Istanbul LRT

Helping to keep the Istanbul light metro system safe

Case Study

The most important thing we build is trust

Overview

Working with AIR Telecommunication Solutions, Cobham Wireless was commissioned to provide public safety coverage for police and TETRA networks to the stations and onboard the trains themselves, on the Aksaray-Airport metro line.

Challenge

The Istanbul LRT is a light metro system spanning 32km, with 10.4km of it underground. The system consists of a total of 40 stations and transports over 300,000 passengers a day. The technology used needed to be able to continuously evolve to keep pace.



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Where a deployment involves locations that are so heavily used by the public, robust wireless communication networks are crucial for the provision of continuous communications during emergencies. Emergency services must be able to communicate both at stations and even onboard the trains themselves and will expect a fully redundant, un-interrupted service, 100% of the time. With new standards and regulations changing the public safety network landscape, the technology that is chosen has to continuously evolve to keep pace.

The Solution

To meet the high reliability requirements, Cobham Wireless employed a DAS (distributed antenna system). Using this method, the rail system required two fibre-optic master sites (using Cobham Wireless' latest Optical Master Unit, or OMU II), two off-air repeaters and seven remote units.

The off-air repeaters take the signals from outside the trains, and feed them into the vehicles, providing public safety coverage onboard the trains running on the network. Cobham Wireless' public safety off-air repeaters are based on patented DSP (digital signal processing) technology and use a unique and industry leading SDR (software defined radio) architecture. They provide operators with an almost infinite number of possibilities for filtering radio channels and other blocks of RF spectrum.

The remote units are placed at the stations on the network, and connected through optical fibres back to the master sites.

Fibre-optic DAS systems in public safety networks overcome the challenges of locations like this 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 in tunnels, on tracks and even onboard the trains themselves.



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. 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, repeater or cable 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.

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