WORLD TRADE CENTER TRANSPORTATION HUB

Unmatched Mass Transit Complex Receives Unmatched Cellular Coverage

The Oculus is home to a rail, subway and shopping mecca in New York City

CASE STUDY: WORLD TRADE CENTER TRANSPORTATION HUB

JMA Wireless Assures Powerful and Convenient Mobile Communications at World Trade Center Transportation Hub

OVERVIEW

Time for Expansion, Time for a New Wireless Network

Some say it is the equivalent of Grand Central Station, Times Square and Penn Station rolled into one new magnificent structure. At the middle of the new World Trade Center buildings and the 9/11 Memorial is the World Trade Center Transportation Hub. The World Trade Center offers direct, weather-protected access to most of the city's subway, bus and ferry lines. To support the designer's goal of fast and convenient travel, every mobile device moving through the Transportation Hub has access to a robust mobile network. Unmatched Mass Transit Complex Receives Unmatched Cellular Coverage The Port Authority of New York and New Jersey (PANYNJ) and its neutral host for wireless connectivity have embarked on a journey to ensure the newest center of mass transit includes powerful wireless coverage for the subway platforms, bus station, loading docks, new retail complex and parking area. JMA Wireless played an integral role in this project. The company not only provided its leading edge wireless infrastructure solutions, but it also oversaw all aspects of the project including RF design, deployment, integration, commissioning and optimization.

Every year on 9/11 the skylight of the Oculus will be opened to the sky for 102 minutes as an annual remembrance of the 2001 terrorist attacks in New York City

SITUATION

A Project with Many Challenges

The World Trade Center Transportation Hub and Vehicle Security Center opened in early 2016. The Transportation Hub is the Port Authority of New York and New Jersey's name for the new PATH (Port Authority Trans-Hudson) station. Additionally, this hub also includes a retail complex known as the Westfield World Trade Center. The Transportation Hub is the third largest transportation facility in New York City, measuring one million square feet with 365,000 square feet dedicated to the high end shopping complex. This area serves over 320,000 local residents on a daily basis and is expected to serve one million plus annual visitors.

The newly expanded area also includes the Vehicle Security Center (VSC), which provides parking facilities for all of the towers within the World Trade Center Complex. It includes parking not only for office tenants, but also for VIPs and government officials as well as tour buses.

The VSC also services loading docks associated with Towers 1-4, and retail establishments and businesses within the overall World Trade Center Complex.

These facilities are housed under an above ground area known as the Oculus Pavilion. The 355 foot operable skylight known as the Oculus was designed by the world renowned Spanish architect, Santiago Calatrava. It is the most distinct element of the Transportation Hub. This movable steel and glass structure ranges from 12 feet wide at its most slender end to 22 feet wide in the center.

JMA Wireless realized providing robust wireless coverage for this newly expanded area would not be an easy undertaking. To begin with, the building materials posed a challenge because its ceiling includes strips of steel, a material that naturally impedes cellular signals from the distributed antennas. Additionally, concrete was used, another material that does not allow for easy penetration of wireless signals. The system needed to ensure coverage for facilities above as well as below ground level.

Next, in order to maintain the aesthetics of the spectacular Oculus, it was requested that the wireless antennas deployed be invisible to the public. The process known as stealthing needed to be implemented to meet this requirement. With stealthing, the TRU-Omni Antennas from JMA Wireless needed to be placed strategically behind the steel strips of the ceiling.

Since the Transportation Hub and Vehicle Security Center are public facilities the system needed to support multiple cellular operators and multiple bands. Daily commuters may use certain carriers while international visitors may subscribe to different mobile service providers.

In addition, the wireless network had to be future proofed. It needed to easily support any new bands launched into the market. Being in New York City, densification is another issue that the wireless network needed to take into consideration. Densification is a term used to describe dense areas of mobile subscribers with a high demand for cellular connectivity. Especially during peak commuting hours and/or shopping times the network still needed to enable robust mobile communications.

The cellular capacity and coverage must be powerful enough to enable mobile connectivity even during emergency situations. It must assure coverage for first responder needs as well as for employees, commuters and shoppers in times of crisis. During crisis situations people immediately reach for their cell phones to share text, voice and video messages. Lack of connectivity can leave first responders without proper communication channels and place the area at further risk.

Finally, this deployment involved many stakeholders beyond JMA Wireless and the neutral host. Throughout the project open communication and coordination needed to be maintained also with the architect of the Oculus, the Port Authority of New York and New Jersey, and the local trade union companies assigned to the installation.

SOLUTION

Multiple Offerings Produce One Powerful Wireless Network

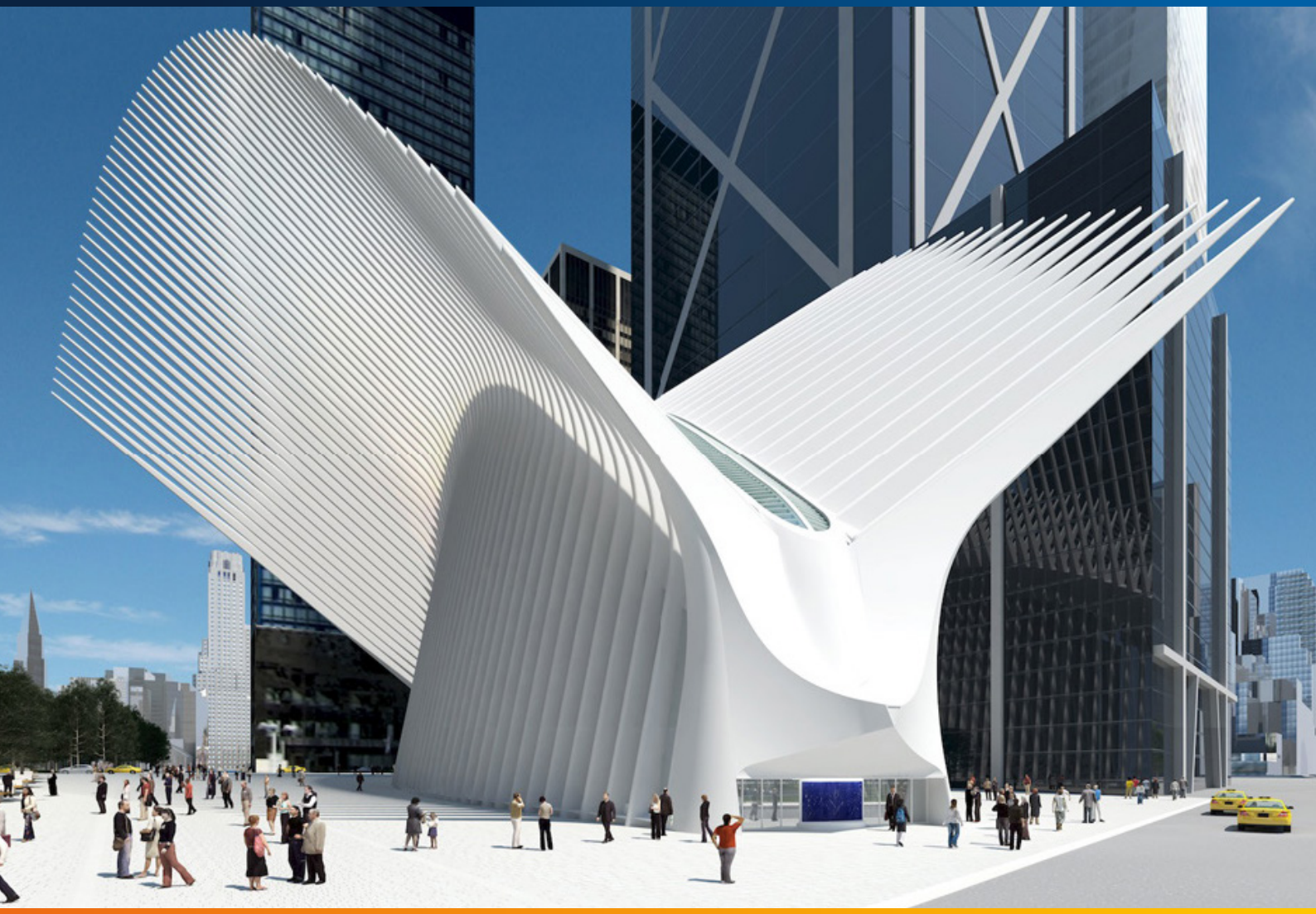
The wireless network deployed is comprised of multiple solutions from JMA Wireless including its JMA DAS (distributed antenna system), TRU-Omni Antennas and industry leading compression connectors. The multi-band, multi-carrier JMA DAS was deployed to enable coverage for four wireless carriers. In addition, it covers a wide variety of bands including LTE 700, 800, 1900, 2100 and 2300, UMTS 850, 1900 and 2100, CDMA 1900, TDD 2500, and GSM 1900.

Passengers at the
WTC Transportation Hub.

This modular solution includes a rack mounted Master Unit (MU), which combines the different high speed wireless technologies with multiple bands to easily serve the needs of public venues such as the WTC Transportation Hub. Additionally, with its future proofed design, existing infrastructure can be leveraged easily to support new bands and technologies.

Only a single optical fiber cable was pulled to simultaneously distribute multiple frequency bands and multiple carriers from the Master Unit to the high power Remote Units throughout the multiple levels of the Transportation Hub and Vehicle Security Center. The amount of optical fiber needed to support the JMA DAS is 50 percent to 75 percent less than competitive offerings in the market currently. The result is a very cost efficient solution in terms of manpower and material.

Furthermore, with the Multiband Spectrum Analyzer (MSA) the facility's IT department can remotely monitor and optimize the Quality of Service (QoS) delivered by the JMA DAS components. It easily addresses uplink and downlink signal quality issues, and the RF spectrum is measured and recorded for each sector and Remote Unit. Performance-degrading interference is identified quickly to ensure the system is operating optimally at any given point in time.



The structure's white metal-clad steel ribs reach up and out in a monumental move symbolic of a hand releasing a dove

In addition, the deployment included multiple in-building TRU-Omni Antennas, which were installed strategically under the strips of steel comprising the ceiling of the structure. These antennas offer MIMO 2X2 coverage, PIM certification and are ideal for neutral host deployments. After many RF design iterations and antenna pattern tests performed by JMA Wireless, all stakeholders were satisfied with the integrity of the system.

Finally, the network utilizes JMA Wireless' industry leading compression connectors. Incorporating technologies developed by JMA Wireless, these connectors are PIM-optimized; therefore, they are a key factor in ensuring robust mobile communications throughout the new facilities.

RESULT

Demonstrated Success by JMA Wireless

When the World Trade Center Transportation Hub and Vehicle Security Center opened their doors in 2016, mobile users experienced robust wireless communications whether standing on the underground platform waiting for the subway or parking a vehicle onsite. The multi-band, multi-carrier JMA DAS along with the TRU-Omni Antennas and compression connectors from JMA Wireless ensured cellular coverage and capacity needed even during peak commuter times. Yet the aesthetics of the Oculus still have been maintained for all to enjoy. Throughout the entire process JMA Wireless was a trusted partner to the neutral host, the PANYNJ, Mr. Calatrava and the local trade unions.

About JMA Wireless

JMA Wireless is the leading global innovator in mobile wireless connectivity solutions that ensure infrastructure reliability, streamline service operations, and maximize wireless performance. Employing powerful, patented innovations their solutions portfolio is proven to lower the cost of operations while ensuring lifetime quality levels in equipment and unrivaled performance for coverage and high-speed mobile data.

JMA Wireless solutions cover macro infrastructure, outdoor and indoor distributed antenna systems and small cell solutions. JMA Wireless corporate headquarters are located in Liverpool, NY, with manufacturing, R&D, and sales operations in over 20 locations worldwide.

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