CASE STUDY

# The Canopy® 400 Series Delivers Higher Throughput and Extended Range for Cascade Networks

**Brian Magnuson**
President,
Cascade Networks

**"Motorola's latest addition to the wi4 Fixed Point-to-Multipoint wireless platform, the OFDM-based Canopy® 400 Series, can significantly increase throughput, improve performance and extend range in the 5.4 GHz frequency band for a wide cross section of organizations."**

Brian Magnuson, Cascade Network's president, helped launch the Canopy series in its initial implementation in 2002. In 2007, Magnuson complemented Cascade Network's Canopy 100 and 200 Series systems with one of the first installations of the 400 Series. Results are already impressive.

Cascade Networks is a Wireless Service Provider and equipment reseller based in Longview, a city of about 100,000 residents located in Washington State. "We serve business and residential customers in a five-county area between Seattle-Tacoma and Portland, Oregon," says President Brian Magnuson. He characterizes the city's location as "terrain-intensive," an area that can severely test the performance and range of wireless networks. After installing Canopy 400 Series technology in 2007, Cascade Networks is already seeing tangible benefits.

## OFDM Technology

Based on Orthogonal Frequency Division Multiplexing (OFDM) technology, the Canopy 400 Series helps Cascade Networks and other network operators extend coverage to difficult-to-reach customers and locations. These include Near Line of Sight (nLOS) situations in which radio signals are partially blocked. They also include certain Non Line of Sight (NLOS) environments in which signals are entirely blocked but provide reflective characteristics that allow signals to reflect, or bounce, around the obstacles.

## Central Installation

"When Robert Long designed Longview in 1923, he envisioned a wheel with the hub being Monticello Circle, dominated by the seven-story Monticello Hotel," notes Magnuson. "To take advantage of this unique centralized layout, we've located our Canopy Series 400 equipment on the hotel roof." The network itself consists of four Access Points (APs) — one each facing North, South, East and West— mounted vertically, plus a Cluster Management Module (CMM). "We then have two SMs dedicated to each sector," continues Magnuson. "The first is located about one-third of a mile out, the second anywhere from three to four miles out. That gives us a truly significant increase in range."

## CANOPY SOLUTIONS ARE PROVEN WORLDWIDE

The wi4 Fixed Point-to-Multipoint Canopy solutions are proven reliable in the real world's toughest environments. Powering high-speed wireless networks in more than 4,000 systems in 120 countries around the world, Canopy solutions are facilitating mission critical applications such as 24/7 video surveillance systems, advanced mobile communications networks for enhanced productivity, safety and security, easy-to-deploy backbone networks for nationwide high-speed connectivity, and many more.



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## MAJOR BENEFITS OF CANOPY 400 SERIES OFDM-BASED TECHNOLOGY

Based on OFDM technology, the Canopy 400 Series helps Cascade Networks and its customers with:

**Higher throughput.** The Canopy 400 Series provides upgraded throughput of up to 21 Mbps supporting today's bandwidth-intensive applications such as VoIP, video surveillance, high-speed Internet access and many other in-demand applications.

**Increased range.** OFDM-based Canopy 400 technology enables operators to extend network coverage significantly, consistently delivering connectivity at distances up to five miles per Access Point (AP) cluster.

**Outstanding multipath performance.** The 400 Series' underlying OFDM technology is proving exceptionally adept at delivering increased performance in multipath environments. In large part, this success is driven by its ability to excel in reflection-intensive environments.

**Increased spectral efficiency.** With a 10 MHz channel width (as opposed to other systems' 20 MHz), the Canopy 400 Series provides up to 50 percent more throughput in half the channel width, resulting in highly cost effective spectral efficiency.

**Line-of-Sight solutions.** In nLOS locations, there is clear visual line-of-sight but the Fresnel zone is partially blocked. In NLOS locations, both visual and radio lines-of-sight are blocked. The Canopy 400 Series can help network operators extend coverage in both of these environments.

"I very much enjoy working with Motorola. I especially appreciate the way Motorola embraces new ideas that are fresh and exciting and have great potential."
*– Brian Magnuson, President, Cascade Networks*

### More bounce

In multipath environments, the Canopy 400 Series provides significantly improved performance over non-OFDM networks. "OFDM loves to reflect," observes Magnuson. In nLOS and NLOS environments, reflections allow radio signals to bounce around many types of obstructions—especially those with reflective surfaces such as buildings, bridges, water and more —to reach their targets with stronger, more usable signals. "In large part," Magnuson says, "that ability to bounce signals is what makes OFDM such a good technology for multipath environments."

### Excellent Results

What's the biggest benefit Cascade networks is realizing from the Canopy 400 Series network? "We're seeing up to a 30 percent increase in throughput per AP and only using a 10 MHz channel instead of the 20 MHz channel used in the legacy product," notes Magnuson. Other benefits include reduced real estate costs thanks to increased connectivity range. Our Canopy 400 network can reach up to an edge of about five miles, and provide consistent coverage.

### Looking Forward

How does Magnuson see using the Canopy 400 Series in the future? "Right now, we're using the network to offer our customers bandwidth-hungry applications, like VoIP, VPN tunnels, collaborative gaming and more, no matter where they're located," Magnuson says. "That's great, but we're also testing other applications. One thing we're doing now, with an eye to the future, is testing different video applications. I'm confident the Canopy 400 Series can provide the higher throughput for managing multiple video streams which is very exciting."

### Working with Motorola

Magnuson states, "I remember launching Canopy when we were still naming firmware versions after books of the Bible like Obadiah and Nehemiah. Seven years later, we continue to use Canopy technology exclusively, and we are very pleased with the benefits we and our customers are realizing from our Canopy 400 Series network."

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