

# Bringing wireless Internet on board

New Mexico train project brought AzulStar a year-long project.

**Jake Himmelspach**

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GRAND HAVEN — The challenge of delivering seamless wireless Internet service to a moving train was not an easy one.

"It was one of the most innovative things we've worked on," said Tyler van Houwelingen, CEO of AzulStar, a privately held 4G wireless Internet and communications services provider.

The project took place in New Mexico where the Grand Haven-based company created a wireless system for the 95-mile RailRunner train system. The high-speed train runs from Belen to Santa Fe, a stretch that cuts through 80 percent of New Mexico's population, said van Houwelingen.

It was the varying types of terrain and the fact that a wireless signal is being provided to a moving target that made the installation difficult.

"It goes through the desert; we went through Native American lands, federal lands ... And then you're along a train, so there's not

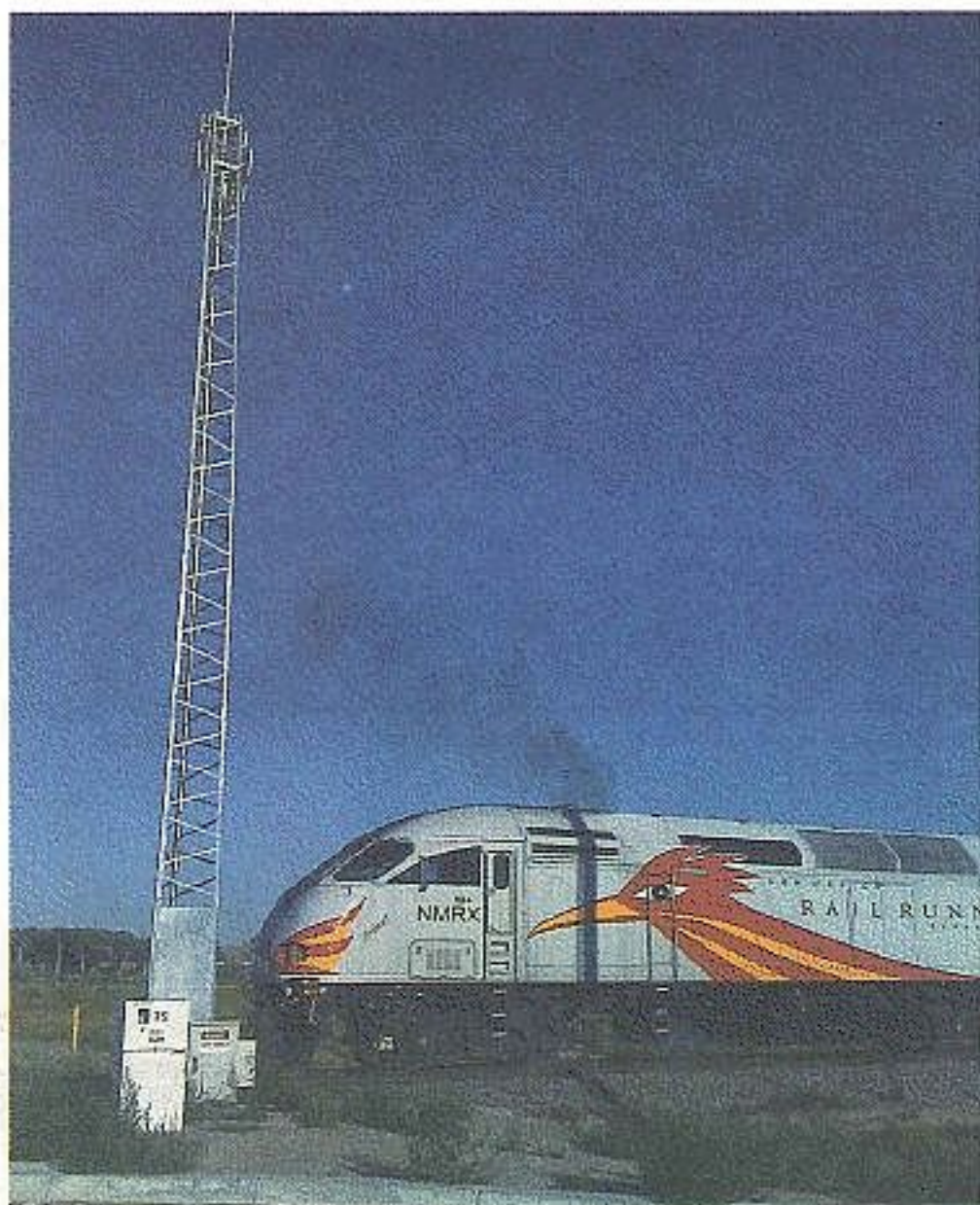
power everywhere," said van Houwelingen adding that about half the towers run on solar power.

The system includes 23 WiMAX base stations, which are similar to mini cell phone towers and cover the 95 miles of railroad track. The difference between WiMAX and WiFi is that WiMAX signals expand over miles, where WiFi expands over feet. WiMAX is often used to cover regional territories, while WiFi is used in offices, homes, restaurants — or in this case, inside the box cars.

"We've got these 23 WiMAX towers based along the track. They are all connected together to hop a signal down the track. Then we shoot the WiMAX signal from those towers to the roof of the train," he said. "We put three antennas on the train. Then there is basically some intelligence which allows this thing to move at the speed it does."

The train is in need of a large amount of bandwidth to cover the number of passengers using it. WiMAX does a good job of providing such bandwidth, but the general rule is that the faster something is moving, the smaller the bandwidth it is able to receive. The intelligence installed on the train allows for a larger bandwidth to be received. Once the WiMAX signal is received by the train, it is converted to a WiFi signal for use inside the train cars.

"People get on the train with any old laptop and can connect using WiFi, and that's relayed back over the WiMAX," he said. "Each car has its own WiFi access point. Then we hop (the signal) down the train. If you think of it, you can't run



PICTURED ABOVE IS one of 23 WiMAX base stations, which are similar to mini cell phone towers and cover the 95 miles of railroad track. Shown below left is an on-train mount to signal wireless service to the New Mexico RailRunner trains. Courtesy AzulStar



wires between the cars either."

The purpose of providing wireless Internet on the train wasn't only to offer free wireless Internet for passengers' commutes. It also provided a communication and management tool for the Department of Transportation.

"It's not just for Internet," van Houwelingen said. "The DOT in New Mexico is putting cameras on the train for safety and then feeding those cameras back to their headquarters in Santa Fe or Albuquerque. They have cameras for maintenance, so it's real time. They're also putting flat panel (TVs) on the train, which will run content, commercials and ads. There are a lot of operational aspects."

The \$2.5 million project took roughly a year to install, and AzulStar has a four-year contract with

New Mexico that pays \$180,000 per year for ongoing service.

The New Mexico RailRunner is hardly the only train system adding wireless service. There is a bid out in California for a similar system, van Houwelingen said, and Amtrak is rolling out wireless service, as well. Amtrak, however, will use a system of satellites and existing cell towers. This means that signals will not be as fast or as strong.

Van Houwelingen believes cars are the next place WiMAX systems will show up. Last month AzulStar put in a stimulus bid to put WiMAX across 17 counties in Michigan in partnership with Clearwire, another WiMAX provider. Clearwire currently has service in Grand Rapids. The decision on the bid should be made within the coming months.