Hytera TETRA Connects Continents
Mobile Radio System for Rail Connection between Asia and Europe

User
Istanbul Marmaray Metro and Railway, Turkey

Market segment
Tunnel

Project time
2013

Products
Hytera TETRA Solution
Mobile radio system ACCESSNET®-T IP
2 IPN switching nodes
38 DIB-500 base stations
Approx. 350 PT580H mobile stations

Solution features
• Powerful TETRA mobile radio system for voice and data communication
• Network management system
• Gateway to PABX/PSTN
• Extensive redundancy functions
• Integration of external applications
• Robust mobile radio connections underground as well as in buildings

DIB-500   IP Node

NMS

ACCESSNET®-T IP for the Project of the Century ▶▶

Based on its unique location between the two continents Asia and Europe, the million-strong metropolis Istanbul occupies a central role in politics, economics, and history. The Bosporus straits divides the city into the Asian and the European part.

For the first time, the ambitious traffic project Marmaray connects the two sides of Istanbul by a tunnel underneath the Bosporus. The extremely high traffic volume in the city of Istanbul and particularly across the Bosporus straits is significantly reduced through the new rail connection. In only a few minutes, up to 1.5 million people can pass under the Bosporus every day with the fast train connection.

For the railroad line with an overall length of more than 76 km and the high traffic volume, the railroad operator requires a reliable and independent voice and data communication. Our innovative TETRA mobile radio system convinced the integrator SISTEM S.A., so that we were employed in 2012 to implement our mobile radio system ACCESSNET-T IP for the entire railroad line of the Marmaray project.

A solution that succeeds ▶▶

In addition to building the 1,387 m long railroad tunnel under the Bosporus, the existing railroad network, which runs from Halkalı in Europe up to Gebze in Asia, was replaced and expanded in the framework of the Marmaray project. For a smooth and trouble-free railroad operation as well as the safety of the railroad passengers and the train personnel, our TETRA mobile radio system offers the radio subscribers of the Turkish National Railroad (TCDD) the optimum work equipment.
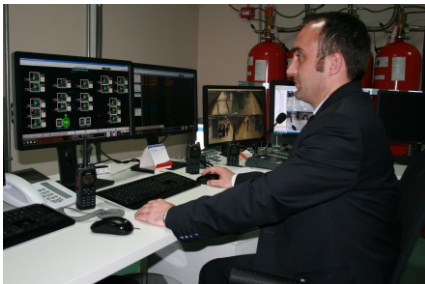
Our TETRA mobile radio system supports the classic personal mobile radio as well as the disposition mobile radio, i.e. the communication between trains and control centers. Additional features of our system are the automatic login and logout of the individual trains to and from the system, the passenger emergency call from the train as well as the automatic transmission of diagnostic messages of the trains to the central control.

Our TETRA mobile radio system masters the special requirements imposed by the boundary conditions of the project without any problems. Roughly one-third of the entire railroad line is supplied with mobile radio underground without any restrictions. Comprehensive reliability, high flexibility as well as a minimum bandwidth demand also distinguishes our solution.

Our solution in detail

For the mobile radio system in the Marmaray project, we implemented an individually tailored ACCESSNET-T IP network. For a continuous mobile radio supply, we installed two base stations inside the railroad tunnels, 27 base stations above ground as well as eleven indoor base stations for supplying the railroad stations. Due to varied redundancy functions, the TETRA mobile radio system is perfectly secured against breakdowns. Even under extreme conditions, such as the breakdown of entire locations, the entire mobile radio system continues to remain reachable and the performance is maintained.

The individual trains are directly connected with the mobile radio system using onboard units (OBRUs). A total of 110 of these OBRUs from ErvoCom are used for voice communication and transmit all types of different pieces of information in the Marmaray project via our TETRA mobile radio system. Extensive applications offer varied and user-friendly functions. The integrated network management enables a central and convenient network monitoring as well as fast fault diagnostics and remedy from the workplace. The "Radio Ground Server" application enables an upload of diagnostic messages to the maintenance management system using SDS messages. An external train dispatcher system with integrated voice recorder from Thales Deutschland ("Norumat") is used by our TETRA mobile radio system for effective data transmission. Own and external applications are efficiently integrated via our multifunctional ACAPI interface.

Highlights of our solution

• Very flexible, individually tailored TETRA mobile radio system

• High redundancies of the system components for maximum reliability

• Extensive functions through integration of various applications

• Simple integration of external applications using our multifunctional ACAPI interface