The Impact of Wireless Connectivity on Traffic Control

Introduction

Modern transit increasingly relies on a multitude of applications – not only to assist traffic flow, but also support public safety, facilitate road maintenance, and generally make the driving experience more enjoyable. Increased bandwidth requirements drive the evolution of the wireless broadband networks deployed by transit authorities from the serial age to the digital age with Cambium Networks as a partner. Our Regional Sales Manager, Yancey Johnson, has 18 years of wireless experience in industrial markets including traffic control, public safety, electrical markets, and oil and gas utilities. With insider expertise and a keen ability to illuminate fine details, Yancey explains how Traffic Control networks can succeed at being proactive instead of reactive.

Challenges Traffic Control Networks face today

What are the unique needs of Traffic Control networks that Cambium Networks addressed?

Yancey: Bandwidth requirements have increased a great deal. Several years ago, a few megabytes were enough to get the job done because switch data is minuscule. Today, traffic control networks need to increase the types of data transmitted (e.g. video, geo-sensing), boosting the need for bandwidth a great deal. As bandwidth requirements increase, so does the need for Cambium Networks' radios. Our radios provide enough bandwidth even in narrow channels and are spectrally efficient, delivering 10 bits per hertz. We can provide 100 Mbps using only a 10 MHz wide channel. These networks are typically in urban environments where there is a very high noise floor. We operate very efficiently in that area, more so than competitor radios which are not as spectrally efficient and cannot handle the noise floor.

Additionally, running or terminating fiber to every intersection is cost prohibitive. T1 lines, leased lines, and failing copper lines may present issues and require recurring monthly expenditures. Going to wireless from intersection to intersection and wirelessly backhauling data to a fiber drop-off point has both solved the bandwidth problem and provided a flawless, low cost solution.

What is the business value of the solution?

Yancey: Cost reduction is significant when upgrading to Cambium Networks wireless technology. Previously each intersection had $50,000-$100,000 worth of equipment. If there are leased lines at each intersection, reoccurring operating costs may run $600-$1,000 per intersection per month to backhaul the data. The Cambium Networks solution eliminates theses costs. Each intersection only has to power the radio off the pole and it can then communicate to the next intersection and so on. It is important to point out that now the agency running the network actually controls the network, and they are not restricted to the bandwidth that is available for them by the carrier if they used a leased T1 line. Because of that control, if they want to go from 50MB to 100 MB, or 200MB, or 300 MB, they have that capability and there is no additional cost. They already spent the money on the infrastructure, the network is in place, and there is no operating cost when they wish to grow. This is critical when considering the cost-benefit analysis of investment in new infrastructure; budgeting for roads and bridge work can be tight and state governments may find it difficult to deploy a new network – so they may keep paying the monthly operating costs (and leasing fees) rather than investing in a brand new wireless network. However, once the network is wireless and fully owned, the reoccurring operating costs disappear, leaving these customers ahead of the game in the long run with funds they could dedicate towards construction and renovation.

Solution Design

Let's explore the products chosen for the network.

Yancey: The PTP 670, the PMP 450i, as well as the licensed PTP 820 for fiber replacement or fiber back up are ideal for Traffic Control networks.

The PTP 670 is optimal when operating with a high noise floor in non-line of sight installations. It's very spectrally efficient, providing higher bandwidth – it is a radio that could be used in multiple scenarios, for any application required.

The PMP 450i allows customers to make those connections in high noise floor areas with the bandwidth they look for. Customers receive high throughput, and the sensors and the video traffic are pulled back from more than the next intersection. A Point to Multipoint (PMP) network can connect multiple intersections, reducing the total amount of network equipment, resulting in further cost saving benefits.

The PTP 820 licensed microwave products operate in licensed bands for critical data transmissions and are capable of extremely high capacities. This can serve as either a fiber replacement where it's difficult to reach, or as an under-build for fiber to create redundancy.

What are some common mistakes in the selection of technology?

Yancey: Customers can make the mistake of deploying a radio that is inexpensive but does not fit their current needs, or cannot grow with their future needs. For example, they could deploy an inexpensive radio that can [barely] manage the current needs of 25 Mbps and does not perform well in a high noise floor, but in the near future they will need 100 Mbps, and that radio will never be capable of getting to that level. The total cost of that network might be $100,000 and may last only a year. By properly designing the network with Cambium Networks, the initial investment might be more expensive, but they would have a network that could last up to 8 years. It is very important to make sure they have enough bandwidth to support network growth. As it expands and matures, so must the radios within that configuration.

Results

What impact do Cambium solutions have for Traffic Control workers on a daily basis?

Yancey: For network managers, we have made their jobs easier because the radios rarely fail and make it possible to run multiple applications across one network. Law enforcement units benefit because reliable networks make the streets safer every day. But, the other big winner is the typical driver because optimized light timing, automated toll systems, and traffic advisories improve traffic flows, resulting in fewer frustrated drivers and an overall better driving experience.

How can a customer monitor their system?

Yancey: Customers can integrate cnMaestro™ with their network monitoring platform so there is just one system to manage. Many times customers might have traffic signaling on one network and maybe video surveillance on another network, so they are trying to control three to four different applications on multiple networks. With our Cambium Networks wireless network, all of these applications are handled on the same network because it has enough bandwidth. Now they manage only one wireless network and all the different applications that can be VLAN tagged, controlled and then pulled back across. So their network managers have one wireless network to manage and one management platform that could integrate into their own platform.

How can a customer evaluate their investment?

Yancey: They can measure the total cost of ownership for the network, how much bandwidth is provided to each intersection versus before, and how many applications can now run across the network versus before. Often, customers can clearly see that the total cost of ownership is worth the investment. After year two or year three, they can reallocate the money they were spending on operating costs and use that somewhere else. We save them money, and they understand that.

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