

An aerial photograph of a harbor in Bermuda at dusk. Several sailboats are anchored in the water, and their lights are visible. In the foreground, there are white houses with red roofs. The background shows more houses and greenery on the island.

# Bermuda Reinvents Paradise

BY TONY GRAUSSO

Already a premier tourist destination, the island continues to invest in a key strategic resource...

**P**ICTURE-postcard perfect, Bermuda long has been popular with tourists. And the country long has benefited from this status. Some 60% of the island's foreign earnings are derived from its service-based economy. But there is a downside to dependence on tourism. During a global recession—or, particularly, a U.S. recession—Bermuda suffers when luxuries such as travel are curtailed.

Faced with this situation, Bermuda's Commission on Competitiveness determined an enhanced telecommunications infrastructure is vital for economic stability.

Thus, the Bermuda Telephone Co. instituted a network modernization program to help strengthen the economy by providing the best communications capabilities possible. These capabilities should enhance the com-

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... its  
telecommunications  
infrastructure.



## Paradise Found

**T**HE year was 1503. Sailing across the Atlantic to explore the New World, Juan de Bermudez encountered a curl of uninhabited islands surrounded by turquoise seas. Bermudez charted his find, then abandoned the islands for the promise of greater riches.

More than a century later, a hurricane scattered a supply-laden English fleet bound for the Virginia Co.'s Jamestown colony. The *Sea Venture* wrecked upon reefs off the same islands Bermudez happened upon; thus, a new colony was born.

In 1612, the Bermuda Co. purchased the rights to the islands from the Virginia Co., and in 1684, the Bermuda Co. Charter was conveyed to the British Crown. The island was governed by an Executive Council, or advisory body, until 1968 when Bermuda adopted a representative government elected by the people.

Today, the government comprises a governor who represents the Queen, a premier elected by his

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petitiveness of existing businesses and attract new businesses, resulting in a more diversified, less vulnerable economy.

Not that the island is in economic trouble. Bermuda has a mere 2% unemployment rate and a per capita income of \$23,000, third in the world. The infrastructure overhaul is a strategic investment in a core digital fiber communications platform that can deliver the newest services today and be enhanced to provide emerging services via Synchronous Optical Network (Sonet) and asynchronous transfer mode (ATM) technologies.

Because of Bermuda's highly developed infrastructure, strategic location and pro-business laws, more than 7000 international companies have incorporated or maintain key offices in Bermuda. The island also has become the premier offshore location for reinsurance companies.

"Telecommunications is the key that allows multinational companies to reside here," says James King, vice president and vice chairman of Bermuda Tel. "Our banking industry, for instance, consists of principally Bermudian enterprises, but it is an international industry. Our banks are global, with branch offices in Luxembourg, Cayman, London, New York, Hong Kong and Guernsey [UK], among other locations. And they require superb voice and data communications.

"Because of this, our domestic arm of communications must be at the leading edge of development," he adds. "We have to provide the local capability to effectively link all of the global offices and provide as close to instant contact as possible. And, importantly, against our framework of quality communications, we can attract new businesses to Bermuda."

To that end, Bermuda Tel has installed one of the most advanced digital, fiber and cellular networks in telecommunications. The telco offers a range of advanced services including central office-based voice mail; switched 56/64 kbps service (national and international); CLASS (customized local access signaling services) features, including calling number deliv-

ery and selective call acceptance and rejection; centrex/custom calling features; and digital cellular service, which extends more than 75 miles out to sea. The company also is trialing Northern Telecom's VISIT, a PC-based product providing desktop video conferencing, file transfer and document sharing capabilities via switched 56 kbps service.

The public switched telephone network is driven by dual Northern Telecom S/DMS SuperNode switching systems—a DMS-100 host in the capital city of Hamilton and a DMS-100/200 toll host in nearby Paget. Both systems are outfitted with full enhanced network, link peripheral processor and Sonet capabilities.

A pair of OC-12 S/DMS TransportNodes connect the sites. These nodes increase channel capacity between the two central offices (COs), ready that portion of the network for wideband service distribution to customers and provide Hamilton businesses with alternate services access.

Host COs are linked via fiber to DMS remote line modules at West, Southampton, East and St. George; and to six DMS outside plant modules (OPMs), one on Ireland Island North, two at the U.S. Naval Air Station Annex in Southampton and one each in Paget, the area of Flatts and East.

Finally, a DMS-MTX SuperNode digital cellular switching system in Hamilton provides island-wide service in conjunction with six combined General Electric and Motorola Nortel cell sites at St. George, Flatts, Paget, Hamilton, Southampton and West.

Bermuda Tel claims its sophisticated customer base keeps the company on the leading edge of communications.

"Like any corporate business community in the world, ours requires the best available services," says Ernest Pacheco, the company's general manager and secretary. "But unlike other countries, Bermuda has a very demanding residential customer base as well. Many homes have two or three lines including a fax machine or a data circuit. And our customers are very well-traveled, very well-schooled. As a result, they are aware of and they

*Bermuda is a study in contrasts—Old World charm and New World technology exist side by side. Motorola's Nortel cell site in St. George is situated at a fort overlooking the approach to St. George's harbor. A cannon emplacement and 40-foot deep moat surround the fort/cell site.*





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party, an elected House of Assembly and an appointed Senate.

Over the years, Bermuda has figured in international events: accommodating a supply and naval yard for England during the American Revolution and the War of 1812; trading munitions for cotton with the Confederacy during the U.S. Civil War; providing land for a U.S. naval complex; hosting the "Big Three Conference" in 1953 among Dwight D. Eisenhower, Winston Churchill and French Prime Minister Joseph Laniel; and serving as home to a NASA tracking center.

Bermuda annually welcomes more than 500,000 tourists, the vast majority from the U.S. Lured by a semitropical climate, visitors are charmed by a unique blend of British and island influence exhibited in quaint, bucolic villages.

For recreation, the island boasts the world's highest concentration of golf courses per square mile. Miles of pink-sand beaches and reef-enclosed waters are ideal for sunbathing, swimming and snorkeling.

As a result, tourism drives the economy. But other critical industries such as insurance and reinsurance, finance, retailing, publishing, computer software licensing, oil, communications and shipping contribute as well.

The island's laws and economy are conducive to business. The Bermuda dollar is on par with the U.S. dollar. And corporations need not worry about income or capital gains taxes, or taxes on profits. Not surprisingly, more than 7000 international companies have incorporated in and operate from Bermuda.

This is the economic segment Bermuda hopes to expand with the help of Bermuda Telephone Co.'s infrastructure modernization. ■

demand the very latest services. Our goal is to satisfy them."

Many Bermudians work for multinational companies and often require miniature offices in their homes. "At 2 am, either through voice or data, they may have a need to communicate with various resources to the east or to the

west," says Collington Perinchief, assistant general manager-operations. "This requires us to deliver to the home those exact same sophisticated services we deliver to the workplace." Data traffic is growing annually between 10% and 12%, partially due to residential demand.

Cellular service also crosses the boundary between business and residential applications. "Our business and professional community provided the earliest users," says Eugene Saunders, assistant general manager-network planning.

"Taxis, other transportation agencies and public utilities were also early customers, as were small business owners who find that cellular is very cost-effective because it allows them to take their office with them and cut the expense of clerical help. Now, growth in the service is increasing from the general public, especially as equipment costs come down."

Cellular is growing annually more than 20%, accounts for 3% of the telco's business and currently penetrates 4% of the population.

Bermuda Tel's most significant endeavor will be to build on its digital fiber platform and deliver to customers' doorsteps—via fiber to the home and fiber to the business—interactive communications capabilities including distance learning/interactive education, telecommuting, multimedia libraries, medical imaging/radiology, interactive games, movies on demand, high-speed PC communications and high-definition television.

"Because of our digital fiber platform, our customers will have the opportunity to move into interactive communications," says King. "Not only will the multinational corporate customers benefit, but it will also allow the residential customer to interact with all of their commercial partners—the bank, the utilities, the grocer, the department store or with whichever provider of services or goods they require."

"The home will become a communications center," says Pacheco, "with capabilities to access an infinite number of voice, video and data resources. This is where we are headed, indeed where the industry is headed. Anyone

who doesn't realize this is going to be quickly left behind."

Perinchief adds, "We're a few years ahead of the game, but we want the infrastructure to be in place to accommodate such services. And the presence of such an infrastructure will only help to encourage the development of these services. Once you put the bridge there, someone will find a way to put traffic on it."

With its digital fiber platform, Bermuda Tel envisions the island as a repository for globally accessible data bases—a warehouse for voice, data and image files. "We have the potential core facilities to attract emerging service provider companies, the keepers of the data bases," says Gary Edwards, assistant general manager-finance and information systems. "They can establish data bases here—whether it is a Library of Congress or a university medical data base—that can be updated and accessed from anywhere."

The Bermuda government, together with Bermuda Tel and its international gateway partner Cable & Wireless, actively have pursued new business. Last summer, they hosted a consortium of *Fortune 500* companies considering Bermuda as a site of a communications hub for the U.S., Europe and South America.

The recent bombing of New York's World Trade Center highlights Bermuda's main attraction as a data base repository—security. Just 600 miles off North Carolina's coast, the island—a NATO member—offers a highly controlled and secure environment that is home to a U.S. Naval Air Base and the British Atlantic Area Naval Headquarters. Together, they monitor the surrounding water and sky closely.

One concern remains, however: Bermuda Tel may be a telco ahead of its time. "We may find that we have a unique capability," says Pacheco. "We may be able to deliver the goods through an international gateway to foreign shores, but unless the facilities on the other end can distribute the signals to their intended destination, what good is it? We very much need to work with our counterparts on the mainland to ensure we're all moving toward the

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## Bermuda Telephone: Past, Present and Future

**T**HANKS to its sole telephone company, Bermuda always has been on the communications vanguard. A private company, the Bermuda Telephone Co. was founded in 1887, a mere decade after the telephone was invented. In July of that year, the company placed its first exchange—a single-position magneto switchboard—into service. A single operator routed calls for the entire customer base—twelve subscribers.

By the early 1900s, the telco replaced the magneto switchboard with a central battery system, which, in turn, was replaced by an automated system. A radio-telephone system accommodated overseas communications. During the next upgrade, step-by-step/crossbar systems were installed in Hamilton (1959) and Bailey's Bay (1961).

In 1962, an 865-mile undersea cable project was completed, connecting Bermuda to mainland America. (Two additional undersea cables were laid later—one to Canada, the other to the West Indies.) By 1970, the telco brought three new exchanges on line, and subscriber lines totaled 23,500.

A 10,000-line electronic switching

system was introduced in 1975 to handle local and international traffic, and subscribers could dial long distance calls directly for the first time.

By 1981, the telco discontinued party lines and total network capacity reached 30,000 lines. One year later, automated directory assistance became available.

1983 marked the start of the company's all-digital service conversion. It installed a local and long distance digital switching system (DMS-100/200 with a traffic operator position system) in Paget; the building housing the switch was designed to resemble a traditional Bermuda cottage to comply with zoning requirements. The telco installed a 6000-line DMS-100 in Hamilton, and four DMS remotes totaling 10,400 lines replaced electro-mechanical systems in Southampton, East, West and St. George.

The island was flash cut to digital service in 15 minutes, making it compatible with North America. Simultaneously, the telco liberalized, allowing interconnect and customer-owned equipment to connect to the network. Another first: custom-calling services.

In 1984, Bermuda Tel's partner, Cable & Wireless, installed a satellite earth station. The project linked Bermuda and England, giving the island an alternate route for international traffic.

Between 1986 and 1993, six DMS outside plant modules were added: one on Ireland Island North, two at the U.S. Naval Air Station Annex in Southampton and one each in Paget, the area of Flatts and East.

By 1987, Bermuda Tel deployed fiber throughout the network to carry interoffice and overseas traffic to Cable and Wireless Teleport. AMPS (Advanced Mobile Phone Service) cellular mobile radio service also was introduced.

The telco made central office-based voice mail available to residences and businesses in 1989. In 1990, common channel signaling and CLASS (customized local access signaling services) services were rolled out.

Bermuda Tel is focusing on several further enhancements: It upgraded DMS-100 switches to S/DMS SuperNodes with enhanced network and link peripheral processor capability; implemented multiple OC-12 DMS TransportNodes, establishing a Synchronous Optical Network connection between its two DMS SuperNode central offices; and began converting the island-wide cellular network to DMS-MTX SuperNode digital cellular switching systems.

Today, Bermuda Tel provides more than 42,000 access lines (including cellular) to the island's 56,000 residents, or approximately 75 lines per 100 people. Seventy percent of these lines are residential.

### Bermuda

**Location:** 600 miles east of Cape Hatteras, N.C.

**Capital:** Hamilton

**Population:** 56,000

**Size:** Three main islands; more than 150 smaller islands; habitable area totals 22 sq. mi.



same vision and following the same standards."

"We don't want to have to build our bridge two or three times," echoes Perinchief. "We want to get the right bridge in place the first time around. The switching platform is in place. And we can get the fiber out to the field, but we can't deliver it to the doorstep just yet. And that is the short portion of the link that we require now—or some assurance that if we do take fiber to the curb, there is not going to be some

redesign needed to take it to the doorstep.

"We don't want to get fiber out to the curb only to find out that in order to take it to the customer's doorstep, we have to go back to the central office because of technology incompatibilities that can potentially occur."

To ensure the network's viability, Bermuda Tel may add up to 20 S/DMS AccessNodes to build multiple Sonet rings, which will prepare the network for ATM broadband switching and

deliver various services to the island's business and residential communities.

Bermuda Tel aims to complete the network overhaul by 1998, but dividends from this strategic investment already are being reaped as more multinational corporations set up shop in Bermuda. Who says you can't improve paradise?

*Tony Grausso is a senior editor-marketing communications for Northern Telecom, Research Triangle Park, N.C.*