

BAI Communications

Bringing the connection to our world

Transit Wireless transports the NYC subway into the digital age

Case Study

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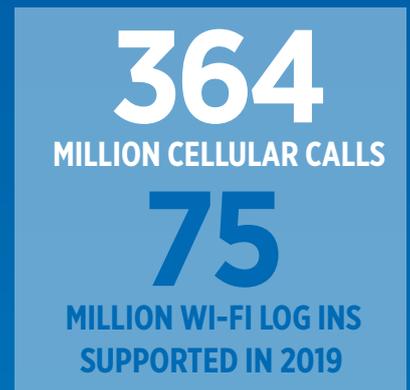
The reliable partner for connecting the New York subway

Transit Wireless, a majority-owned BAI Communications company, deployed cellular and Wi-Fi connectivity across New York's underground metro system. This included a dedicated 4.9 GHz public safety band licensed to the Metropolitan Transportation Authority (MTA).

The underground system's 5.7 million daily riders now have access to their online lives while commuting. In 2019, Transit Wireless supported more than 364 million calls and more than 75 million Wi-Fi logins on the underground, showing the popularity of the connectivity.

Key achievements:

- The project was completed two years ahead of schedule thanks to Transit Wireless's world-leading planning, design and project management skills, as well as its innovative solutions for accelerating infrastructure deployment.
- Instead of fibre being run through the tunnels Transit Wireless installed fibre in the streets to connect stations with the data centres.
- The connectivity has enabled innovative applications and services to be supported, such as passenger information systems to inform about train arrivals; Help Points for making emergency service calls or general information queries; and the potential for IoT applications to help cut the transit authority's maintenance costs and improve customer experience.



North America's largest underground connectivity deployment

The New York underground subway has more stations than any other system in the world. As part of its modernisation programme, the MTA wanted to provide mobile connectivity for passengers, its own communications and emergency services communications.

Following a fiercely competitive selection process, Transit Wireless was awarded a 27-year exclusive contract to finance, design, build and maintain a neutral-host Distributed Antenna System (DAS) and free Wi-Fi network in all 277 stations (with five new stations being added subsequently) at no cost to the taxpayer.

To deliver the project, Transit Wireless faced several challenges, the first being access. The New York City subway system operates 24 hours a day, 7 days a week. As a result, Transit Wireless construction teams could only work on a restricted schedule to limit the disturbance to the 5.7 million daily riders. Another was the environment. Despite many being underground, all subway stations are considered an outdoor environment. The communications equipment must withstand wide temperature fluctuations, water penetration from both daily, high-pressure station cleaning and precipitate weather and accumulation of steel brake dust from daily operations. In addition, the low ceilings and historic preservation areas within many stations create strict regulations on where equipment can be placed, and sometimes even how it looks.

Despite the demands of the project, Transit Wireless completed the network-wide deployment of cellular service (one year ahead of schedule) in December 2016.

By bringing Wi-Fi and cell service underground ahead of schedule, we are reimagining our subway stations to meet the needs of the next generation. This will better connect New Yorkers who are on-the-go and build on our vision to reimagine the country's busiest transportation network for the future. I thank all of our partners.

Andrew Cuomo GOVERNOR OF NEW YORK STATE

Source: "Governor Andrew M. Cuomo Announces Cellular Connectivity in Underground Subway Stations One Year Ahead of Schedule", Governor Cuomo website, 5 January 2017

A wide range of connectivity services



Transit Wireless provides cellular connectivity for the mobile operators, using their commercial spectrum bands. The network below ground is connected via the Transit Wireless fibre network to its Base Station Hotels, enabling a secure and controlled environment for hosting mobile carrier base station equipment.

In addition to cellular and Wi-Fi connectivity it incorporates 4.9 GHz connectivity for public safety users and to support more than 1,200 Help Points; a 160-mile fibre optic backbone; and five highly secure data centres.

Help Points are intercoms that enable passengers to call emergency services through the MTA's Rail Control Centre. Customers can also connect to station agents for less critical enquiries, like travel information. In addition, passengers can access E911 (Enhanced 911) over cellular through major operators: AT&T, T-Mobile, & Verizon Wireless. E911 uses location tracking support for wireless phone users who dial 911, the standard number for requesting help in an emergency.

Innovation helps achieve acceleration milestone

The original project timetable had a completion date set for late 2018. However, following a request by New York Governor Andrew Cuomo to accelerate the schedule, Transit Wireless found it had just nine months to build a third of the system's entire network; compared to the five years it had to build the previous two-thirds. This was extremely challenging, calling for Transit Wireless to substantially increase its resources to build out remaining stations, install many miles of fibre, and build a completely new data centre.

The acceleration was made possible by a meticulous phased planning approach, well organised forward-thinking design and highly efficient project management tools and capabilities. From the onset of the build, Transit Wireless has worked to anticipate the complexities involved in building and maintaining a communications network in the New York Subway, ensuring

every aspect of the system is carefully designed, safeguarded and continuously improved.

Transit Wireless employed many creative solutions throughout the accelerated push to completion, such as 360-degree photographic surveys of station interiors. They could then easily determine the best performing and least obtrusive locations inside stations for communications equipment, without the need for frequent, time-consuming site visits. This also significantly shortened the approval process, often the item with the longest lead time in a project.

Another innovation that accelerated the timetable was a special design of flexible, jacketed conduit for running power and fibre cabling. This design allowed for installation without machines to bend it to shape, as conventional conduits need. This was much faster to deploy – and halved the cost of conduit installation.



In June 2016, with 153 stations deployed, Transit Wireless received the 'Best Wi-Fi Deployment to Connect the Unconnected in an Urban Environment' award at the Wireless Broadband Alliance's (WBA) World Wi-Fi Day Case Study Awards.

Harnessing the power of the network

In partnership, the MTA and Transit Wireless have delivered a seamless wireless communications experience. From the moment a passenger enters the subway station, their cellular device can seamlessly connect to the Transit Wireless network. Emerging from the underground, users automatically switch back to the cellular operators' above ground networks.

With the network now live and running seamlessly throughout the subway system, it has opened a host of opportunities for new services.

In 2016 the MTA asked Transit Wireless to help install the system's B-division Countdown Clocks. Based on beacon train-mounted transmitters and receivers in the tunnels connected to the network, these beacons track train arrival and departures from stations and provide passengers with arrival times displayed on LCD screens. Completed in less than a year, by the end of 2017 Countdown Clock beacons and connectivity had been extended to the system's remaining 162 underground and 109 above ground stations that previously did not have this service.

In 2019, Transit Wireless supported more than 364 million calls and more than 75 million Wi-Fi logins in the subway system.

The network also opens opportunities for possible new services in public safety; Machine to Machine (M2M) communications, the Internet of Things (IoT) such as CCTV, sensors for maintenance data, and underground operational support, crowd heat mapping applications, and the development of new smart connected services, such as electronic fare payment.

What's next?

MTA and Transit Wireless recently expanded their partnership and brought wireless connectivity to the Canarsie Tunnel, which carries the L Line under the East River in New York City. It is the first under-river tunnel to have full connectivity.

Now, Transit Wireless plans ahead for new technological developments to continuously improve the system, develops and designs solutions with our majority shareholder BAI Communications and our international sister companies, and is at the forefront of wireless connectivity network infrastructure design for transit systems.

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