

# TUnIS.moving station Assistance System for laser/target-based navigation system in tunnelling

- ▣ Efficient use of specialist labour
- ▣ Material-saving tunnelling
- ▣ Increased occupational health and safety

## TUnIS.moving station

TUnIS.moving station is an assistance system that enhances a laser and target-based navigation system in tunnelling. With TUnIS.moving station, the total station is not mounted on the tunnel wall, but travels on the gantry of the TBM.

Three prisms installed on the tunnel wall and an active electronic laser target in the shield of the TBM are used for exact determination of position. In the first step, the exact current position of the total station is determined using the prisms. In the second step, the current position of the laser target is determined and thus the position of the TBM.

During ring building, the system determines the coordinates of the total station (free stationing).

The total station is moving during the advance. In this phase, the TBM position is determined with the help of the assistance system **TUnIS.track assistant**.

If the total station moves too far away from the rearmost prism installed on the tunnel wall, this is removed by the site personnel and moved forwards ahead of the other prisms. As there are still three prisms present with their positions precisely determined, the system can automatically remeasure the prism moved. No surveyor is required for this. With continuing advance, this process is repeated cyclically.



### Benefits

#### Efficient use of specialist labour

The surveyor no longer has to continuously accompany the advance on the machine, as the recurring modification of total station and console is no longer necessary. This leaves more time for working on other activities.

#### Material-saving tunnelling

Since heavy total station consoles are no longer required, the segments remain undamaged. The prisms can be attached quickly and easily.

#### Everything in view, regardless of radius

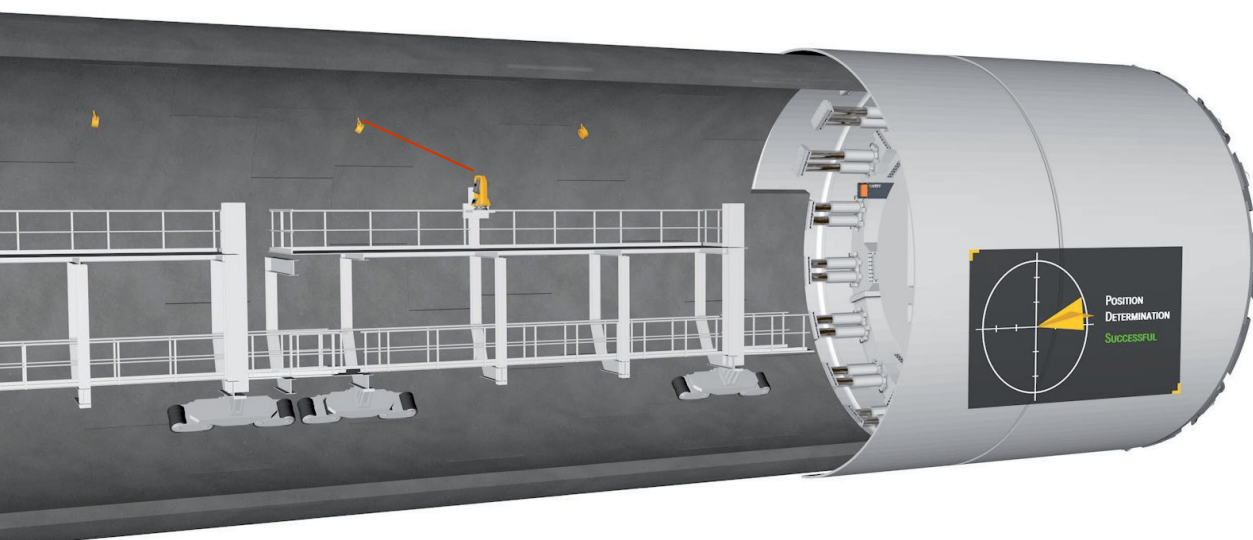
Because the total station is permanently mounted on the gantry, tight curves can be driven – without loss of sight.

#### Increased occupational health and safety

Simplified assembly, remote control of the tachymeter via TUnIS.mobile app and reduced danger of looking into the laser beam all ensure better occupational health and safety.

#### Optimal flexibility

Switching between TUnIS “main system” and “moving station” navigation modes is quick and easy.



**TUnIS.moving station** determines and calculates all data and information that is necessary for navigating the TBM along a tunnel axis. 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. This allows vertical or horizontal curves to be easily and precisely controlled.



“The advantages of the system can be accredited mostly for improved time efficiency resulting in cost saving.”

Roy Behrend, BAM Nuttall, Morgan Sindall, Balfour Beatty Joint Venture



- ▣ Total station at the front of first gantry
- ▣ Mounted on top of self-leveling tribach
- ▣ Short distance to laser target and shield



- ▣ Prisms glued on the segment
- ▣ No need for drilling and no risk of damages



- ▣ Easy handling of TUnIS Navigation system thanks to smart-phone TUnIS.mobile app
- ▣ Measurement of new backsight prism from a safe place next to the total station

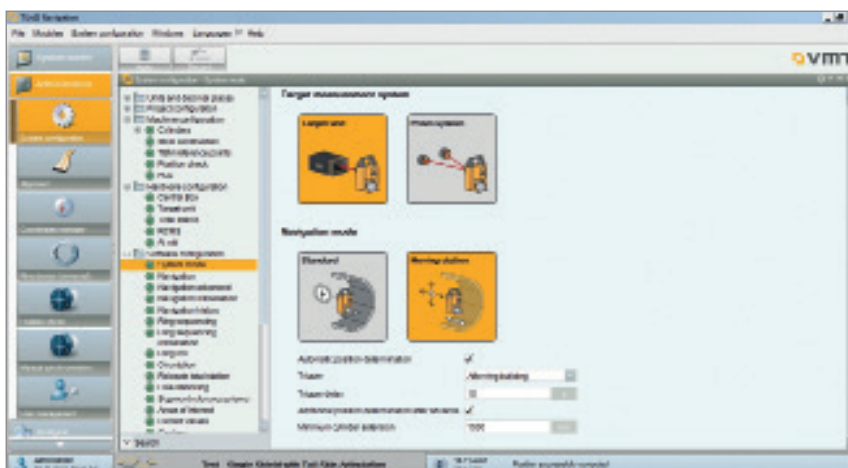
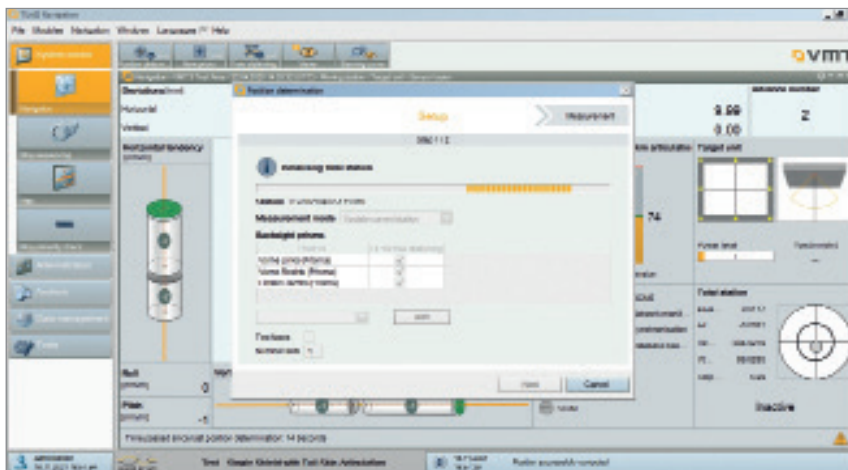
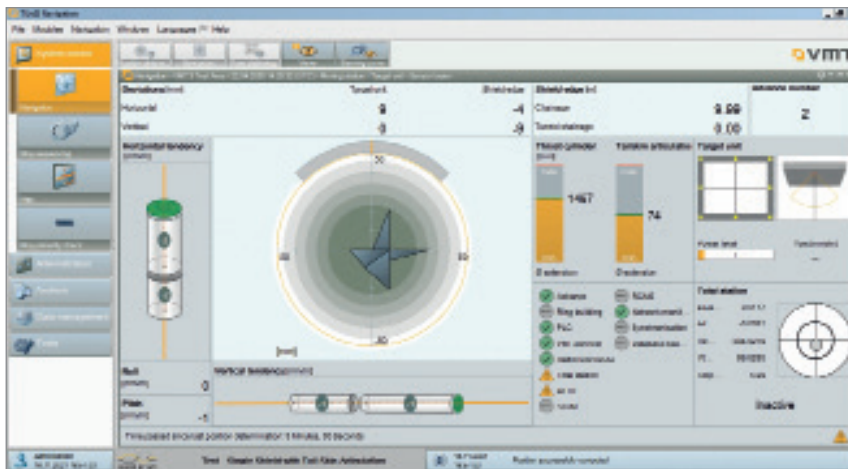


- ▣ View against direction of drive
- ▣ Total station at the front of the first gantry inside the laser window



## TUnIS.moving station

### Screenshots of TUnIS Navigation – the common software platform for all VMT navigation systems



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