



Broadband On Board: Introducing a New Generation of Wireless Metro/Light Rail Communications

An entirely new category of high-speed mobile hotspots will be rolling into the global marketplace soon – literally. Their location may surprise and delight many: Metro/Light Rail trains. While the expectation of public access anywhere has certainly played a role in making WiFi available onboard, it is not the sole driver pushing light rail operators to make the investment in wireless broadband technology. The move toward automated train and signal control, location, advanced data applications like video, along with improved safety and security, has brought the need front and center.

Anticipated Growth

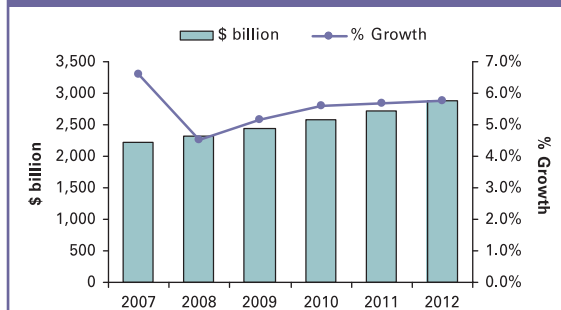
In 2012, the global road and rail industry is forecast to have a value of \$2,881 billion, an increase of 29.7 percent since 2007. The rail industry accounts for 29.7 percent of this market.

– Datamonitor

A Global Footprint

The number of Metro/Light Rail train companies with wireless broadband plans and deployments underway is on the rise. With train ridership up around the world, planned upgrades to legacy systems in the works and green initiatives increasingly taking hold in the transportation industry as a whole, innovation and advanced technology capabilities have become a strategic imperative.

Global Road & Rail Industry Value Forecast: \$ billion, 2007-2012



Source: Datamonitor

through the use of video surveillance and video analytics. All of these technology applications require, and in some cases demand, a robust highly reliable wireless broadband network.

Dual Purpose Wireless

Motorola's robust Wireless Broadband portfolio provides a number of powerful and cost effective solutions to serve the varying needs of the Metro/Light Rail industry. Its purpose built 2.4 GHz AP 6300 mesh solution, featuring Mobility Enabled Access (MEA), supports automated train and signal control systems, as well as mission critical applications and offers superior RF interference mitigation. Leveraging advanced meshing and rate selection technology, the AP 6300 series provides fast hand-offs, dynamic channel selection and self-healing capabilities that reliably deliver critical data even in harsh or crowded RF environments.

The growth potential in this market has brought with it a surge of investment and new technology innovations, including Automated Train Control (ATC), passenger Internet access and security enhancements

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MOTOROLA WIRELESS BROADBAND

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The Motorola mesh AP 4300 dual band 802.11a/b/g solution will help usher in a new age of WiFi on rail, providing the necessary bandwidth and capacity to support passenger access and information systems, as well as advanced video surveillance capabilities for added safety and security on the train and off.

Both solutions can be fully integrated and managed using a powerful tool in Motorola's One Point Wireless Suite – One Point Wireless Manager. This comprehensive software provides a single view and point of control for all network components through real-time, advanced visualization capabilities in an embedded Google mapping environment. For the rail industry, a combined, scalable wireless platform serving multiple applications is an appealing proposition.

The Origin of MEA

Purpose-built Mobility Enabled Access (MEA) technology was originally developed for the US Department of Defense, Defense Advanced Research Projects Agency (DARPA) for battlefield communications. Through client meshing, MEA enables each client device to act as a router to and from every other network device. As a result, signals do not have to penetrate difficult environments such as railway tunnels, but they simply use other client devices to pass the signal along while bypassing interference-causing barriers.

A Powerful Combination

WiFi and MEA technologies are both present in Motorola's Mesh Wide Area Network (MWAN) solutions. Proven complementary, both are differentiated only by the applications and environments they best support. This is becoming important to rail operators investigating outdoor and indoor wireless strategies and scalable solutions that address a variety of operational needs.

In the past, WiFi traded throughput for range, making it the technology of choice for short-distance environments in unlicensed radio bands. However, with improved routing algorithms and advanced data rate selection, Motorola's 4300 series delivers increased bandwidth, network stability and fast hand-offs to support more advanced applications in fixed and mobile environments. Improved 802.11 standards provide more effective and reliable video surveillance capabilities using WiFi. Additionally, advances in Motorola's mesh algorithm technology enables low to medium speed mobility in standards based environments.

MEA's strength lies in its ability to offer consistent throughput with exceptional interference mitigation. Motorola's MWANs with MEA technology can assess the entire 2.4 GHz band, selecting the best channel for communications on a packet-by-packet basis. This enables the network to dynamically avoid other radio transmissions or interference. Motorola's MEA radios feature client meshing as well, wirelessly extending and strengthening the network as the radios move throughout a transportation system. MEA's "bullet proof" reliability ensures communications connectivity is maintained and issues are handled immediately to mitigate delays and breakdowns.

Making the Wireless Investment

When evaluating the available wireless technologies for Metro/Light Rail operations, the type of physical network, as well as the applications desired will be key investment decision criteria. Instead of deploying a singular WiFi or MEA specific network, a hybrid network may be required, leveraging the strengths of MWAN technologies. WiFi's ability to support off-the-shelf clients and higher throughputs may be important in certain areas of the network. In others, high speed mobility and reliability of MEA technology may prove equally important, delivering the optimal connectivity, cost-efficiency and performance required by a rail system operator.

Global Light Rail Investments & Growth

- The Dubai Metro, opening this year, is a driverless, fully automated metro network and among the longest in the world with a total of 70 kilometers of lines and 47 stations.
- The European Union recently conducted a study of the growth potential for Light Rail and Metro systems and concluded an average level of expected growth over the next 10 years of 30 percent – a figure it states is conservative given it does not account for the re-opening and upgrading of existing Light Rail/Metro network infrastructures, 50 percent of which are up for renewal in the next 10 years.
- The top five light rail systems in North America in daily and annual ridership serve Monterrey, Calgary and Toronto in Canada, Boston and Guadalajara.
- For the train-to-track data communications network alone, not including station coverage, in-carriage services, or inter-station connectivity, the Share of Market (SAM) for the EU and future member states is estimated at \$200 Million over the next 5 years.

About Motorola Wireless Broadband

Motorola's Wireless Broadband and our WLAN solutions provide and extend coverage both indoors and outdoors. The Motorola Wireless Broadband portfolio offers high-speed Point-to-Point, Point-to-Multipoint, Mesh, WiFi and WiMAX networks that support data, voice and video communications, enabling fixed and mobile applications for public and private systems.



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