Istanbul Metro

Going underground in Istanbul

COBHAM

Case Study

The most important thing will build is trust

Overview

Commissioned by Istanbul Transport - the public enterprise that operates the railway network - in 2008/2009, AIR Telecommunication Solutions worked with Cobham Wireless to provide public safety underground coverage for TETRA, police and fire networks to a proportion of the tunnels and stations.

Challenge

The Istanbul metro is the world's second-oldest subterranean urban rail line after the London Underground. The Metro includes 58 stations that are in service, with another 23 currently under construction and all locations require a robust wireless communication network suitable for the busy public.

The Challenge

The Istanbul Metro is the underground rail network that serves the city of Istanbul, Turkey and its oldest line was opened in January 1875. This makes it the world's second-oldest subterranean urban rail line after the London Underground. The Metro includes 58 stations that are in service, with another 23 currently under construction.

Commissioned by Istanbul Transport - the public enterprise that operates the railway network - in 2008/2009, AIR Telecommunication Solutions worked with Cobham Wireless to provide public safety underground coverage for TETRA, police and fire networks to a proportion of the tunnels and stations.

In underground locations like this one, heavily used by the public, robust wireless communication networks are crucial for the provision of continuous communications during emergencies. However, with new standards and regulations changing the public safety network landscape, the technology that is chosen has to continuously evolve to keep pace.

AIR
İletişim Gerektiğinde

The Solution

To meet the high reliability requirements of the Istanbul Metro system, Cobham Wireless employed a DAS (distributed antenna system). Using this method, the metro system required 4 fibre-optic master sites (using Cobham Wireless' latest Optical Master Unit, or OMU II) and 11 remote units. Each remote unit is placed at an underground station, connected through optical fibres. Leaky feeder cables then run form the remotes, providing coverage inside the tunnel itself.

Fibre-optic DAS systems in public safety networks overcome the challenges of underground locations by leveraging usability and flexibility. The use of these repeaters allows base station coverage to be boosted and extended over great distances to remote locations; removing the issues associated with continuous communications underground.

Optical Master Unit (OMU)

A reliable public safety system must continue performing despite any failures to the system itself. This problem is solved by providing overlapping coverage underground. Each base station is configured to feed several repeaters, and overlapping coverage exists between two adjacent repeaters. If a repeater fails, the repeater sited next to it will carry on providing coverage.

Additionally the system has a dual fibre feed to each remote location. This means, that if one master site location fails, or if the fibre-optic cable becomes damaged, the remote repeater will switch its feed to the other master site. As a result, the system has both overlapping and dual fibre-optic feed redundancy. The requirement for critical resilience, ensuring that there are no coverage black spots for the emergency services, is of vital importance.

The system installation was strong, yet flexible, allowing the secure handover of RF communications from one unit to the next, should a base station or repeater suddenly be damaged or destroyed during a crisis. This ensures the emergency services receive continuous coverage in an enclosed and potentially hazardous environment.

The Benefit

Fully redundant network - As a fully redundant system if any part fails the system will continue to run through overlapping coverage between stations. This comprehensive wireless system meets stringent safety standards, as the network is underpinned by an automatic single level control, which is integrated in the system, so in the event of any failures the signal will still be carried.

Easy to extend – Providing radio frequency over fibre makes the network flexible to upgrade and offers the ability to add to the network when expansion is needed.

Future-proof solution – Cobham Wireless' technology is flexible and adaptable, providing public safety operators with the flexibility to specify and change sub-band allocation providing an easier path to new standards in the future.