

AIRadio Uses Rajant Kinetic Mesh[®] Network for Istanbul's M8 Metro Line



Istanbul, Turkey, is a vibrant and dynamic modern city that seamlessly blends its rich history with a thriving arts scene, a bustling culinary scene, and a modern transport network. The Istanbul Metropolitan Municipality (IMM) has been working to improve internet access by expanding free public Wi-Fi networks across the city, including its metro lines of the Istanbul Metro, to provide seamless connectivity for commuters.

The Istanbul Metro, a rapid, underground transit railway, opened its first line in 1875 is still serving as one of the oldest subway lines in the world. Hosting 757,971,355 passengers in 2022, Metro Istanbul carried the population of Istanbul approximately 47 times. In 2022, Rajant Corporation's partner, AIRadio Middle East FZE (AIRadio), participated in IMM tender to provide high-speed on-board Wi-Fi internet access for the M8 metro line. The M8 metro line opened in January 2023 and is fully automated.

The Challenge

The M8 metro line, which carries over 40,000 passengers per day and includes 13 stations, runs in two parallel ~14.3km underground tunnels (total ~30km) with trains traveling at speeds more than 80km/h. The IMM required an average throughput of 250Mbps for each of the ten trains operating on the M8 line to achieve reliable commuter Wi-Fi. This meant the network architecture had to be capable of potentially delivering multiple Gbps of throughput.

Deploying a dedicated LTE or even a 5G network was not an option as there were several serious challenges, including CAPEX and OPEX costs, as well as technology complexity. Attempting to deploy a fully Wi-Fi-based network also faced challenges with high-speed mobility and the potential cost due to the large number of Wi-Fi APs required to handle the volume of M8's commuter traffic.

Location

- Istanbul, Turkey

Customer

- Istanbul Metropolitan Municipality (IMM)

The Partners

- **Rajant** - Pioneers of peer-to-peer radio communications enabling real-time voice, video, and data to connect machines, robots, and people together as part of a secure private mobile network.
- **AIRadio** - A Rajant Kinetic Mesh Distributor (KMD), AIRadio is based in United Arab Emirates and is a member of AIR Group, headquartered in Chicago, IL, USA. AIRadio is a premier technology company that began in 1990 and has since grown to direct offices in twelve countries and partners in over 60 countries all over the world, including the US, Africa, Europe, and the Middle East.

Kinetic Mesh Components

- Hawk FE1-5050 BreadCrumb[®]
- SlipStream XG BreadCrumb
- Rajant RCP tunnel and train antennas

Impact Statistics

- Seamless internet access for passengers with on-train average speeds of nearly 300Mbps.

The Solution

Rajant Kinetic Mesh, utilizing BreadCrumb wireless nodes, has already seen extensive deployments in support of high-mobility applications for underground and tunnel environments. Rajant Kinetic Mesh partner, AIRadio, designed a novel linear mesh network using Hawk FE1-5050 BreadCrumbs combined with Rajant RCP tunnel antennas for both trackside and on-train deployment.

The Hawk BreadCrumb is part of Rajant's initiative to develop deeply integrated solutions that securely combine data from connected people, vehicles, machines, and sensors, with machine learning. Hawk is optimized for mobility. The Hawk contains two transceivers to give high-performance data flow with enhanced security performance making it the premier choice for IoT/IloT mobility in today's autonomous networks.

The Hawk FE1-5050's dual 5GHz RF interfaces are configured to use 80MHz RF channels which enable the network to deliver extremely high average throughput to the on-board Wi-Fi APs. Trackside nodes were deployed at ~600m intervals with every second trackside node connected to backhaul fiber. This is 50% less fiber infrastructure than initially considered for the project.

On-board BreadCrumb nodes were installed at both ends of each train. To handle the multi-Gbps total throughput at the network core, the design uses the Rajant SlipStream XG BreadCrumb node which can handle LAN aggregation at speeds of close to 10Gbps.

The Results

AIRadio's highly skilled project engineers, combined with Rajant Kinetic Mesh technology, successfully implemented a high-speed wireless solution

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Thanks to the infrastructure investments made, 2.5 million passengers traveling on the metro will be able to enjoy the Internet by using it more efficiently.

— Erol Ozguner
CIO at IMM

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underground that met and exceeded the required customer average throughput per train. The M8 metro passengers can now enjoy fast and reliable Wi-Fi. This consistent and secure on-the-go connectivity provides a range of in-train communication options unmatched by other networking providers. From enabling leisure browsing activity on personal devices to more complex live video calls or streaming video-on-demand for business, all train riders enjoy the added benefit of Wi-Fi thanks to Rajant Kinetic Mesh and AIRadio, even during peak commute times when train cars are most crowded.

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We are working nonstop to encourage the people of Istanbul to prefer the railway systems more often as we continue to improve the technological infrastructure of the city.

— Nihat Narin
President, ISTTELKOM, Subsidiary of IMM

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As a truly disruptive technology, Rajant Kinetic Mesh has delivered several very large project wins for AIRadio.

— Koral Turkkan
AIRadio VP Sales and Business Development

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