

## CASE STUDY

### About Culiacán

Culiacán is the capital city of the state of Sinaloa, Mexico. Located in north western Mexico, it's one of the largest cities in the country with a total area of more than 4,700 km<sup>2</sup>, and population of 793,000 inhabitants, including the outlying communities of Costa Rica and El Dorado. Culiacán is also one of the fastest growing cities in the country representing more the 30% of the state's economy.

### The Project

The project, "Culiacán Digital Community" is part of an overall plan to improve one of the country's fastest growing cities by providing ubiquitous and free broadband wireless Internet access for residential and business users throughout the city of Culiacán.

Wireless connectivity was deemed low-risk and cost-effective alternative to traditional DSL, and other "fixed" broadband access technologies.

*"The goal of this project is to close the digital gap in Culiacán, to provide wireless access to those who do not have it and cannot afford it. By working with Tranzeo's radio technology, the city of Culiacán will enable many of its residents to work from home, provide much needed advancements in the city's technology infrastructure, and attract more business and tourism dollars to Culiacán," said Culiacán Mayor Jesus Vizcarra Calderon.*

Initial requirements included:

- Coverage area of 30 km<sup>2</sup> with support for up to 65,000 users
- Total network capacity that can scale up to 300Mbps
- Coverage to the wall with direct access by laptops and other user devices
- Paid and free usage model with single sign-on and network-wide roaming
- Low latency and low jitter capable of supporting Wireless-VoIP

### The Complete Solution

Tranzeo's high performance WiFi mesh and unlicensed WiMAX networking products were part of four of the seven proposals that were received by the city of Culiacan. After an exhaustive bidding process, Tranzeo and it's distributor in Mexico, PacificNet, were selected to roll out the largest wireless broadband network in the country.

*"The wireless market in Mexico is expanding very quickly and there are many new opportunities emerging everyday," said Angel Behar President and CEO of PacificNet, "As a wireless integrator and distributor we have tried almost all the equipment available on the market today and have found Tranzeo to be the most reliable and cost effective."*

In partnership with PacificNet, Tranzeo provided on-site support and training during initial network design and deployment. This was to ensure that the PacificNet field team is well equipped to handle the complete roll-out and future maintenance of the network effectively and reliably.



### Highlights

- Culiacán is the fastest growing city in Mexico
- The largest community broadband network in Mexico with initial coverage area of 30 km<sup>2</sup>
- PacificNet to roll out entire network using Tranzeo's full line of WiFi and WiMAX products
- Wireless is a cost effective alternative to DSL
- Support for up to 65,000 users
- Support for both VoIP and data services
- To the wall coverage with direct access by WiFi enabled devices such as laptops
- Network-wide roaming with single sign-on
- Installation rate of 10 nodes per day
- 42 clusters in initial coverage area
- 1 cluster per 1 km<sup>2</sup> with 18 radios per cluster
- Centralized Network Operation Center (NOC) with a single injection tower
- Use Tranzeo supplied AirSync EMS program for provisioning and to manage network resources
- On-site support and training provided by Tranzeo during initial design and deployment

## Tranzeo Wireless Technologies Inc.

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**The Site Survey**

For optimal network planning and in order to avoid interference from other wireless networks operating in the same ISM band, a preliminary site survey was conducted, which facilitated selection of optimal access point locations and clean frequency channels.

**Operation in the Unlicensed ISM Band**

The primary technology used in consumer-grade wireless devices is mainly based on the 802.11b/g standards operating in the 2.4GHz ISM band, so user access needed to operate in this band. In order to avoid interference within the network, the mesh backhaul is operated in the 5.8GHz frequency band.

**Mesh Clusters**

Using Tranzeo's self-forming and self-healing dual-radio mesh technology allowed for separation of the user access at 2.4GHz and the mesh backhaul operations at 5.8GHz, resulting in optimal network performance and capacity for both network layers, while maintaining reliable and maintenance-free operation.

**Centralized Control and Management**

Since Culiacan does not have an available community wired metropolitan area network to feed from multiple Internet point of presences, all centralization of data had to be done wirelessly. So, a centralized Network Operation Center (NOC) with a single injection tower using point-to-multipoint (PxMP) WiMAX links operating in the 5.8GHz frequency band was deployed.

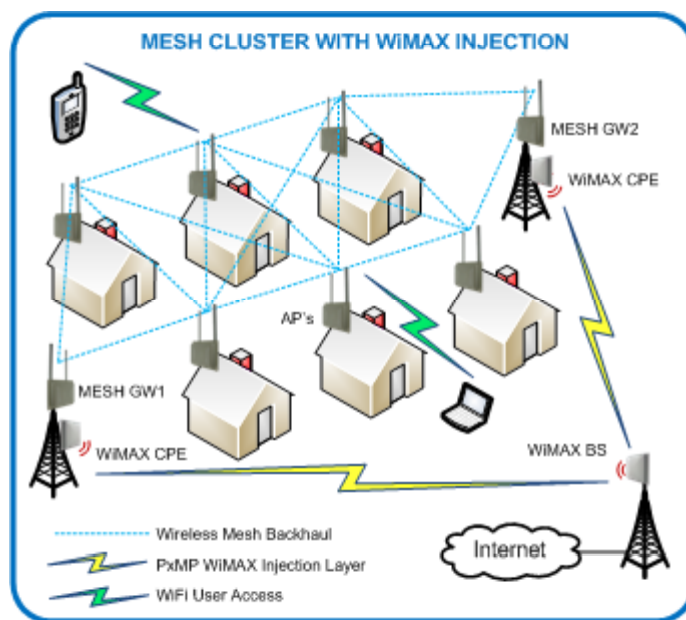


**The Results**

With 42 mesh clusters installed in 41 Colonias (residential neighbourhoods), more than 37,000 users have registered from 270 Colonias to use this system using their nomadic technology devices such as laptops and smartphones.

Besides providing free Internet access to the general public, this service is also offered to schools and small to medium businesses located in the coverage area.

Commercial projects are also being developed to utilize this network to provide different services such as educational programs for public schools, online water consumption monitoring, event advertizing, and VoIP Call Center operations.



**About Tranzeo Wireless**

Tranzeo Wireless Technologies Inc. (TSX:TZT) leads the wireless broadband industry for value, by producing high-performance wireless network equipment with a low cost of ownership and unparalleled service allowing communities and businesses to communicate without boundaries. Since the company's inception in 2000, Tranzeo's optimum cost effectiveness, premium quality and responsive support have attracted a growing number of devoted dealers, distributors, and customers worldwide. Tranzeo's full spectrum of point-to-point and point-to-multipoint radios, WiMAX equipment, and mesh network solutions are designed for use by wireless internet service providers, governments, campuses, military, carriers, enterprise, and systems integrators worldwide.

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