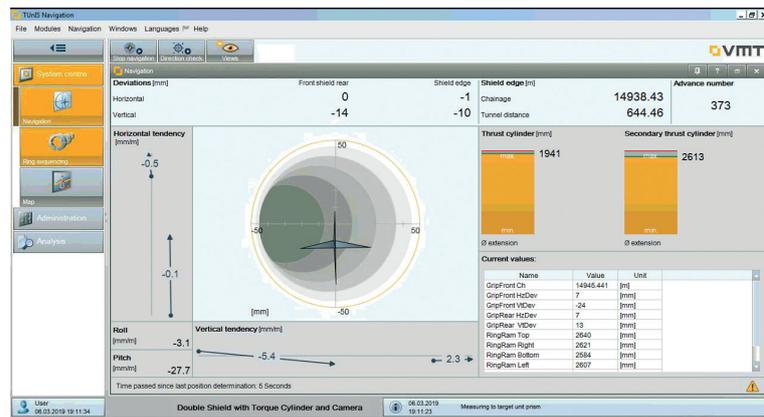
The high information content of the data displayed ensures optimum control of the machine position and thus helps to maintain a uniform shield run with small deviations from the tunnel axis. The position and tendencies are continuously displayed to the shield operator.

### Features

- Field of application: Large tunneling with Double Shield/TBM
- Precise automatic calculation of TBM position
- Continuous and permanent visualization of positions
- Calculation for all machine parts including gripper shield and tailskin
- Control of roll differences from gripper- to front shield
- Software routine for relocating total station
- PLC connection for various types/producers

### Advice and competence from VMT

We do not leave you alone for the configuration, installation and operation of TUnIS Navigation Double Shield. We offer you competent support against the background of our 25 years' experience in more than 2,000 successful tunnelling projects.



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