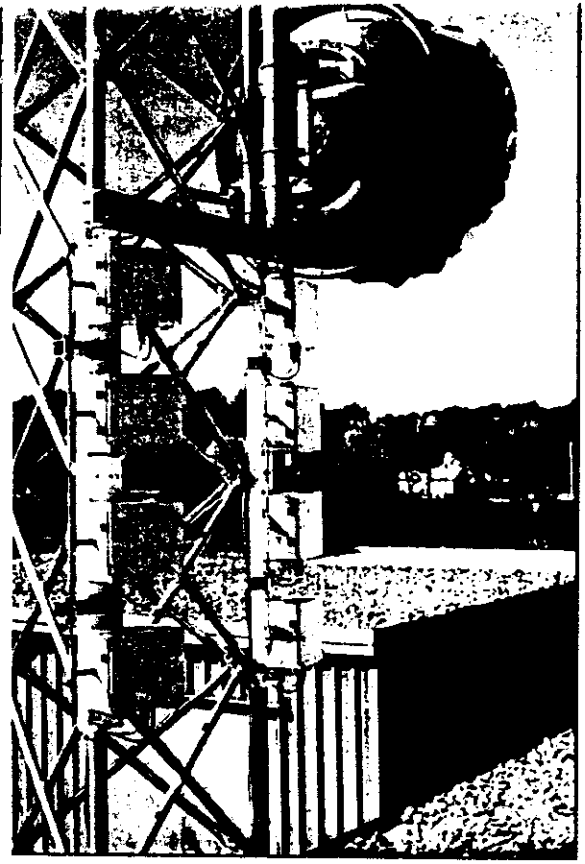


A pole-mounted antenna on a rooftop

The microwave factor in disaster recovery

The traditional role of microwave has changed. Digital microwave offers another solution for disaster recovery in the public network

JAMES E. INNES

The local loop is an Achilles heel in today's high-capacity digital networks. And it is this vulnerability that makes digital microwave technology more attractive as a means to both eliminate local access links as a point of exposure to outages and soften the blows of catastrophic circuit failures.

Microwave no longer plays its traditional role as the basic transmission medium for long-distance trunking in the public telephone network. Since the AT&T divestiture in 1984, microwave has largely been supplanted by the deployment of fiber optic technology by both local exchange and interexchange carriers. This change has occurred even while microwave has benefited from the many developments in digital transmission technology. Most notable are improvements in digital modulation schemes and a decrease in component costs.

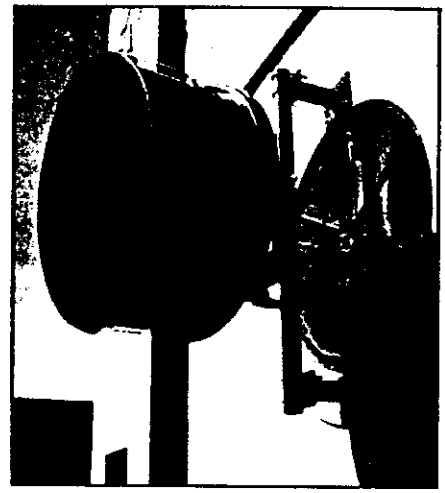
Real growth in microwave radio deployment has been in short-haul systems, which operate in the 10-GHz, 18-GHz and 23-GHz bands that are suitable for paths of 10 miles or less. Less stringent Federal Communications Commission requirements for frequency stability and bits/hertz efficiency have facilitated the development of low-cost, modularly designed digital radio systems. These systems provide full-duplex digital transmission with interfaces that conform to the North American digital transmission hierarchy.

In disaster avoidance applications, microwave radio has proven useful to gain both mode and route diversity for multi-DS1 and DS3 capacity circuits. The most common application is in providing diversity for interexchange carrier access circuits in central metropolitan locations. Primary routes are usually provided by the local Bell operating company. Due to high central city construction costs and limited availability of underground conduit space, it is difficult or even impossible for the BOC to economically provide a cable-based diverse route from a customer premises to an IXC point of presence.

Short-haul digital microwave is the answer to this dilemma because these radio systems can be readily deployed. Line-of-sight paths, with or without repeaters, can be established between rooftops of office buildings, apartment houses and other commercial buildings with minimal engineering. Spectrum availability in the 10-GHz, 18-GHz and 23-GHz bands is high with few frequency coordination problems, even in highly radio frequency-congested areas like New York City. One technician, assisted by one or two laborers, can install the system.

The greatest concern in constructing short-haul microwave systems in urban areas is obtaining roof access and reasonable rental rates. Many commercial real estate firms view antenna space rental either as a barely necessary evil or an opportunity to charge whatever the traffic will bear. A building manager with a negative attitude can be a serious roadblock.

With deployment of a diverse route via microwave, an end user gains highly reliable communications. It is unlikely that a cable cut or CO failure also would lead to simultaneous failure of a diverse microwave path. One exception would be in the case of a power loss coinciding with a catastrophic circuit failure. But use of a battery back-up or an uninterruptible power system supporting the radio would eliminate even that possibility.



Close-up of a wall-mounted microwave antenna

If a business does not want to devote the engineering and capital resources necessary to implement a microwave system for route/

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mode diversity, a carrier option is available. A few FCC-authorized common carriers now offer short-haul microwave-based carrier services. To obtain these services, a user only has to specify terminal and IXC locations; the carrier will survey the path and offer a proposal.

If the proposal is attractive, the user can order the required service. The carrier then performs all necessary engineering, equipment procurement, licensing, installation and ongoing maintenance. These services are charged on a monthly basis under a fixed contract.

In disaster recovery applications, short-haul can be rapidly deployed to provide transmission when circuits are destroyed. A catastrophic loss of a circuit occurs when transmission has been lost for more than six hours with no foreseeable prospects for restoration. The impact of the Hinsdale, Ill., CO fire was catastrophic. Few people affected by the outage truly understood its magnitude or how long they would have to wait for circuit restoral.

With grim prospects for quick circuit restoral, some IXCs, notably MCI, joining with Illinois Bell were able to get Digital Microwave Corp. to divert a significant amount of their then available 18-GHz and 23-GHz radio products to provide at least minimal circuit restoral. For example, temporary paths were set up between an MCI POP and large volume users, such as telemarketing operations and financial institutions. Radio installations, without the complications of permanent mountings, were cut over in as little as four hours from delivery to the site.

The alternate access carriers have taken this a step further by offering rapidly deployable microwave radio for disaster recovery on a service basis. This service is optimized for digital access circuit recovery to backup connections between the end user and its chosen IXC POP. The carrier pre-surveys and pre-engineers the path and points to ensure that reliable communications can be established quickly when necessary.

Pre-engineering can mean merely identifying appropriate roof sites for tripod-with-sandbag mountings. It also can mean pre-installation of antennas and waveguides on towers. Frequency clearance and path performance studies also are performed so that a radio in the appropriate frequency band is chosen. The customer then keeps the carrier on a monthly retainer with the option of running occasional disaster recovery drills.

If a client requests service, the carrier responds on-site within a specified interval—usually 12 hours—with the radio system and an installation crew to install and cut over the radio. The radio is then left in operation for the duration of the telco circuit failure.

The microwave factor is critical to contingency planning. In both disaster avoidance and recovery applications, it has proven to be a reliable approach. ■

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