



Gilat

Rural Telephony *Telkom SA Case Study*

The Challenge – To be Up and Running in 3 Months

Early last year, Pretoria's Telkom SA came to Gilat with a difficult challenge. Telkom needed to implement a telephone network to thousands of rural customers in remote areas, and they needed to do it fast.

The schedule was very tight. The targeted rollout of services to the rural customers had to be completed within a matter of months in order to meet the commitments of Telkom's South African telecommunications license. In some remote locations of South Africa, only three percent of the population are connected to the telephone network. And while South African cities benefit from the latest in telephone technology, people have been waiting a long time for telephone service in outlying areas. The imbalance had to be corrected. In fact, Telkom was obliged to deploy thousands of lines to rural communities by the end of 1998.

It quickly became clear to Telkom that terrestrial solutions would not work. It would



be virtually impossible to construct land lines and microwave networks in the remote, 1000 square-kilometer area in Northern Province, Mpumalanga and on the Transkei border in time to meet the deadline.



There were other drawbacks as well. The cost of copper wire would be astronomical. A wireless local loop (WLL) with a microwave radio transmission tail is not suitable for very harsh terrain, or for locations that are more than 20 kilometers away from the nearest PSTN central office. It must have line-of-sight conditions. The use of microwave repeater towers, requiring line-of-sight from one tower to the next, was ruled out. Mobile satellite telephones (GMPCS) were eliminated from the competition as well due to price considerations. These problems were only the tip of the iceberg. Other deterrents to a terrestrial solution included continuous changes to the subscriber list, the remoteness of the customers and even the lack of electricity in many of the targeted customer locations.



The Solution

All these factors led Telkom SA to choose a VSAT solution. First of all, a geosynchronous satellite, perched 36,000 kilometers above the equator can "see" an entire continent. This means that the subscriber line infrastructure is basically distance-independent.

Secondly, according to the latest COMSYS report on the VSAT industry, the number of rural telephony networks has grown significantly in recent years – and so has the role of VSATs within these networks. Currently, over 50,000 channels are expected to be in service in "approximately 25 different networks, and some of these satellite channels may well support the long distance and international connections of many more local connections," noted COMSYS.

Thirdly, one of the keys to the growing VSAT role is the availability of star DAMA systems which are based on products designed specifically to serve the one-to-three channel rural telephony market. These products have "as a primary objective, the intention of reducing the cost of the remote terminals as much as possible. For the sake of comparison, star

DAMA systems cost less than half of an equivalent mesh DAMA terminal," according to the report. The main price difference between the star and mesh systems is the cost of the associated antenna and RF equipment.

In fact, there are many more reasons why VSATs and rural networks are a "marriage made in heaven." VSATs are optimized to solve several of the major issues facing rural telephony and can sometimes mean the difference between a project's success or failure.

Cost is perhaps the most important factor. The COMSYS report indicated that in many cases "the requirement for a satellite based system is driven from a carrier's universal service obligation." This obligation is becoming more and more common in developing countries that open their markets for competition and oblige the new licensees to deploy their services to rural communities as well as to urban areas.

Time limitations and short schedules are also major issues, noted COMSYS, "because carriers often tend to put off the inevitable until the last minute, and the sudden realization that some level of state enforcement is imminent leaves no alternative but for the speedy deployment which a satellite solution offers."

Telkom turned to several of the world's leading satellite telephony vendors, among them Gilat, for solutions.





Quick Rollout Experience

"Telkom SA wanted a turnkey solution to be planned, delivered and deployed within three months. They asked the different vendors to present alternative systems – a live system demo was a must. This was a considerable advantage for Gilat, because Gilat was the only company with a fully operational system at the time. Bearing in mind the time limitations, we were asked to design a uniform outdoor installation to be solar-powered and mounted on 5 meter-high polls rather than on the roofs and walls of buildings. Most customers were small businesses and schools," said Ben Kornizer, Gilat's Marketing Manager for Africa.

Tal Meirzon, Gilat's Director of Satellite Telephony, noted "When Telkom had to make their decision, only Gilat had a field-proven rural telephony VSAT product installed in several networks around the world, and our DialAway VSAT solution was ready for massive, quick rollout. We were able to fulfill a delivery commitment for 1,000 VSATs in just two weeks. What's more, we offered the VSAT with the lowest power consumption – less than that of a 30-watt light bulb – and offered an integrated solar-power solution. The product is designed to expand seamlessly from one to three lines, without any changes in the RF and antenna. It is transparent to the PSTN, meaning that a VSAT telephone subscriber is treated as any other terrestrial customer. From the perspective of dialing and billing, the system inherently supports payphone metering as well as supervision of payphones via satellite from the a central control center. Finally, the Gilat VSAT network offered expandability and an affordable price tag."

The project was awarded to Gilat on September 1, 1998. It called for 3,000 single-channel VSATs with expansion slots for second and third VSAT channels, with 500 of the channels (lines) to be connected to payphones. Solar systems were to be provided by Telkom, with solar system integration by Gilat. The entire network would have to be installed in just a few months – a time schedule so short that it would require one of the fastest VSAT rollouts ever. The network would operate via Intelsat 704 Ku-



band Spot and be integrated with several traffic gateways at the PSTN.

Gilat challenged its own experienced technical teams to repeat their successes in previous remote telephony projects, like the large-scale satellite telephony networks in Ethiopia, Kazakhstan, Chile and Indonesia.

The System

Telkom decided to implement service with a DAMA VSAT network of 3,000 sites, based on Gilat's DialAway VSAT. Sewes Erasmus, the company's Director of DAMA VSAT and Video Service, said "Telkom chose Gilat because its DialAway VSAT features easy upgradability from one to three channels, as well as having low-power consumption, enabling solar-power."

Ben Kornizer added "DialAway is a low-cost rural telephony product that provides on-demand voice, fax and data services to and from remote locations via satellite. DialAway delivers toll-quality voice transmission and represents the most cost-effective solution for communities in areas where PSTN telephone and fax service is unavailable, unreliable or too expensive. The system is ideal for providing public call office, payphone and emergency telephone services in any location."



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DialAway™ VSAT

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In addition, the DialAway VSAT chosen by Telkom could be star or mesh topology. The star configuration is suitable for most rural applications (where remote dwellers call into regional centers), but it was important to have the mesh option as well.

Putting it All Together

Telkom could count on Gilat's commitment that the network rollout would be accomplished on time. Establishing a consortium of technicians from Gilat, with the help of GVT (Global Village Telecom) and technicians from two local South African installation companies and a local management group, Gilat set out to do the job.

"Not only was there no electricity at most sites," reminisced the captain of one installation team, "sometimes there was no running water either, and we needed water to mix concrete. Can you imagine what it was like to carry water up from a village well using a wheelbarrow?!"

The installed equipment supports two major applications – telephony (voice, fax and data modem) and selected Internet

applications (e-mail). The South African project represents the first time a sub-meter (98 cm) antenna was used in a rural telephony application. The VSAT is configured for connection to the central communications hub. The calls are routed from the VSATs to the PSTN via the hub or one of five regional exchanges (gateways). From the exchanges, the calls are routed to the national PSTN. This way, the VSAT subscriber becomes an integral part of the public network – for incoming as well as for outgoing calls.

1,600 sites were successfully deployed in only two months. The equipment arrived in October. It was in place by the end of November. On a record day, some 75 sites were installed.

Thanks to Gilat, Telkom South Africa is now able to provide a large number of rural sites – largely schools and village groceries – with basic telephone service where none existed before.