

VSATs at Work in Rural Argentina

Historically, telephone communication infrastructure in the Argentine countryside has not kept pace with the sophisticated networks of that nation's urban areas. Rural villages are widely scattered — sometimes several hundred miles apart. Many lie in areas inaccessible by road during the bitterly cold winter months. Until recently, telephone



service was practically non-existent in the more remote villages.

Some regions had local telephone exchanges and pay phones, but no connection with the country's main telephone network.

Others had no telephone infrastructure at all. Villagers farmed their crops and cared for their livestock in virtual isolation. Medical care typically consisted of one doctor serving five to ten villages. A medical emergency was often disastrous since, without telephones, it was difficult to communicate a need for immediate medical help.

It was not until the '90s that the Argentine countryside began to see some large-scale improvements in telephone communications. In early 1995, Telefónica de Argentina commissioned Telefónica Sistemas de Satélites (TSS), a subsidiary of Telefónica de España, to expand Argentina's telecommunications network throughout the rural parts of the country. STM was contracted to supply DAMA 10000 VSATs (Very Small Aperture Terminals) at remote sites strategically placed across Argentina.

APPLICATION NOTE
PUBLIC TELEPHONY
RURAL ACCESS

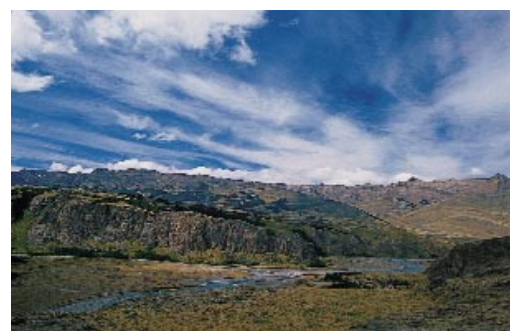


Photo: Thomas Gottshall



How STM Created a VSAT Solution

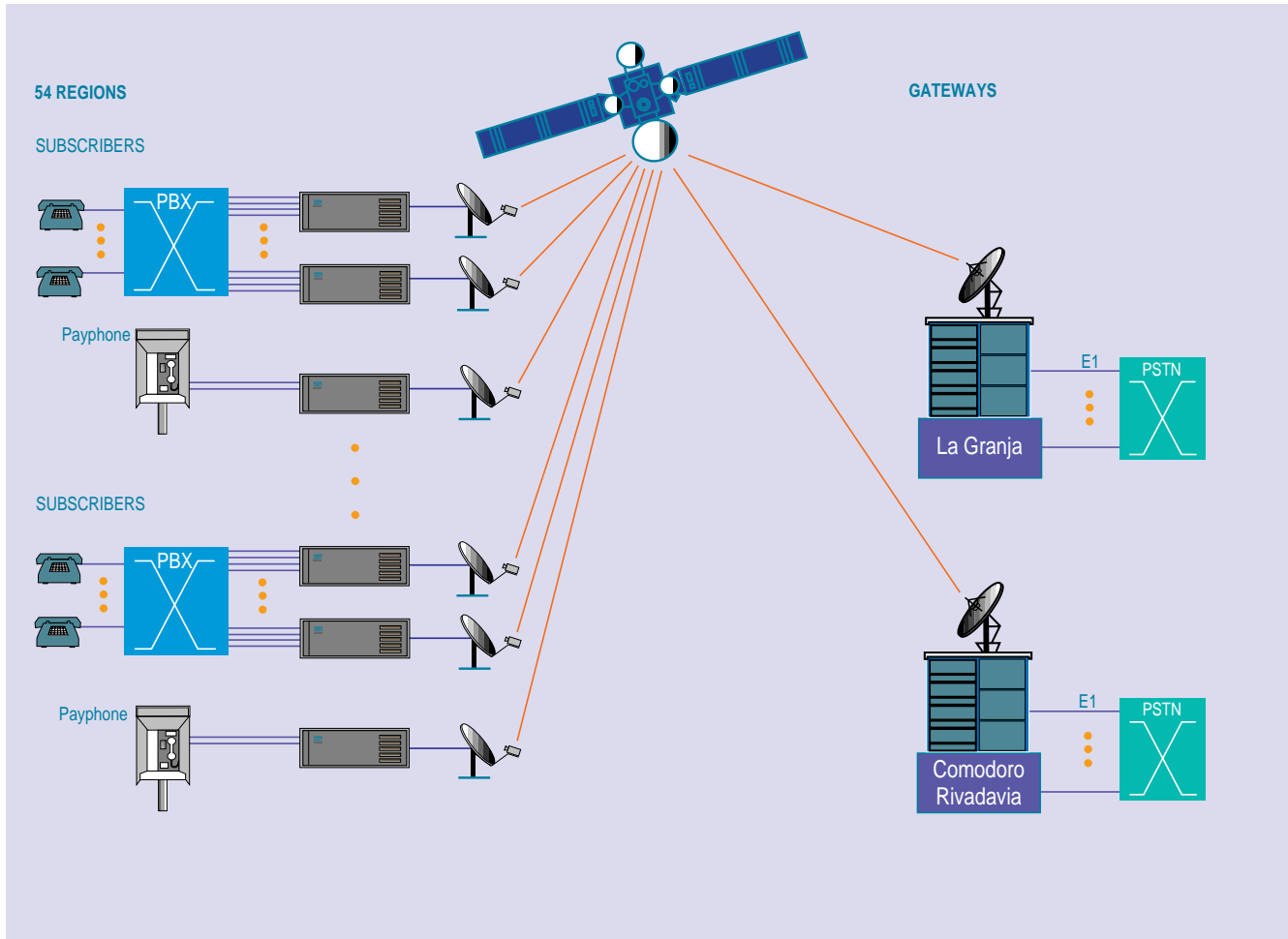
Because of the rugged terrain and vast distances between populated areas, a land-based telecommunications network in rural Argentina would have meant placement of more than 2,000 miles of cable or microwave links. A satellite network was the only quick and economical option.

The next decision was how to provide satellite-based telephony services that would best suit the Argentine application. Because the villages were small — typically containing only 20 to 30 homes — one pay phone often served an entire village and calls were placed only in emergency situations. With such low demand, a satellite link that operated continuously would have been far too expensive. Thus, the chief requirement was for a system that would allow the Telephone company to use satellite resources only as they were needed.

STM's DAMA 10000 VSAT network met that requirement. DAMA (Demand Assigned Multiple Access) technology optimizes satellite usage by automatically allocating space segment to each active telephone circuit on demand. Users are charged for the service only when calls are actually placed.

Although this “bandwidth on demand” feature was the primary reason for selection of STM's VSAT network, it was not the only reason, according to STM's Systems Test Director, Renato Dias. “We adapted our system so that it was targeted directly to rural telephony needs,” Renato explains. “That made it much more efficient in applications like the one in Argentina. Another major advantage STM brought to the project was the company's ability to customize its VSAT system to meet Argentina's unique R2 signaling standards.”

The DAMA 10000 system was further customized to reduce the number of Voice Channel Units (VCUs) required at the satellite hubs that connect to the Argentine Public Switched Telephone Network (PSTN). The basic system requires a one-to-one matching between the trunks or lines at the remote VSATs and the PSTN trunks or lines at the hub site. In principle, the remote VCUs should be matched by an equal number of VCUs at the hub. However, traffic calculations showed that only a few calls would be active in the rural telephony application at any one time and most of the VCUs at the hub would be unused. STM tailored a configuration for Argentina with a much lower number of VCUs at the hub. These are used as a common trunk pool and the calls are switched to the corresponding trunk or line by a special switch. Hardware has thus been minimized and a substantial amount of money saved.



*Telefónica de Argentina's
Network Diagram*

Meeting a Demanding Goal

Following a year of planning, the entire rural telephony system was developed, built, tested and installed in about six months — a remarkably short time considering the size of the project. The VSAT network testing consisted of many levels. Initial tests at STM's facilities were followed by signaling tests and certification in Argentina to make certain the system was compatible with Argentina's R2 signal standards. Testing concluded with operational acceptance by TSS and Telefónica de Argentina of the hub, and site-by-site testing at each of the remote terminals.

Once delivered and tested, the VSAT terminals were installed throughout the countryside, carrying telephone traffic from subscribers or pay phones to the hubs for connection to the main telephone system.

According to Agustin Lopez, Project Manager for TSS, STM's implementation of the DAMA 10000 VSAT network was a great success. "We regarded STM as a highly specialized company providing optimized satellite communication solutions" he explains. "The STM people knew what they were doing and they didn't need a lot of supervision. Their results were impressive."

Now that Argentina's rural telephony system is operational, Señor Lopez feels that the project, though difficult, accomplished its objectives. "Now we can look back and know it's been a successful job," he reflects. "When you're in the middle of such a large project, you think you'll never finish, but you keep on pushing and suddenly everything starts to work and it all falls into place."

The project's greatest challenge, according to Señor Lopez, was installing the VSATs amid rugged terrain and severe weather conditions in certain parts of the country. He cites the example of the famous Moreno Glacier in the south of Argentina, with its thick sheet of ice that has, for years, been slowly advancing down the side of a mountain. One of the VSAT terminals was installed near that mountain to provide telephone service for the adjacent resort area. The installation had to be delayed several times during the winter months because of harsh weather.



Photo: Thomas Gottshall

Señor Lopez adds that perhaps the most rewarding evidence of the project's success has been the happiness of the villagers with their new telephone system. Many of them had never even seen a telephone. "Having telephones has definitely improved the quality of their lives," he says. "For example, if there's a medical emergency now, they can call another village to arrange for a doctor's visit instead of having to transport the patient over many miles of bad roads."

DAMA Technology Worldwide

The DAMA 10000 VSAT Network offers a variety of high-performance features . . .

- Fully-meshed, single-hop satellite transmission. Any user can connect directly to any other user anywhere within the network, without passing through a central hub.
- Satellite resources allocated on demand. As demonstrated in the Telefónica de Argentina application, users pay for satellite service only when it is needed.
- CCITT R2 signaling structure easily adaptable to the signaling needs of individual countries.
- Economical and flexible bandwidth sharing with any mix of voice, FAX, video and data traffic.
- Expandable system architecture that allows networks to grow with increasing demands.
- The basic DAMA 10000 system can be easily customized. In addition to the rural telephony system structured for Argentina, potential applications include:
 - Public telephone networks
 - Private corporate networks
 - ISDN network extension
 - Cellular telephony backbone
 - Video conferencing

