



*Mark R. Wijngaarde*

## **The SOFIA metro extension project, Bulgaria**

During his stay in Sofia, February 2009 the Dutch CLGE delegate and Special Envoy in the CLGE European Enlargement Policy, Mark R. Wijngaarde took the opportunity to go underground to visit the development of the metro extension project under the centre of Bulgarian capital Sofia. Mark was invited to this subterranean adventure by his Bulgarian colleague and CLGE delegate Ivan Andreev, who is the chief surveyor of this project.

The project starts from the city centre at the Metrostation 7, exactly in front of the house of the Bulgarian president and will extend the existing metroline, which starts at the west side of Sofia at the chainage of 8+043. The project will end at the chainage 10+340, the metro station 9, close to the University of Architecture and Civil Engineering.

The metro will then connect the west part of Sofia with the south-east part and only four stations are still needed for the city to be connected to the International Airport. This will be very important for the infrastructure and transport to and from the airport.

It was decided to make one tunnel tube for each line with a diameter of 5,20 meter, that means from one point to the next (A-B) there are two tunnels, one for the outgoing metroline and one for the incoming line. The main contractor is the Taisei Corporation of Japan, an internationally well known corporation specialising in tunnel construction in subterranean and also in mountainous regions.

For all geodetic survey work Geosolve Plc Bulgaria was subcontracted, with Ivan Andreev and his staff of 6 full time surveyors and 2 half time surveyors, managing the daily surveys with accuracies of less than 10 mm for planimetry and altimetry.

The method of construction is the TBM method, the Tunnel Boring Machine. This is a method where the machine excavates 1,4 metres and then the cement tubes are installed and the voids in the tubes are filled with cement immediately after their installation.

The total project includes the construction of 3 metrostations, 2 ventilation shafts, and 4 tube tunnels with an approximate length of 3500 m.

The Municipality of Sofia is the local authority who has commissioned this technical state of the art metro project

This metro project started in November 2004 and is scheduled to be finished in September-2009 CLGE delegates, at the CLGE GA in Sofia, will be able to enjoy this new innovation in a historic, ancient and attractive capital city.