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WIRELESS VOICE AND DATA FOR MOBILE AND REMOTE OPERATIONS

Wireless Rural Loop: The Alternative Wireless Telephony Solution 55

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Wireless Rural Loop

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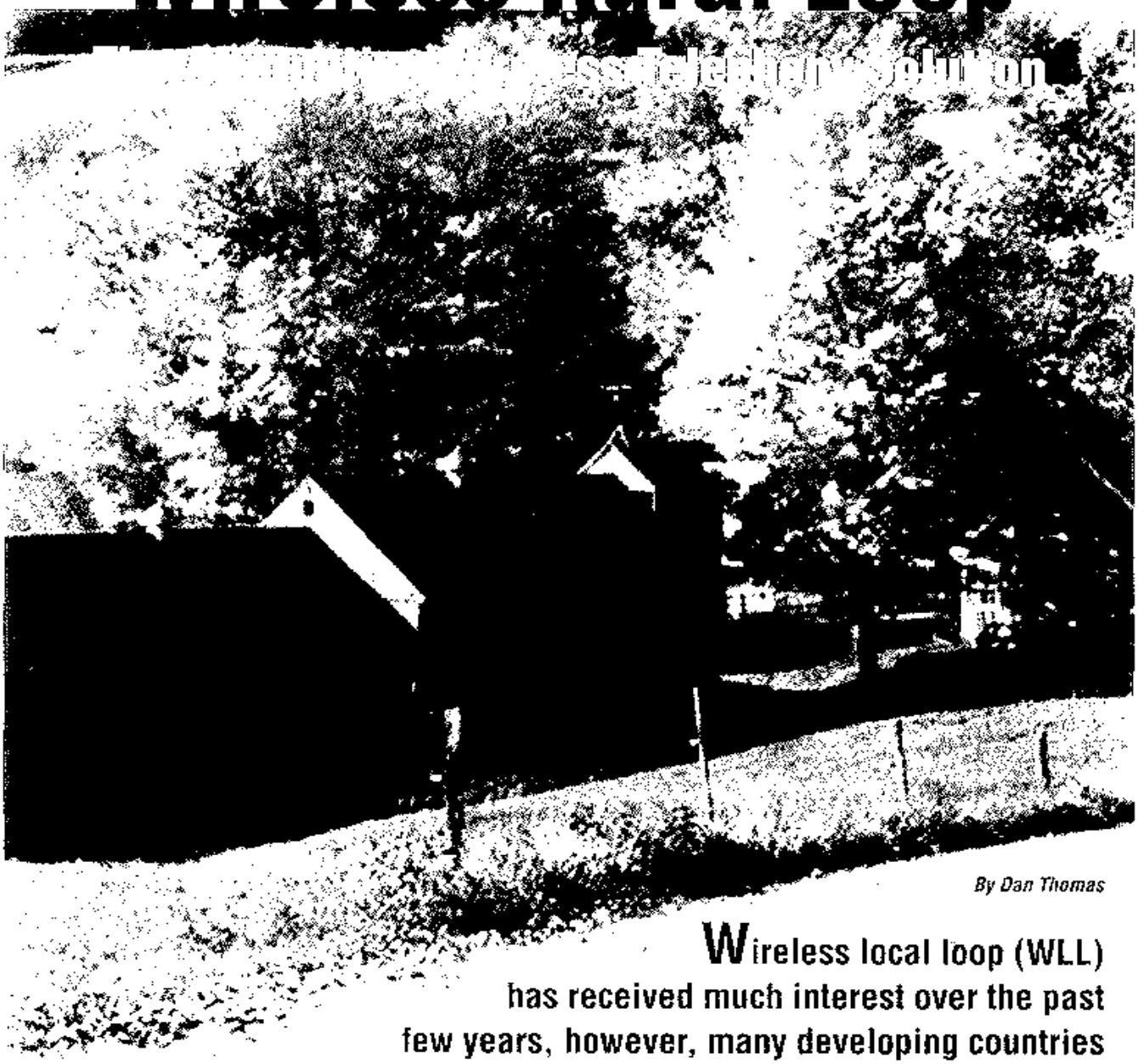

By Dan Thomas

Wireless local loop (WLL) has received much interest over the past few years, however, many developing countries discovered that products designed for WLL applications do not adequately address the unique requirements of rural areas. Another application, wireless rural loop (WRL), offers unique wireless rural telephony applications for developing countries where the population distribution and the required teledensity over a specific geographic area does not comply with the business plan of WLL-producing companies.

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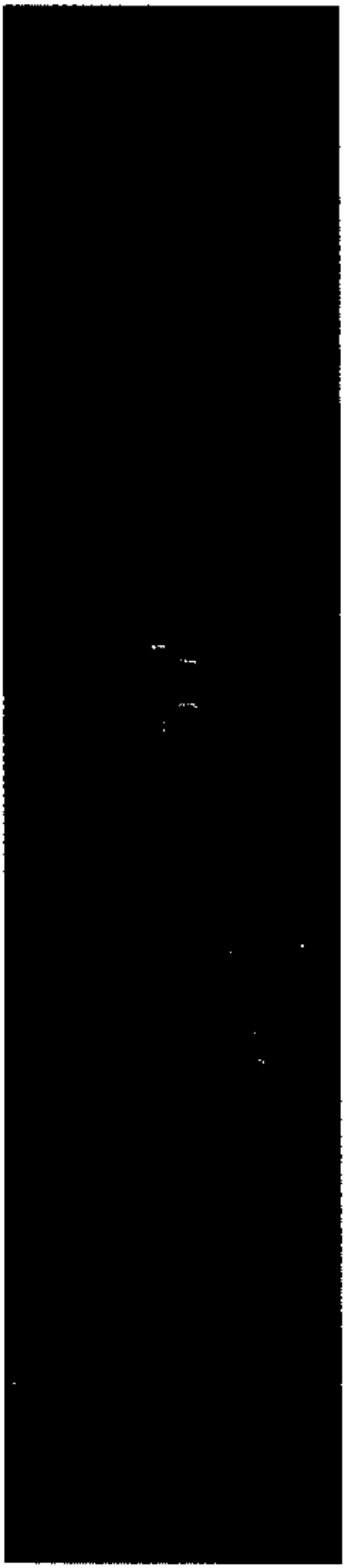
WLL is defined by *Newton's Telecom Dictionary* as "a means of provisioning a local loop facility without wires." The definition goes on to specify capacities up to T1 and data rates as much as 1 GB, however, it fails to properly address or define the unique requirements of people in rural areas. WRL, on the other hand, is a subset of WLL that specifically addresses a small number of subscribers over a large geographic area.

The original WLL concept was more of a solution to fixed cellular phone requirements in cities where the existing wireline infrastructure could not be built out fast enough. WLL projects and equipment, however, lacked adequate bandwidth to meet the ever-increasing demand for faster, seamless Internet access. Many WLL equipment providers have developed local multipoint distribution systems (LMDS) for increased capacity and bandwidth requirements.

The original frequency designations and channel allocations of VHF (136-300 MHz) and UHF (300-520 MHz) did not provide sufficient bandwidth to extend the higher speed data services; therefore, the new technologies have migrated to higher and higher frequencies — 5 GHz, 8 GHz, and 23 GHz.

The higher frequencies allow more data to pass between the wireless points, however, there are trade-offs with any new development. Higher frequencies limit the effective range of coverage (distance to remote point), and are subject to coverage problems due to small obstructions such as trees and foliage and the effects of dew, fog, and rain.

Many advanced technologies — building-to-building microwave, infrared beams, spread-spectrum technology — are ideally suited for high-capacity, short-range local applications. When wireless infrastructure requirements extend beyond city boundaries and reach rural areas and villages in developing countries, these newer technologies are not cost effective, nor are they the appropriate application.



WRL's Premise

The ideal wireless rural communication solution is one that utilizes the lower frequency spectrum at moderate radio power levels to extend the signal from its point of origin to the required service location. There are trade-offs with this solution as well, in that the lower frequencies cannot provide high-speed data transmission. Many developing countries have hundreds of sustaining villages with dirt floors and no electricity or telephone service, and while ideally all locations would have universal service for telephone and Internet access, transmission speeds do not need to be DSL, E1, or T1 capacity.

When most of us first experienced the Internet, Web browsing speeds of 9.6 kbps or 14.4 kbps were acceptable and close to the practical limit for personal use. As these limits and speed thresholds were raised to 32 kbps, 56 kbps, and beyond, the online population benefited and thus used the Internet more and more.

With moderately priced wireless rural telecommunications equipment from Telemobile and other providers, wireless Internet and telecom access into these remote areas is now a cost-effective reality for single, remote users within small villages. Individual wireless Phonelink systems are available for single-line extension and digital multiplexed Phonelink systems are available for two, four, or eight lines in a point-to-point manner.

The magical per-line cost of US$1,000 or even US$500 is an ambitious goal even for large WRL systems; however, installing WLL or larger point-to-multipoint distribution systems for less than 20 customers will exceed that figure 20 times or more. Smaller WRL systems can generally extend the same service for only two or three times the advertised WLL cost per line of US$1,000.

On the surface, the WRL cost per line may seem higher than WLL until an "apples-to-apples" comparison is made. Rather than having an undersubscribed WLL system for a thin-route wireless rural telephone requirement, selecting the

appropriate WRL technology (with its quick deployment and relocation possibilities in addition to low overall system cost) will benefit many rural customers.

Convergence Drives Change

Confusion in the communications industry is often due to the convergence of technologies and the combination of different disciplines that previously have been kept separate. We now have computer and software engineers in addition to radio technicians and designers interfacing with telephone company officials and infrastructure development planners. Quite often one word or term can have different meanings for each of the separate disciplines. For instance, does "watt" refer to RF power output or electrical consumption?

Over time, user requirements have changed though requests and words have stayed the same. For example, in the 1980s, the demand was for a wireless telephone system to make and receive regular voice telephone calls. In the early 1990s, the same wireless telephone system was expected to adequately send and receive fax transmissions. In the last few years, users expect the same wireless telephone system to provide Internet access to send and receive e-mails in addition to providing fax and voice service.

Overall, the industry has continued to address the latest global requirements for Internet access. The Geneva-based International Telecommunications Union (ITU) recently announced its launch of the Internet Training Centers Initiative for Developing Countries (ITCI-DC) on World Telecom Day, May 17, 2001. This initiative goes a step beyond the Community Telecom Centers (CTCs) to provide a central location for telecom and Internet services for developing countries.

The digital divide between the "haves" and "have-nots" will continue to be a topic of heated debate and discussion. Developing countries should not be forgotten or left behind. Many technologies are available for immediate implementation to provide part-time, temporary, or long-term solutions.

With today's choices in equipment, technologies, companies, and system design, there is a wide variety of options to connect the world's rural citizens in developing countries to the Internet and public telephone network. ■

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Telemobile, is a wireless communications solution provider based in Los Angeles, Calif. Primary customers are phone companies, oil companies, international humanitarian assistance groups, and private service providers. Visit the company's Web site at www.telemobile.com.