

**CASE STUDY**

# Alpha Powers First-of-its kind **DAS Communication Network** in New York City's Subway

The New York City (NYC) subway system is one of the largest and most well-established subway systems in the world with over 279 underground stations and more than one billion passengers each year. In 2011, an ambitious plan was developed by Transit Wireless Inc. and the Metropolitan Transportation Authority (MTA) to blanket all 279 underground subway stations with mobile voice and data coverage. This would allow the New York City subway riders to make and receive cell phone calls, send & receive texts or e-mail and access wireless services while riding underground. In addition, it would also enable important emergency and security services such as E911 to allow dispatchers to receive calls placed from the underground transit system and know the approximate location of the caller. The scale of the system, combined with the harsh, subterranean environment made this undertaking uniquely challenging for the companies chosen to supply their products and services for this project.

## TECHNOLOGY

There are a number of cellular network architectures available in the market today to provide mobile voice and data coverage. These include Macro Cells, Distributed Antenna Systems (DAS) and Small Cells. In New York, DAS was chosen as the most reliable and cost-effective solution to extend cellular and public safety coverage and capacity to NYC's underground subway stations. DAS is a proven method of

distributing RF signals over fiber or coax to a remote location closer to the customer. The main advantage of working with a DAS network is that it supports multiple wireless frequencies and technologies for two or more wireless service providers, making them ideal solutions for extending the wireless network into indoor venues or outdoor metropolitan areas.

DAS networks have a common set of components – the host unit, remote access units, cabling, splitters, antennas, etc.- though

they vary based on the characteristics of the venue. Likewise, the requirements for a reliable power and battery backup system changes based on the type of DAS equipment, the area served, and whether the installation is indoors or outdoors. The three main aspects of the wireless network in the NYC subway system included: base station hotels, a fiber optic network and distributed antenna system with parallel Wi-Fi networks. At the completion of this multi-year project in 2016, the NYC subway system will have cellular coverage to all 279

subway stations, 5,000 Wi-Fi hotspots enabled, and use about 120 miles of fiber-optic cable to transport wireless signals to and from 6 Base Station Hotels (BSH), that house the optical distribution gear as well as the carriers' base station equipment.

## THE KEY PLAYERS

The DAS program was spearheaded by Transit Wireless Inc. who signed a multi-year contract with the MTA to design, build and maintain the DAS infrastructure throughout all 279 underground subway stations. The four major U.S. wireless carriers supported by this DAS network are AT&T, Sprint, T-Mobile & Verizon Wireless. Wi-Fi services for the entire subway station network are provided by Transit Wireless WiFi. The primary DAS equipment chosen for this application was Solid Technologies' Alliance "neutral-host" DAS, a solution built to support multiple wireless operators and wireless services using a single infrastructure. The foundation of the DAS network is powered by Alpha Technologies' outdoor FXM UPS/battery backup power system, housed inside a custom-engineered IP66 rated outdoor enclosure.

## THE POWERING SOLUTION

Given the critical nature of this application and the challenging subterranean environment, Transit Wireless needed a power solutions provider that specialized in powering solutions that could withstand harsh & variable conditions of temperature, moisture, vibration and shock. Alpha Technologies was selected based on decades of experience providing custom-engineered power solutions for outdoor communications networks. Alpha products' rugged design and ability to handle extreme operating conditions set them apart from the traditional AC UPS and battery systems. Working directly with Transit Wireless, Alpha developed a custom-engineered power system enclosure that met all their operational load requirements as well as the battery backup



Alpha's Ceiling Mount Backup Power Solution at an underground subway station in NYC

**"ALPHA TECHNOLOGIES HAS DEVELOPED A UPS PRODUCT THAT CAN PERFORM RELIABLY IN OUR HARSH UNDERGROUND ENVIRONMENT, WHICH HAS HELPED TO ENHANCE OUR INFRASTRUCTURE NETWORK"**

**THOMAS MCCARTHY,  
NETWORK OPERATIONS DIRECTOR,  
TRANSIT WIRELESS**

time in the event of a grid failure. The three main components of the Alpha power system include: IP66 rated outdoor ceiling mount enclosure, outdoor rated AC UPS and batteries.

There are a number of unique design features of the Alpha enclosure solution that met the specific requirements of this project. The cabinet was designed to be ceiling mounted, including over 250 lbs. of equipment that included the UPS, batteries and customer supplied optical distribution equipment. Given the environment where these cabinets were deployed, Alpha designed a cabinet that was compliant to Ingress Protection rating of IP66, meaning it has been designed to protect its contents against dust and the high pressure water spray used to clean the subway stations at night. The Alpha enclosure solution utilizes non-active based cooling to dissipate the heat

from the enclosure, making it more efficient and reducing the overall power demand from the grid.

The outdoor AC UPS chosen for this application was Alpha's proven FXM 2000 module that delivers clean, reliable 120Vac power to the critical DAS equipment. The UPS has a wide operating temperature range of -40 to 74°C (-40 to 165°F) which is suitable for the most extreme operating environments. Temperature compensated battery charging protects batteries from over-charging at extreme temperatures to extend the battery life. The Ethernet/SNMP card allows for remote communication with the FXM through a web based interface to poll for events and/or alarms.

Alpha's standby battery solution used in this application is the AlphaCell 85GXL which incorporates Gel technology for superior thermal dissipation to ensure optimal lifetime performance in high temperature environments. The battery chemistry incorporates a silver alloy material, reducing grid corrosion and maximizing life expectancy to deliver longer runtimes, outperforming traditional VRLA AGM batteries. AlphaCell batteries offer 100% runtime capacity out-of-box, eliminating the need for pre-deployment cycling, and resulting in a faster installation and setup time.

Decades of leadership in powering critical communications networks for a diverse customer base has established Alpha Technologies as the industry leader in customized powering solutions for unique, challenging applications. Alpha is at the forefront of developing powering solutions for new architectures such as DAS, as seen in the NYC subway project. Alpha is also pioneering new technologies such as Line Powering to reduce the need for battery backup or AC utility at remote sites.

**Visit [www.alpha.ca/das](http://www.alpha.ca/das) and begin your journey to overcoming your DAS infrastructure powering challenges.**



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