



# Tunder

Tunneling design, execution & reporting

A BIM interoperable platform for integrated design, construction and management of tunnels

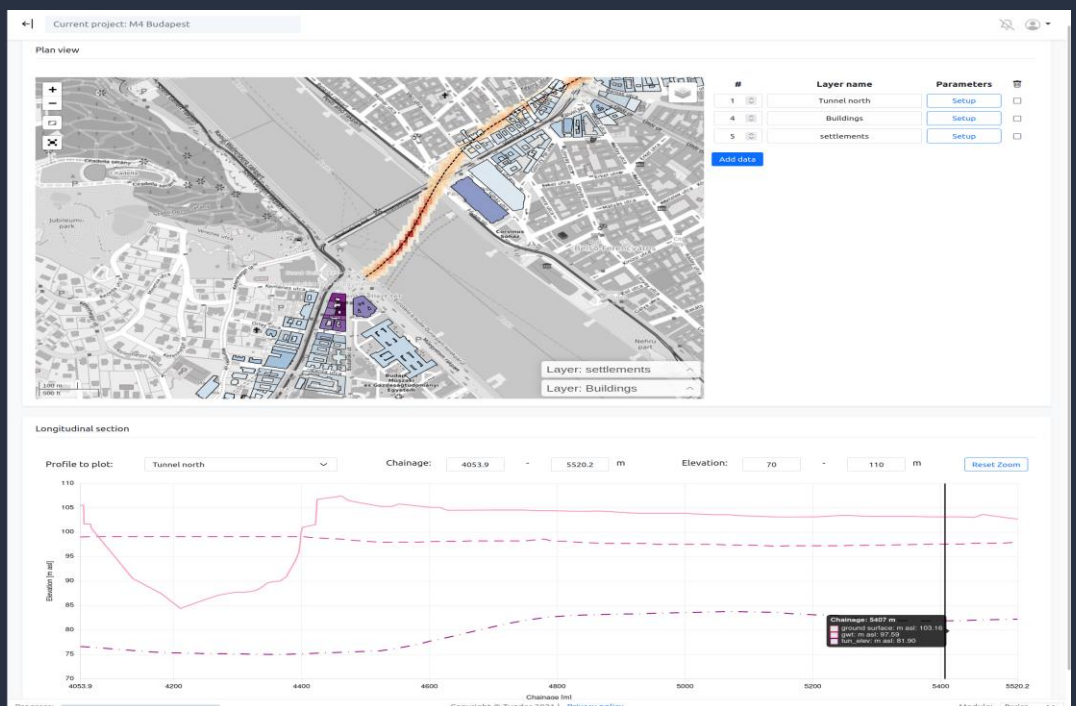
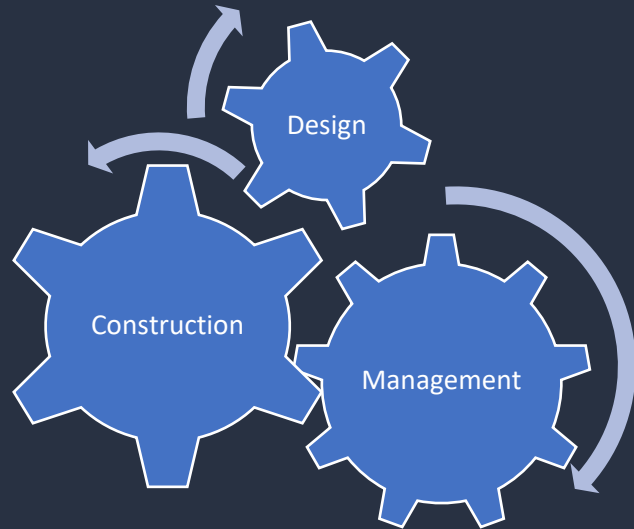


Tunneling is a complex process that involves various subjects and an intensive overlapping of activities. Decision making at the different levels is often made difficult by partial knowledge, a cumbersome transfer of information, lack of common standards, misunderstanding that turn out into a lack of efficiency, delays and extra costs for the entire organization. Building Information Models (BIM) methodology is progressively more incorporated into civil engineering projects to perform data analysis and system integration and help making the best strategic business choices

The proposed software, designed to work in a GIS environment, aims to standardize processes, provide operators with the most aware, complete and updated overview of the whole process, assist them with innovative solutions, cut distances, speed up communication. It consists of a platform where the different phases of the mechanized tunneling process are interconnected to maximize the use of information, avoid misunderstanding and speed up operations.

The software is articulated with three modules to be used singularly or combinedly: management, design and execution, each equipped with specific tools that boost the efficiency of operators.

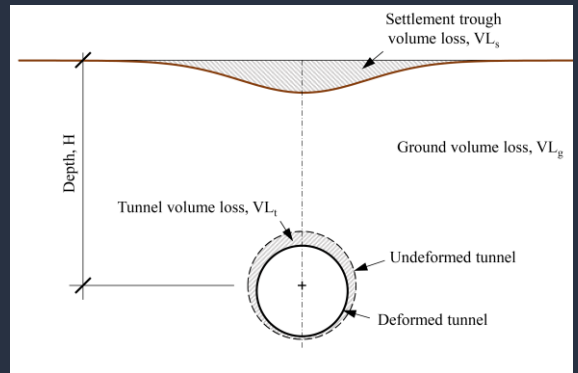
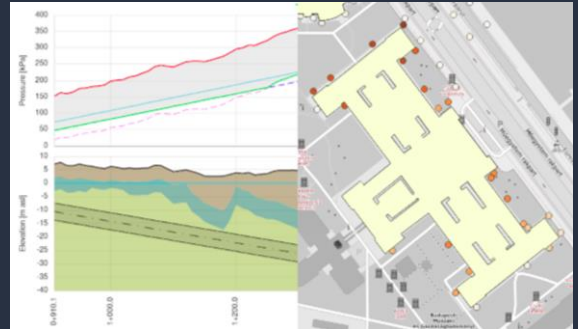
Intuitive and user-friendly interfaces speed up learning. Output in the forms of reports is created and exchanged among phases with a unified format compatible with BIM standards.





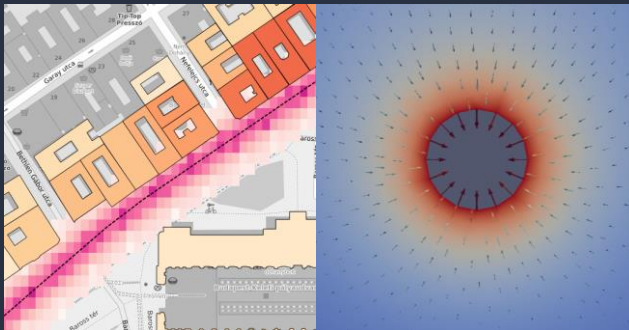
## DESIGN

- Incorporate geological layout and site investigation (i.e. boreholes, sounding profiles) to assist geotechnical modelling and water table positioning.
- Easily assign geometrical and mechanical properties of the tunnel and select the excavation technology
- Assess ultimate and serviceability limit state conditions for mechanized tunnelling:
  - face stability (face and tail void supporting pressure, compressed air pressure)
  - buoyancy check
  - calculation of required cutterhead torque
  - face pressure calculations for serviceability assessment (ground deformations for target volume loss with reference to the face pressure)
  - surface and subsurface ground deformations assessment of building damage categories.
- perform 2D automatic Finite Element Method analyses on selected cross sections
- Reporting



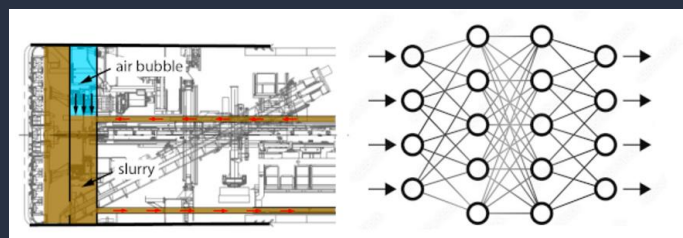
## CONSTRUCTION

- provide reference parameters for mechanized excavation firstly based on literature indication, then with a feedback adjustment based on interpretation of monitoring with Artificial Intelligence (Artificial Neural Network)
- Render the construction progress
- Real time monitoring and database creation of
  - Surface and deep topographic variables;
  - Environmental monitoring;
  - Structural monitoring above ground level
  - Excavation machine parameters
- Daily quantification of activities
- Reporting

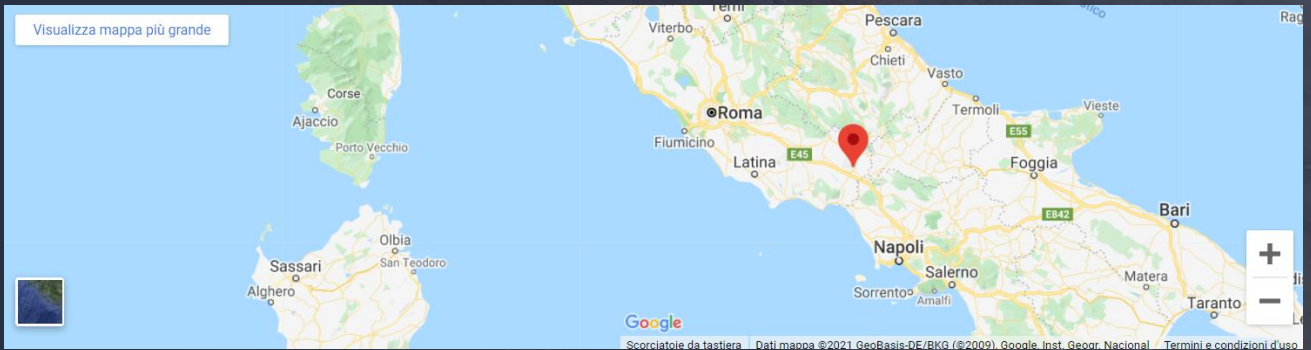


## MANAGEMENT

- Access to BIM databases
- Real-time survey of design and construction
- Archiving of documents
- Project visualization



# ADVANCED GEOTECHNICAL SOLUTIONS



Tel: +39.3298325704  
Mail: [modoni@unicas.it](mailto:modoni@unicas.it)

Viale Dante Alighieri 110  
03040 Cassino (Italy)

[www.ageosol.it](http://www.ageosol.it)