



Tarapoto is one of the principal tourist and commercial cities of the Peruvian Amazon, located in the northeast of the country. With an area of 1700 km², it has a population of 144,000 residents, which makes it the most populous city in the Department of San Martín.

The deployment of a video-surveillance network to ensure public safety in Tarapoto emerges as a local government initiative and it is part of the National Public Safety Plan 2013-2018, launched by the Technical Secretariat of the Public Safety National Council. The project, conducted by Tarapoto's *Serenazgo* with the support of the Municipal Police, includes hiring of 18 camcorders operators and 3 supervisors for the operations center.




Surveillance for Municipalities

Increased security demanded by citizens in municipal environments requires a full development of video-surveillance and security solutions that are able to:

- ⇒ Interconnect and manage a variety of remote locations.
- ⇒ Generate high quality video images for subsequent storage and processing.

About the Technology

Albentia Systems, Spanish pioneer manufacturer in the sector of wireless broadband, presented with his partner in Peru Fagar a solution for digital video-surveillance networks based on IEEE 802.16 using technology and IP networks.

Albentia Systems implements robust and reliable solutions, able to operate in outdoor environments and in the most adverse climatic conditions.



The Challenges

The principal goal of the project was to **establish an effective and highly scalable video-surveillance and public safety system** that records in real time several streets of the city by using a total amount of 33 IP cameras.

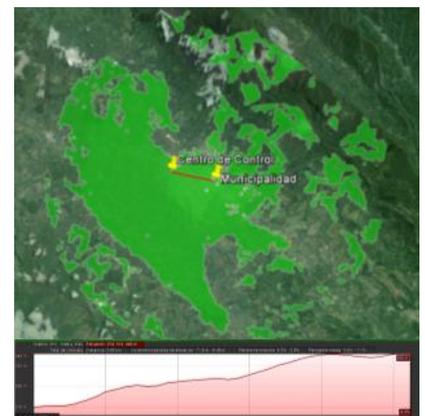
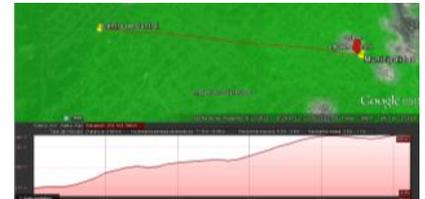
All videos should be sent to a control center to be monitored 24x7 by the police and members of *Serenazgo*. That is why **the network should support large capacity in the uplink and ensure quality of service (QoS)**, so that the videos would be received uncut, without pixilation or delays that hinder the detection of possible security attacks.

The project required a **simple deployment** to enable the Municipality of San Martin to **save costs in time and resources** and, at the same time, **take advantage of the equipment to provide other services** such as voice and data in future network extensions.

Tarapoto has a tropical climate with high levels of humidity and severe storms, so the project also demanded **rugged and robust equipment**, which could perfectly resist the climatic conditions in an outdoor environment.

Another key challenge of the project was to **achieve maximum transmission security**, to prevent the interception of images by anyone other than law enforcement entities.

Finally, being a highly interfered urban environment, a solution with high spectral efficiency that provides **special protection against interference** was needed.



The Solution

The technology used in the design and implementation of the video-surveillance network comprises:

- ⇒ **Three Albentia Systems interoperable 802.16 base stations** located in the pole of the Municipality building. Each base stations has a 120° sector antenna, so 360° coverage is provided.
- ⇒ A total of **16 user terminals (CPE)** distributed around the base stations.
- ⇒ **A point-to-point 300 Mbps ARBA Link-350 radiolink** carrying all videos from base stations to the control center.
- ⇒ **33 cameras** connected to each CPE. There are four cameras connected to each CPE, and every camera transmits a 2 Mbps video.
- ⇒ **Recording system and monitoring center.**

The professional **point-to-multipoint ARBA Pro solution by Albentia Systems** was selected because it has been specially designed for video-surveillance and security applications.

It is a solution with extraordinary spectral efficiency, QoS and powerful security mechanisms which, combined with the robustness of the equipment and its low power consumption, make it the ideal wireless solution for scenarios that require high performance and reliability in outdoor environments.

The network was complemented with a **point-to-point radiolink**, providing the backhaul that the network topology required.

The Benefits

Municipal corps of *Serenazgo* and Municipal Police now have a video-surveillance system with IP cameras which greatly supports the surveillance works in Tarapoto.

With this system not only **real-time images are monitored** from the control center but also the **videos are stored** for use in relevant research.

Easy deployment allowed significant savings in time and costs, which would not have been possible in a deployment of wired networks.

In addition, **low consumption** of Albentia Systems' equipment allowed installation of a camera network on poles, street lights and traffic lights, leveraging the power grid of the city, while **minimizing the total cost** of installation and civil works.

The **robustness and resistance** of the equipments, specially designed for outdoor use, leads into huge **savings in repairs and replacement of equipment**.

Moreover, the **separation of services (QoS)** offered by Albentia Systems' equipment allows **simultaneous transmission of 33 high quality videos using only three base stations**.

Finally, thanks to the powerful security mechanisms, such as AES256 encryption, **maximum transmission security was guaranteed, preventing the interception of images** collected by the cameras.

This network serves as a model for replicating the video-surveillance system in other cities in the region, thus increasing safety as set purposes of the 2013-2018 National Plan of Public Security.



Main Characteristics

ARBA Pro-1100 Series

- Professional OFDM wireless point-to-multipoint system
- Net capacity up to 35 Mbps
- Available in the 4.9-5.9 GHz bands
- IEEE 802.16-2012 standard solution
- Long-range coverage > 50 km
- Guaranteed throughput per terminal and differentiated service
- True-TDMA with layer 2 QoS
- Low latency < 5 ms
- Configuration and provisioning web interface
- AES 256 encryption and X.509 certificates
- TDD synchronization to avoid interference between sectors
- Anti-jamming mechanisms against interference
- Robust and reliable full-outdoor IP67
- Low power consumption < 4.5 W



PRO-BS-1158 Base Station

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Albentia Systems is the leading Spanish manufacturer of broadband wireless solutions and systems with great added value. Based in Madrid (Spain), the company uses its knowledge and experience in developing innovative radio systems for IEEE 802.16 deployments, for broadband access, data, VoIP and professional video applications.