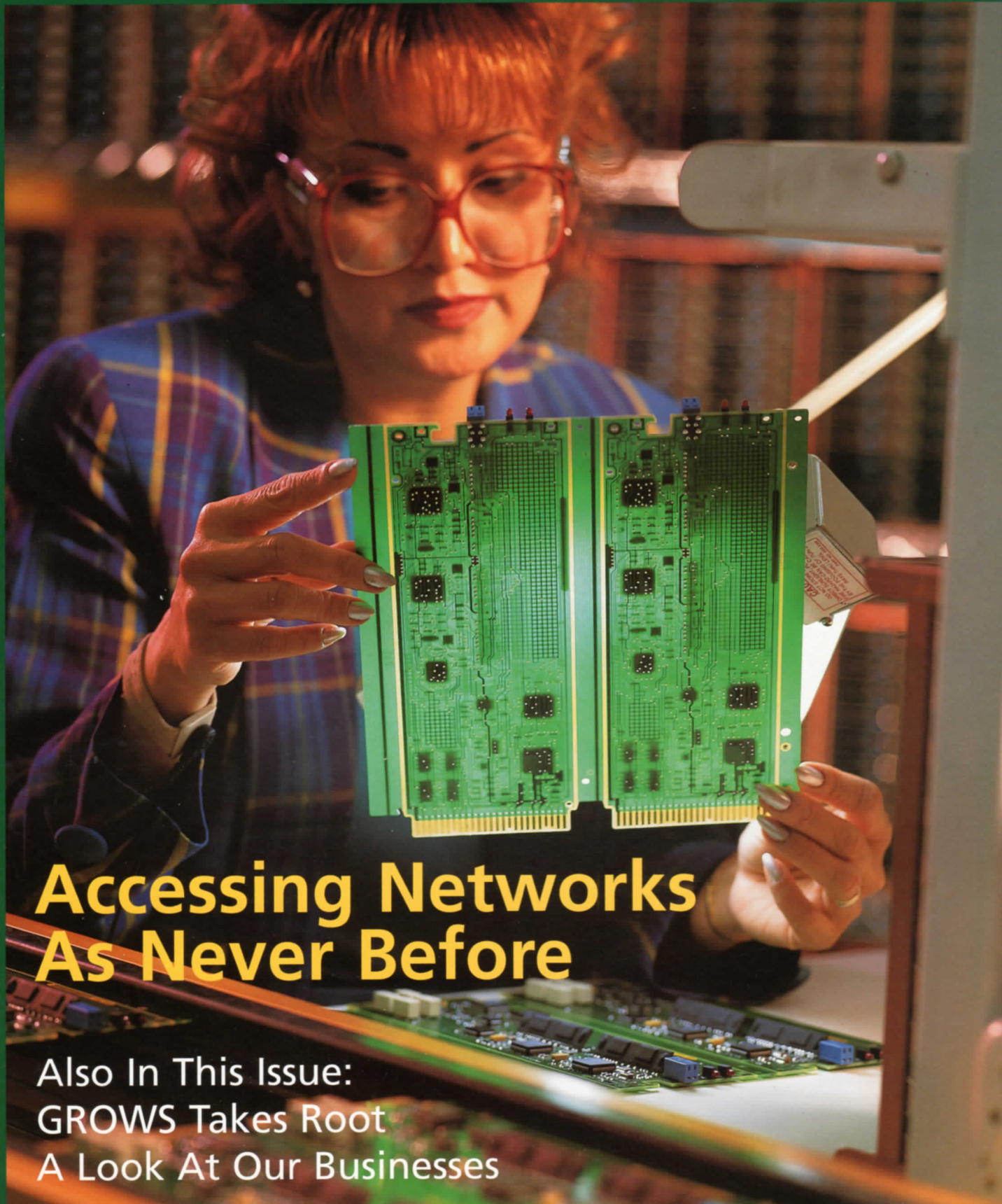# Lucent
## magazine

## Accessing Networks As Never Before

Also In This Issue:
GROWS Takes Root
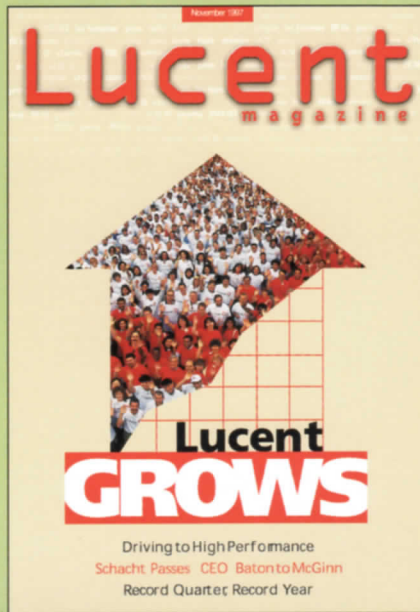A Look At Our Businesses

## Times Have Changed

The article on the 5ESS-2000 switch installed in Qingdao, China, brought to mind an experience I had while there in 1946 with the First Marine Air Wing. While repairing a radio beacon for China National Airways, I needed to call the air base for a part. At a pay phone, an operator told me to stuff a number of bills through a slot in the top of a wooden box located below the phone to make the call. The 5ESS switch now appears ready to modernize telecommunications in that ancient land.

MARVIN IWERKS
Oxford, Md.

## Equal Access...Not

As I've read in numerous Lucent publications, it's nice that many employees can log onto the Internet. However, please remember that I, and a vast majority of employees, do not have Net access.

ULRICH ASMANN
North Haven, Conn.

**Lucent** magazine

November 1997

**Lucent GROWS**

Driving to High Performance
Schacht Passes CEO Baton to McGinn
Record Quarter Record Year

## Sense of Progress

Magazines like this convey a sense of responsibility and a sense of being part of progress.

HENRY PETER
Naperville, Ill.

## Love That Logo!

I am a new employee with Lucent. I love the Lucent logo. I put Lucent stickers on my wallet, rucksack, briefcase, cupboards and everything else I get my hands on. A few people in Saudi Arabia even have Lucent T-shirts and caps. Employees devour Lucent logo items as soon as they arrive. It's a great way to advertise the company and boost Lucent's corporate identity.

GEORGE THEKKINIYATH
Riyadh, Saudi Arabia

## Choose Words Carefully

Choosing words for campaigns and for use in global magazines must be done very carefully. In parts of Europe, obsessed means sick, ill and lacking control of your senses. It's good to have feedback channels so we can really GROW, but in a different meaning — grow toward a global Lucent family that understands each other better.

GERARD JACOBS
Hilversum, the Netherlands

## Write to Us

Please share your opinions about Lucent Magazine with us by sending letters to:
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If you want to learn more about wireless, check out the premiere issue of lucent.context, our new online magazine. It's animated and a fun way to learn about one of Lucent's fastest-growing businesses. Visit:
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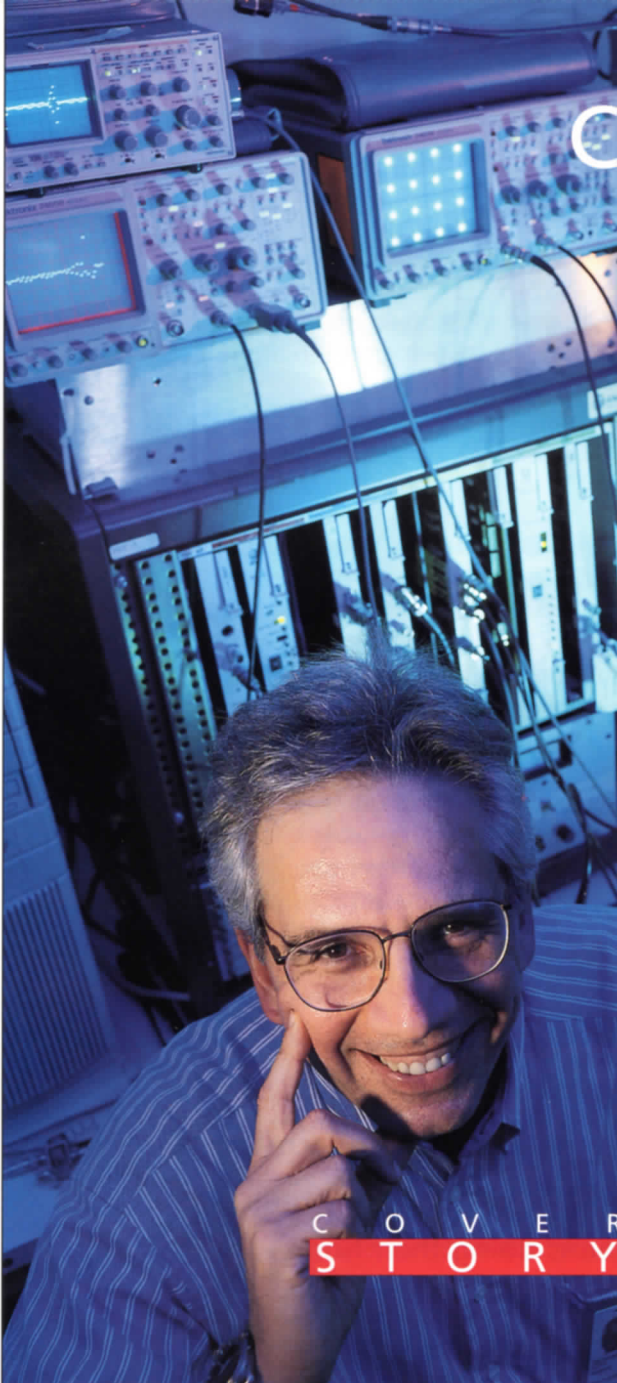
ROGER TULLY

COVER
**STORY**
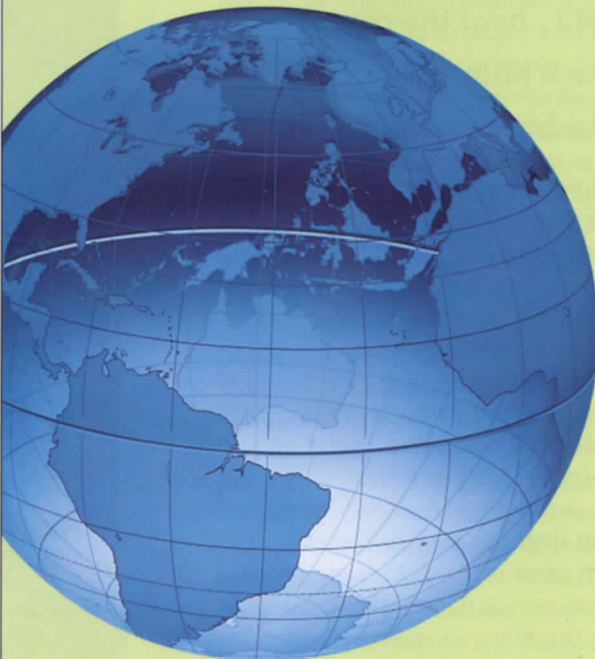
JEFF RYCUS

# Contents

**On the cover:**
At the Oklahoma City Works,
production technicians like Nancy
Presley work on printed circuit
boards, which are at the heart
of network access systems that
supply high performance data
connections through the Internet,
as well as reliable voice services.

**Cover photo by Roger Tully**

# GROW
## *Gains Ground*

## Five Teams Lead The Way

**A Lucent team in Mexico City looked for global growth — and found it — with an emerging carrier in an emerging market. People in Atlanta focused on results and found ways to decrease costs and increase productivity. To associates in Columbus, Ohio, being obsessed with customers means doing their homework on customers and competitors. In Denver, people reached out for help — and got it — from an unlikely partner in Oklahoma City. And a team in Basking Ridge and Holmdel, N.J., beat the competition to market by thinking like a little start-up while leveraging the technology of a big company.**

These stories aren't extraordinary. They're examples of Lucent people who exemplify GROWS behaviors in their everyday work lives. And they're people we all can learn from.

### Global Growth Mindset

Perseverance won the business of a new carrier in the emerging telecom market in Mexico. The $35 million project could grow to more than $100 million as Amaritel builds out its network. Perhaps more importantly, the contract establishes Lucent as a friend to new carriers in a country that's hungry for infrastructure.

In February 1996, Amaritel won a concession from the Mexican government to provide local and long-distance service along Mexico's gulf coast. When the Lucent sales team in Mexico began the proposal process for Amaritel's business, it faced strong competition from Alcatel and Ericsson. But the team soon saw where Lucent had the clear advantage: knowledge of networks. The

*Get Scrappy*

HECTER AMEZQUITA

competition could offer Amaritel equipment and financing. Lucent could offer the fledgling company equipment, network planning, design, services and support. Lucent also assisted Amaritel in obtaining its own project financing. "They needed a 'turnkey' provider," said Guy Ginestet, Lucent's Amaritel account executive who led the team that fought for the contract for nearly two years.

One year after Amaritel won the concession to provide service, Ginestet got the call he'd been waiting for. "They said, 'You are the winner.'" But Alcatel wasn't going down without a fight. "They launched a counterattack," said Ginestet. "Soon we got a call from the customer saying, 'We have a new offer, and it's better than yours.'"

That's when Lucent brought in more ammunition. The team of seven in Mexico grew to a global group of 40. "As the customer wanted more and more information, we got support from many teams," said Rogelio Velasco, general manager for Lucent Mexico. "People in the United States gave us tremendous support — helping us with technical problems and working through issues regarding the network infrastructure."

After six months of renegotiations, Amaritel finally signed with Lucent on Sept. 9, 1997. "It's the first contract to be signed with a new operator in Mexico, and it's the first contract to be signed with a local and long-distance operator in Mexico," Ginestet said. "Amaritel's success is closely related to our success."

## Results-Focused Change

At Lucent's AT&T Customer Business Unit (ACBU) in Atlanta, people are inventing new ways to do their jobs better — and watching costs fall as days disappear from delivery cycle time. Engineers and drafters recently embraced an electronic documents process that's saving an estimated $1.5 million per year in paper alone and shaving 10 days off every order.

The old process was redundant. Engineers receiving an order for new equipment wrote the specifications and manually marked up a drawing showing the technicians where to install the equipment. Then the drawing was sent to a drafter who entered the pencil markings into the computer. Finally, the drawing was reproduced and mailed to the installer and customer.

Last summer, drafters began training engineers to mark up their drawings online. The process that used to take up to three weeks now takes three hours, and the drawings are available instantly online.

"We process 8,000 orders a year for 1,000 AT&T locations," said Chris Camacho, engineering director for the ACBU, "and cycle time is a huge market driver. AT&T, like every other customer, is saying, 'I need it faster.'" A year ago, engineering had a 52-day cycle time per order. Today, it's less than 30 days.

Cycle time also is decreasing in the Atlanta ACBU's next generation lightwave network (NGLN) business. The NGLN team — charged with increasing AT&T's transmission capacity — has increased productivity sevenfold over the previous year.

Angela Beavers-Taylor, NGLN project team leader, said the team made this astonishing improvement by setting clear goals, establishing cross-functional teams and making some radical process changes. For example, performing functions in parallel is a simple solution that's helped slash NGLN cycle time in half. "We are shipping core material before the engineering process is complete," she said, "and beginning the installation process before all of the equipment has arrived."

### Cut Cycle Time



Drafter Kristen Golden teaches Steve Pullen, engineer, how to use software that's saving $1.5 million in paper and shaving 10 days off every order.

Guy Ginestet led the Lucent team in Mexico that fought for the Amaritel contract for nearly two years. The work paid off in a $35 million contract that could grow to more than $100 million as Amaritel builds out its network.

## Obsessed with Customers

Before a customer or competitor visits Columbus Works, everyone there — from production associates to factory managers — hits the books. Fact sheets about the visitors are distributed to employees to explain who will be on the tour, background on the customer and key competitors, the purpose of the tour, areas within the factory they'll be visiting, and "hot buttons" for the customer.

Involving everyone in customer visits is just one way the people of Columbus Works are becoming customer-focused. The facility also offers classes, speakers and other educational opportunities. And factory leaders keep everyone informed of developments in the marketplace.

Every month, Ed Hines, global provisioning and manufacturing vice president for the Wireless Networks Group, frankly discusses customer wins and losses with employees. "We're driving customer obsession because wireless is a very, very competitive business," said Hines. "We don't have jobs because of Lucent. We have jobs because of customers. And we have to earn those customers every day."

Columbus Works put together its customer obsession team several years ago. "In 1994, we renovated the factory to handle the wireless business," said Connie Lambeth, a member of the team. "The factory changed. But what about the people? Our workforce was internally focused because we had only served one customer."

According to Lambeth, most associates had never seen or met a customer. The goal was to make customers real to the people of Columbus Works. The result has meant more than a better understanding of the market in which Columbus Works competes — it's turned the facility into an extension of the Wireless sales teams.

Dee Baker, a production associate at Columbus Works, has participated in many visitor tours over the past several years. According to Baker, customer tours are a matter of pride at Columbus Works. "When we hear a customer is coming, everyone starts sweeping and dusting," said Baker. "We have one of the cleanest factories."

Preparing for her next visitor — Mike Himes, assistant director for network implementation with Ameritech — Baker said, "I'm going to tell him that we've got the highest quality, lowest cost and on-time delivery — and that customer obsession is our way of life."

## Workplace Breeds Creativity

A workplace that's open, supportive and diverse breeds creativity. And creativity leads to innovative solutions to common problems, as it did at Business Communications Systems' (BCS) DENPORT West in Denver and the Switching and Access Systems Group's Global Provisioning Center (GPC) in Oklahoma City.

When *Definity* Enterprise Communications Server (ECS) sales soared above DENPORT West's manufacturing capacity last fall, Moe Tabrizi, engineering manager for the *Definity* ECS product line, had to act quickly to meet the unexpected demand. "We took the typical measures — overtime, triple shifts, using other production lines and working on Saturdays and Sundays." But it became evident that DENPORT West simply could not meet customer demand through normal means.

"I asked my engineers to do some probing outside our factory walls," said Tabrizi. The engineers couldn't call on their sister factory, DENPORT South, in Shreveport, La., for help. "When our business goes up, their business goes up," said Tabrizi. Instead, they called the Switching and Access Systems Group's Oklahoma City GPC, a business with different ebbs and flows in demand, but one that manufactures something similar, *5ESS* switch boards, which happen to be the same size as *Definity* ECS boards.

The Oklahoma City GPC had the capacity and agreed to help. "It

On a recent tour of Columbus Works, Ameritech's Mike Himes hears from the people who make the products. Dee Baker tells him, "Customer obsession is our way of life."

Special delivery: John Rives arrives in Denver with sample boards in hand. The boards were tested by DENPORT West engineers, and production began the following day at the Oklahoma City Global Provisioning Center.

was a very unusual request," said Merry Voeller, switching circuit pack realization manager in Oklahoma City. "But they needed packs, and we had the capacity."

Cross-functional teams in Denver and Oklahoma City retooled and re-engineered the production lines at the GPC to produce the boards. Ten days later, John Rives, DENPORT West engineer, boarded a plane with sample boards produced in Oklahoma City and hand-delivered them to engineers in Denver for testing. Oklahoma City began production of *Definity* ECS boards the following day.

The experiment in cooperative manufacturing surpassed expectations. "It was a great experience, which benefited our production people, our operating unit and our corporation," said Voeller.

"The team in Oklahoma City showed tremendous commitment and flexibility — as did my team here in Denver," added Tabrizi. "We're hoping someday we can return the favor."

## Speed to Market

Speed to market with a new product often means the difference in becoming a market leader or a market laggard. Take Lucent's Internet Telephony Server for enterprise customers, for example.

Making an inexpensive international call over the Internet was a novelty reserved for well-connected computer hobbyists — until recently. Although phone calls via the Net were possible, walkie-talkie voice quality made Internet telephony a not-so-plausible solution for businesses looking to lower costs. Last year, BCS strategists decided this market void was one Lucent should fill fast.

In November 1996, BCS created the Internet Communications Business (ICB), a 35-person internal venture to research, develop, deliver and market Internet-based products that bridge the gap between voice and data networks. The ICB's first challenge was to bring to market an Internet Telephony Server for business customers within one year.

With the speed of a start-up and brains of a big company, the ICB, now part of Data Networking Systems, had an Internet Telephony Server trial under way in six months. By August 1997, the Internet Telephony Server had its first paying customers — meaning the team beat the ambitious one-year deadline by two months.

"Speed was important because there are a lot of small start-ups with product or close to it," said Jeanne Bayerl, technology manager for the group. Lucent's advantage over its Internet telephony competition came in part from the ICB's ability to leverage technological breakthroughs from *elemedia* and Bell Labs.

Marketing also played a role in the product's speedy rollout. In fact, the marketing effort began before the product existed. "Lucent became known for this before we even had a product," said Bayerl. "We wanted to be the first large company to get product to market to capture the 'mind share' of the industry."

Todd Wiebe, marketing manager for the ICB, said it was crucial that he be able to get to Lucent's existing customer base before the competition. "There's a lot of curiosity out there, and we wanted to be the first to talk to our customers about this product." **O**

*— Brooke Houston*

*Think Fast*

Thinking like a little start-up, members of the Internet Communications Business, including Jeanne Bayerl, sped Lucent's Internet Telephony Server to market.

Web Without Wait

# Hot New Net

On Jan. 19, Lucent announced a digital subscriber line (DSL) technology that delivers up to 30 times more information than users get today over conventional phone lines in the local loop that connects the central office to the home or business.

"Now people can enjoy the Web without the wait," said Dan DiLeo, wireless and multimedia integrated circuits vice president with Lucent's Microelectronics Group. "A 30-fold increase in the speed of delivering Internet traffic is nothing short of spectacular."

Added Janet Davidson, product management and marketing vice president, Switching and Access Systems Group, "The announce-

ROGER TULLY

# twork Access

ment is the latest in the access wars — the battle to squeeze the most information through the local loop." With the Internet soon to be a tool of 100 million people worldwide, demand for network access that's both reliable and high performing has never been greater.

The newly announced network access technology is part of Lucent's portfolio of access solutions, including both wired and wireless systems that are high-performance, cost-competitive and able to migrate to optical systems. "Lucent's access systems capitalize on Bell Labs innovations in chip technology, digital signal processing and digital communications," said Rich Gitlin, communication science research vice president, Bell Labs Communication Science Division.

The newly announced DSL technology, called *WildWire*, reasserts Lucent's leadership in network access, where Lucent patents have accounted for the key gains in DSL, modem and access performance over the past 20 years. Lucent's DSL technology will enhance access systems not only to meet emerging industry standards, but also to trump them with capabilities to optimize network performance overall.

## Access market huge and growing
That's what the near future will bring. Today, with growth projected at a whopping 30 percent per year, network access is already one of Lucent's hottest markets. To

Janet Davidson believes nobody knows access like Lucent does.

# As existing

## and new networks are built
## the world, there's a huge
## for a supplier that knows

move customers' traffic into and out of networks, service providers in 1996 installed nearly $5 billion worth of equipment in countries Lucent targets around the world. By 2001, that annual investment may rise to $13 billion.

"As existing networks expand and new networks are built around the world, there's a huge market for a supplier that knows network access," said Davidson. "Nobody knows access technologies and understands service provider needs like Lucent."

For a large percentage of network users everywhere, access requires equipment that intervenes between the home or office and the network. A third or more of access lines in the United States are served by equipment such as digital loop carriers (DLCs), first deployed in the United States in the early 1960s. Located away from central switching offices, DLCs extend service to remote locations and concentrate traffic from residential areas. Lucent has supplied the lion's share of DLCs, delivering 35 million access lines through digital loop carriers to date.

More than 600 million new access lines will be needed in 13 countries where Lucent sees a viable market for network access equipment. New lines installed worldwide between 1996 and 2001 will outnumber today's total access lines in the United States by a wide margin. Countries including China, India, Japan and Mexico have markets where Lucent access equipment fits as easily as a diskette in an a:\drive.

Opportunities for full suppliers of access solutions include:

• Enabling service providers to reach customers.

• Delivering broader bandwidth so that data access, including Internet access, is fast and reliable.

• Installing wireless access to rapidly extend communications.

Fundamental changes in communications are sweeping the globe, rendering the network access market as complex as it is rich in growth potential. Among the changes:

• **Deregulation and privatization** are creating new opportunities for competitors. The right network access technology gives competitors an edge by reducing the capital cost of reaching the customer.

• **Emerging global standards** are opening up competition in access technology. In the past, proprietary interfaces between switching and access equipment tended to mean that switching and access came from the same supplier. Today, service providers in Asia and elsewhere are telling their suppliers to adopt a global standard, called V5. Where non-Lucent switch vendors prevail,

Lucent access equipment will benefit from the leveled playing field.

• **Demand for high-speed data** services is changing the access picture — but at a pace that's hard to predict. People want second and third lines for fax and data service, and they want connections for videoconferencing and high-quality images. "Slow and fitful Internet connections are a big pull for upgrading access," said Davidson. Today, DSL and other access technologies for data services and even full-motion video are ready and waiting.

• **Increased teledensity** is a policy priority in many countries. Fixed wireless local loops enable a service provider to build a wireless network in five months from contract to commercial service, and to hook up customers in as little as 20 minutes. Calling features and data services are much the same as in wired networks.

So what is Lucent doing to meet the hot prospects in today's network access market? "We're enhancing our customers' present Lucent digital loop carriers," said Bob Holder, group president, Switching and Access Systems Group. "And we're rolling out new access technologies that maximize the value of fiber and copper in the access link to the customer. Given our offers in both wired and wireless digital access solutions, Lucent has more to offer in access than anyone."

Holder added that all of Lucent's access technology, both wired and wireless, gains a big edge in the market from its partnership with the 5ESS-2000 switching system. Today, the 5ESS switch is an AnyMedia system — a flexible platform that supports all forms of



Customers at SuperComm '97 in New Orleans flocked to see Lucent's latest network access offers.

# networks expand
## around
## <span style="color:red">market</span>
## network access.

Rich Gitlin and his Bell Labs colleagues are responsible for developing key technologies and systems that make possible today's high-speed modems.

ROGER TULLY

# Lucent's wireless platform has proved its flexibility for both fixed and mobile wireless access.

At the Oklahoma City Works, Sherry Bowen and Kevin Nichols inspect printed circuit boards before the boards are packed and shipped to customers.

communications, wired or wireless, data or voice. The newly announced DSL technology will plug into Lucent's switches and access systems to let them communicate with *WildWire*-equipped homes and offices.

### Digital Loop Carrier Solutions

Mainstays in loop access include Lucent's *SLC*-2000 and *SLC*-Series 5 DLC systems. Such service providers as Bell Atlantic and SBC don't want these systems to grow old just when customers want new capability. To the contrary — and Lucent is at their sides with solutions — the *SLC*-Series 5 and *SLC*-2000 systems now handle high-speed data with Lucent circuit packs that simply plug in.

Where *5ESS* central offices go in global markets, Lucent's *SLC* platform follows. In the Philippines and Indonesia, a variant on the *SLC* line, Lucent's *SLC* 240 access system, enables towns and villages to gain phone service from a remote central office.

*SLC*-2000 is a hot seller among competitive local exchange carriers such as ICG Telecom Group. ICG is

using advanced *SLC*-2000, along with other Lucent products, to provide fiber connections to sites near its business customers in Cincinnati; Denver; Sacramento, Calif.; and San Diego. According to Phil Haka, an ICG transmission network engineer, Lucent provided a complete solution. "You just take it out of the box, mount it, wire it, and it plays," said Haka. "We're able to offer dial tone very quickly and easily."

### Broadband in the Loop

Some service providers are using a high-powered technique called asymmetric digital subscriber line (ADSL) to pump high-speed data to users' premises. Lucent offers ADSL in conjunction with the *SLC*-2000 and Series 5 systems. The big benefit: With a simple plug-in, *SLC* can serve an individual customer with high-speed data. A service provider doesn't need to blanket a service area with equipment before knowing how many customers in an access area will use it.

ADSL technology delivers eight megabits per second of data from

the network to the user. That's a hundred times faster than conventional access. The "asymmetry" is that the data rate from the user into the network is one megabit per second, not eight. But most users don't care, they just want snappy downloads from the Internet.

### AnyMedia Access System FAST

Reliable, efficient industry-standard asynchronous transport mode (ATM) technology is another way to deliver voice, high-speed data and video, and Lucent offers access solutions to carry ATM services to the neighborhood as well. In September 1997, Lucent announced the *AnyMedia* Access System FAST. FAST means "flexible access services terminal," and it's the last loop carrier terminal that a service provider will ever need to deploy.

"As our customers face uncertainty about types of services users will demand over the next 10 years," said Davidson, "they are looking for an access platform that will deliver low-cost plain old telephone services today while being able to carry demanding data and other broadband services now or later." The FAST also handles conventional copper loops, fiber and, in the future, wireless access. The system can grow gracefully with a network and be moved closer to the customer as a service provider extends fiber.

### Fixed Wireless Local Loop

Many Lucent customers are looking not to copper loops but to the airwaves for access to their users. Around the world, the fixed wireless local loop (FWLL) market is expected to grow from 140,000 subscribers in 1997 to more than 60 million by 2001. FWLL comes in two flavors, and Lucent is the supplier carrying both. And both

are based on the highest-capacity, most advanced wireless communication protocol, CDMA (code division multiple access).

One flavor, called wireline displacement, is embodied in Lucent's IS-95 CDMA Fixed Wireless Application (CDMA FWA). As an access offer, CDMA FWA takes advantage of the same open standards-based wireless infrastructure that can serve mobile customers. With it, users enjoy the same services, such as data, that they demand today from a wired connection.

CDMA FWA is the choice of Centennial Cellular Corp. in Puerto Rico. Centennial already operates with Lucent's CDMA mobile technology. Now it's launching CDMA FWA to extend teledensity in unserved areas, including Puerto Rico's adjacent islands. Customers given trial service last summer were so happy they didn't want to hand back their telephones at trial's end. "Lucent's wireless platform has proved its flexibility for both fixed and mobile wireless access," said Centennial's president, Rudy Graf.

Lucent's *AirLoop* Wireless Local Loop is the other flavor, called wireline equivalent. It's optimized for networks that are strictly fixed-loop, and it lets customers use modems, faxes, multiple extensions — you name it; if a wire can provide it, an *AirLoop* connection can, too. So wireless access creates no second-class subscribers. *AirLoop* equipment is now in commercial deployment by service providers who are keeping their plans quiet. Their services will spring up fast because there's no need to string wire or fiber.

In short, service providers using Lucent access technology around the world are extending their familiarity — or getting acquainted — with the Lucent heritage of reliability. Be it a mile, kilometer or stone's throw to the customer's premises, they're spanning the gap at the network's edge with wired or wireless technology from the world's leader in access equipment. O

— *Blanchard Hiatt*

## What is Network Access?

**Access is the communications industry term for getting a service — voice, video or data — in and out of the network.** The access network is the outermost layer of the network — the skin of a body whose muscle is transport equipment, such as SONET systems, and whose skeleton is switching equipment, such as *5ESS* switch-equipped central offices.

Access points are the nerve endings within this skin: telephones (wired or wireless), modem-equipped computers or fax machines, or data equipment such as computers or digital video appliances.

Access equipment bundles the "nerves" in economical channels between access point and switching node. It includes, classically, the digital loop carrier (DLC), which is a frame of circuit packs tucked in a closet or in a cabinet in the neighborhood. Today, access equipment addresses the challenge of making data services as elegant and easy as voice calls.

## Who in Lucent Makes Network Access?

**Oklahoma City is Lucent's center of network access manufacturing, with production of *SLC* 2000, *SLC* 240, and *SLC*-Series 5 DLC.**

To serve the access market around the world, Lucent makes *SLC* 240 systems in Ghandhinagar in Gujarat, India, and in the Shanghai, China, facility on Yi Shan Road.

Lucent's site of CDMA technology at New Jersey's Mount Olive Product Realization Center is the global center of fixed wireless local loop systems. *AirLoop* systems are made in Columbus, Ohio.

Microelectronics makes access components at its locations in Allentown, Pa., Orlando, Fla.; Madrid, Spain; Bangkok Thailand; and Singapore.

Development groups supporting access systems are located throughout Bell Labs, notably in Whippany, N.J.

Product marketing and management is located throughout the United States and the Netherlands.

## Who Competes in Network Access?

**The competition in access includes Lucent's traditional rivals, as well as fast and aggressive newcomers** poised to pounce on shifts in the market such as the advent today of DSL, or digital subscriber line standard technology. Traditional switch and access vendors include Nortel, Alcatel, Fujitsu, Siemens, Ericsson and DSC Communications. Non-traditional loop access competitors hungry for a big break are firms like AFC Industries of California and Rockwell. Said Bob Holder, group president, Switching and Access Systems Group, "With new opportunities springing up, Lucent's challenge is to be ready with the marketing and the technology to solve customer needs."

# Focused
# And Ready
# For Growth

*It's a tough market out there, but Lucent intends to play like a winner.*

**Our new structure better targets the fastest-growing markets, intensifies our focus on customers and speeds global expansion. Here's a profile of Lucent's hot new businesses, their key offers, customers, competitors and business challenges.**

## Business Communications Systems Group

### Business Challenge
"It's critical that BCS extends and improves its advantage in customer service, while investing in new product development and market expansion opportunities," said Bill O'Shea, group president.

### Business Profile
BCS is the U.S. market leader in business communications systems, voice processing and business wireless systems; a U.S. and European leader in call center systems; and the global leader in structured cabling systems and voice messaging products and services. The $3 billion call center industry is expanding by 30 percent a year, while business wireless is expected to grow to about $2 billion by the year 2000.

Lucent call center specialist Erica Shim (left) works with SITEL customers Seema Nasiruddin and Andrew Sidwell at SITEL'S Singapore call center.

### Number of People
About 29,000 (as of late 1997)

### Key Products/Offers
BUSINESS SOLUTIONS — *Definity* Enterprise Communications Server, *Merlin Legend* communications system, *Partner* communications system

WIRELESS — *FreeWorks* family of offers: *Definity* wireless business system, *Transtalk* wireless phone, Forum Personal Communications Manager

CUSTOMER SERVICE — Traditional installation and repair

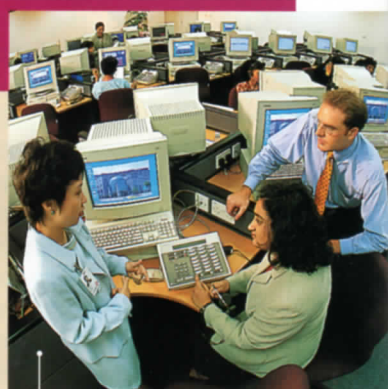MESSAGING — Products offered through the Octel Messaging Division include Octel *Overture, Intuity Audix* Multimedia Messaging System, *Partner Mail VS* Messaging System, *Intuity* Interchange, *Octel Unified Messenger, Sierra, OcteLink*

### Key Customers
Small businesses, entrepreneurial firms, Fortune 500 companies, U.S. government agencies, universities

### Key Competitors
Ericsson, NEC, Nortel, Rockwell, Siemens

# Intellectual Property Division



The $1 millionth dollar awarded in Lucent's Patent Award Program went to Stamatios Kartalopoulus (center). With him are Mike Greene (right), and Bob Martin, Lucent technology officer.

### Business Challenge
"Lucent will continue to use its intellectual property to provide leading-edge technology in its products, establish standards and create strategic alliances. In addition, we will sharpen our focus on obtaining fair value for use of our patents by others," said Mike Greene, acting president.

### Number of People
About 300 (as of late 1997)

### Business Profile
Intellectual property is the legally enforceable assets resulting from innovative activity. The Intellectual Property Division creates, maintains, licenses and enforces intellectual property rights not only to protect the assets, but also to enhance profitability through licensing.

### Key Products/Offers
Patents, copyrights, trademarks, trade secrets, technology and know-how

### Key Customers
Non-Lucent Technologies licensees

# New Ventures Group

### Business Challenge
"New Ventures will create high-growth opportunities by leveraging Bell Labs technology and speeding good ideas to the marketplace," said Tom Uhlman, president.

### Business Profile
This group gives promising technologies support and independence to become stand-alone entities. The ventures include external ones — like Veridicom — that are completely independent companies, and internal ones — *elemedia* and *Inferno*, for example — run as independent companies within the corporate structure.



New venture Veridicom develops fingerprint acquisition chips for use in computer and data network security applications.

### Number of People
About 350 (as of late 1997, including venture personnel)
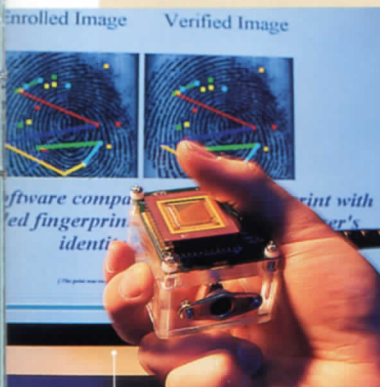
### Key Products
Software, semiconductors, data communications products, fiber optics

### Key Customers
Each venture targets it respective customer segments. For example: *Inferno* — major equipment manufacturers; *elemedia* — Internet software and hardware companies; Veridicom — security firms, equipment manufacturers and systems integrators.

# Microelectronics Group

### Business Challenge
"We are committed to outpacing the industry growth rate by establishing leadership in the fastest-growing segments of our industry," said John Dickson, group president. "That means ensuring we are the company our customers most admire, desire and require."

### Number of People
About 12,000 (as of late 1997)

### Business Profile
The Microelectronics Group is a world leader in design, development and manufacture of integrated circuits and optoelectronic components. In 1996, global sales of integrated circuits and optoelectronic components were $132 billion, expected to grow to $232 billion by the year 2000.



Microchips require a dust-free environment like the one found in Microelectronics' Singapore plant, where Ying Xue Lan (left) and Le Fo Yong work as inspectors.

### Key Products/Offers
INTEGRATED CIRCUITS — Digital signal processors, wireless radio frequency devices, application-specific integrated circuits, transmitters, receivers, transceivers, controllers and interface devices and Field Programmable Gate Arrays

OPTOELECTRONICS — High-speed receivers and transmitters, photo detectors, laser modules and other components

### Key Customers
FOR INTEGRATED CIRCUITS — Compaq, 3Com, Lucent, Motorola, Quantum, Seagate, Sun Microsystems

FOR OPTOELECTRONICS — Lucent, Siemens, Tyco Submarine Systems

### Key Competitors
FOR INTEGRATED CIRCUITS — AMD, LSI Logic, SGS-Thomson, Texas Instruments

FOR OPTOELECTRONICS — Fujitsu, Hewlett Packard, Nortel

# Global Service Provider Business

## Business Challenge

"Staying focused on our customers is the greatest challenge we have," said Carly Fiorina, group president. "When we do it well, we excel. When we don't, we tend to fall short. There could not be a better time for us to be in this global industry, serving the set of customers that we have the privilege to serve. Our success demands nothing less than an absolute obsession with serving customers. Competitors are waiting and watching to see if we falter. Customers have the right to expect the very best from us and their expectations of us rise every day."

## Number of People

About 21,000 (as of late 1997)

## Business Profile

This business will include marketing and sales, service and support, and program management for the network operators and service providers around the world, including local, long-distance, Internet and wireless service providers and global commercial markets. This unit unifies Lucent's customer interface to service provider customers around the world. It has responsibility for commercial relationships with Lucent's largest customer segment.

## Key Products/Offers

Global Service Provider offers products from Communications Software Group, Data Networking Systems Group, Network Products Group, Optical Networking Group, Switching and Access Systems Group and Wireless Networks Group.

## Key Customers

Regional Bell operating companies, wireless service providers, long-distance companies, competitive local exchange companies, PTTs and independent telephone companies

## Key Competitors

Alcatel, Bellcore, Ciena, Cisco, Corning, Ericsson, Nortel, Siemens

# Optical Networking Group

## Business Challenge

"As service providers turn to the almost unlimited speed and bandwidth offered by new optical networking technologies," said Gerry Butters, group president, "our challenge is to marshal all our resources into a virtual 'Photon Valley' that will put Lucent into a permanent leadership position in optical networking."

## Number of People

About 9,000 (as of late 1997)

## Business Profile

The optical networking market is experiencing vibrant growth of 14 percent a year. We introduced dense wavelength division multiplexing (DWDM) to the market in 1995 and are the DWDM leader with more than 1,000 systems deployed. We offered the industry's first all-optical cross-connect in

*Ginny Nichols works on some of the world's most advanced optical networking systems in Holmdel, N.J.*

May 1997 and have more than 1,600 optical patents. We also were first to demonstrate an experimental ultra wideband optical amplifier capable of carrying 100 wavelengths of light. Optical Networking provides all manufacturing, development, product marketing and management for SONET (Synchronous Optical Networking)/SDH (Synchronous Digital Hierarchy) and DWDM offers. The group will align closely with Bell Labs, Data Networking Systems and Network Products Group to leverage offers when appropriate. Sales will be managed by the Global Service Provider Business.

## Key Products/Offers

Optical Line System (OLS) in eight- and 16-wavelength models, Metropolitan Optical Line Transmission System, DACS-2000, DDM-2000 and ISM-2000 multiplexers, FT-2000 OC-48 and SLM-2000 lightwave systems

## Key Customers

AT&T, British Telecom, Dacom (Korea), Ministry of Posts and Telecommunications (China), Teleport, Vebacom

## Key Competitors

Alcatel, Cambrian Systems, Ciena, Fujitsu, Nortel, Pirelli, Siemens, Tellabs

## Switching and Access Systems Group

**Business Challenge**

"By focusing on international growth, speed to market, and on new customers, like competitive local exchange carriers and second operators, we intend to become a worldwide leader in the switching business," said Bob Holder, group president. "In access, we will focus on our *AnyMedia* access system and on digital subscriber line."

**Number of People**

About 13,000 (as of late 1997)

**Business Profile**

Lucent has deployed more switches in the United States than any other supplier. The global market for switching and access is expected to continue growing at a rate of 30 percent a year as customers rely on high-speed access as a competitive differentiator. This business includes all manufacturing, development, product marketing and management for switching and access products and software for the carrier market. The group's sales will be managed by the Global Service Provider Business.

**Key Products/Offers**

SWITCHING SYSTEMS — *5ESS*-2000 family, including the Compact Digital Exchange (CDX), Very Compact Digital Exchange (VCDX) and associated software that makes up the *AnyMedia* Software Release 1998; *4ESS*/voice and signaling products for long-distance service in the United States

ACCESS SYSTEMS — *SLC*-2000 and *SLC* Series 5 digital loop carriers to support everything from plain old telephone to wideband services (*SLC* also has asymetrical digital subscriber line capability via our partnership with Westell); *AnyMedia* Access System; Switched Digital Broadband Access System (via joint development with Broadband Technologies)

**Key Customers**

FOR SWITCHING SYSTEMS — The flagship *5ESS* is installed in 52 countries. Customers include global service providers, leading public network providers, competitive local exchange carriers and interexchange carriers, independent telephone companies, wireless service providers and cable TV companies.

FOR ACCESS SYSTEMS — Hutchison, regional Bell operating companies, SBC

**Key Competitors**

FOR SWITCHING SYSTEMS — Alcatel, Ericsson, Nortel, Siemens

FOR ACCESS SYSTEMS — ADC, DSC, Pairgain, PulseCom
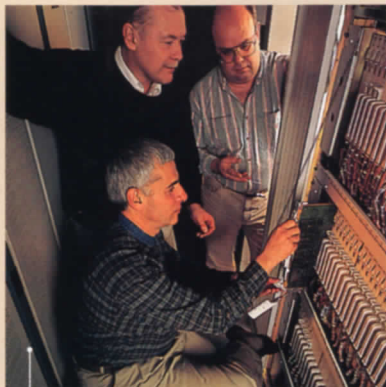


*Vernon Scacci (seated), Bill Francis (left) and Mike Wempe work on an Access Interface Unit, which speeds voice and Internet traffic through the central office.*

## Wireless Networks Group

**Business Challenge**

"Our focus is on growing globally by deploying product experts locally to streamline the sales process," said Jim Brewington, group president.

**Number of People**

About 11,000 (as of late 1997)

**Business Profile**

The wireless market is growing globally at a rate of more than 20 percent a year, a trend that's expected to continue well into the next decade.

Lucent is a global leader in wireless networks that employ the major international standards — Advanced Mobile Phone Service (AMPS), code division multiple access (CDMA), Global System for Mobile Communications (GSM) and time division multiple access (TDMA). This business group provides all manufacturing, development, product marketing and product management for wireless products, software and support for the service provider market. Its sales will be managed by the Global Service Provider Business.

**Key Products/Offers**

Wireless network infrastructure (base stations and mobile switching centers) that adheres to major global standards, specifically GSM, CDMA and TDMA. Product line also includes *AirLoop* Wireless Local Loop and *WaveLAN* family of wireless local area networking products.



**Key Customers**

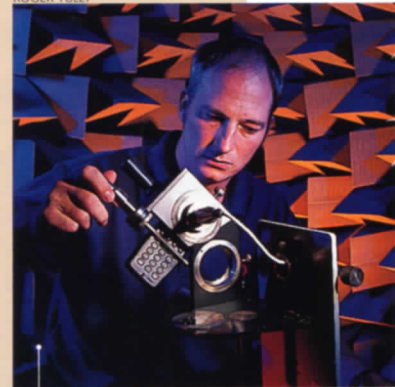AT&T Wireless Services, AirTouch, Ameritech, Bell Atlantic Mobile, CTI Móvil (Argentina), Hansol PCS (Korea), PrimeCo Personal Communications, Shinsegi Telecomm (Korea), Sprint PCS, T-Mobil (Germany) and U S WEST

**Key Competitors**

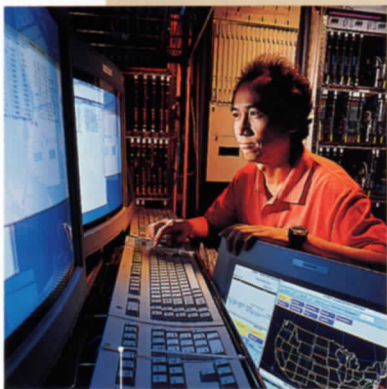Ericsson, Hughes, Motorola, Nokia, Nortel

*Steve Walker tests a digital cordless handset in a special acoustic chamber at Bell Labs Wireless Center of Excellence in Winchester, England.*

## Bell Laboratories

### Business Challenge
"As Lucent's innovation engine, Bell Labs must continue to build on its qualities of technical excellence and innovation, making sure that Lucent's businesses can bring critical communications technologies to market quickly," said Dan Stanzione, president. "Bell Labs scientists and engineers daily are creating advances and breakthroughs in high-potential technologies like semiconductors, optical communications, software, wireless and networking."

### Number of People
About 24,000 (as of late 1997, including central Bell Labs and development labs)



*Kai Eng tests prototype ATM switches that can operate at terabit speeds.*

### Business Profile
The global Bell Labs R&D community supports every Lucent business group. Averaging three patents per business day, Bell Labs is the center for the company's creative efforts, bringing innovations and breakthrough technologies to all parts of the business. More than any other single R&D institution, Bell Labs has helped weave the technological fabric of modern society and is the birthplace of the transistor, laser, solar cell, cellular mobile radio, communications satellite and more.

### Key Research Areas
Leading-edge communications technologies, like photonics, digital signal processing, software, networking, wireless and semiconductors; applied and longer-term research vital to the company's future; Centers of Excellence around the world supporting the businesses; the integration of technology and standards throughout Lucent.

### Key Customers
Brings innovations to all of Lucent's businesses for their customers.

## Network Products Group

### Business Challenge
"Our challenge is to continue to meet growing worldwide demand for fiber and cable products to focus on faster product delivery," said Bill Spivey, group president.

### Business Profile
This business derives 26 percent of its revenues from outside the United States, and the worldwide market for these products is growing from 10 percent to 30 percent. We introduced the concept of a structured wiring system over unshielded twisted pair cabling. In 1995 we reached a milestone by demonstrating data transmission at 622 megabits per second over copper cabling. This business provides all manufacturing, development, product marketing and management for fiber and cable products and Power Systems products (formerly part of Microelectronics). Its products will be sold through the Global Service Provider Business, Microelectronics Group, Business Communications Systems and indirect channels.

### Number of People
About 13,000 (as of late 1997)

### Key Products
FIBER PRODUCTS — *TrueWave* optical fiber; *SYSTIMAX* Structured Connectivity Solutions (SCS), including *GigaSPEED* SCS; *HomeStar* Wiring Systems; *ExchangeMAX*; apparatus and cabinets

POWER SYSTEMS — GALAXY telecom power system; board-mounted power modules for applications in routers and servers; transformers and inductors for modem and integrated services digital network (ISDN) applications; switching power supplies; battery plant products

### Key Customers
FIBER PRODUCTS — Qwest, WorldCom



*A Lucent technician installs a SYSTIMAX structured cabling solution.*

STRUCTURED WIRING SYSTEMS — Emory University's Grace C. Rollins School of Public Health, Hong Kong Convention and Exhibition Center, Lowry Redevelopment Authority, Sun Microsystems
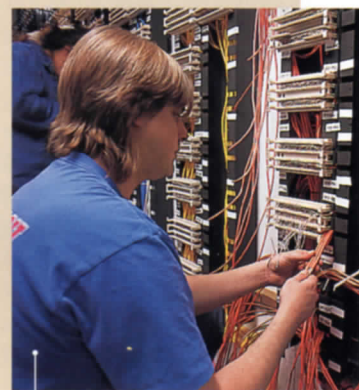
POWER SYSTEMS — Cabletron, Compaq, Jiang Su Provincial Postal and Telecommunications Appliances Corp. (China), Lucent, NEC, Qualcomm

### Key Competitors
FIBER PRODUCTS — Alcatel, Corning

STRUCTURED WIRING SYSTEMS — AMP, Belden

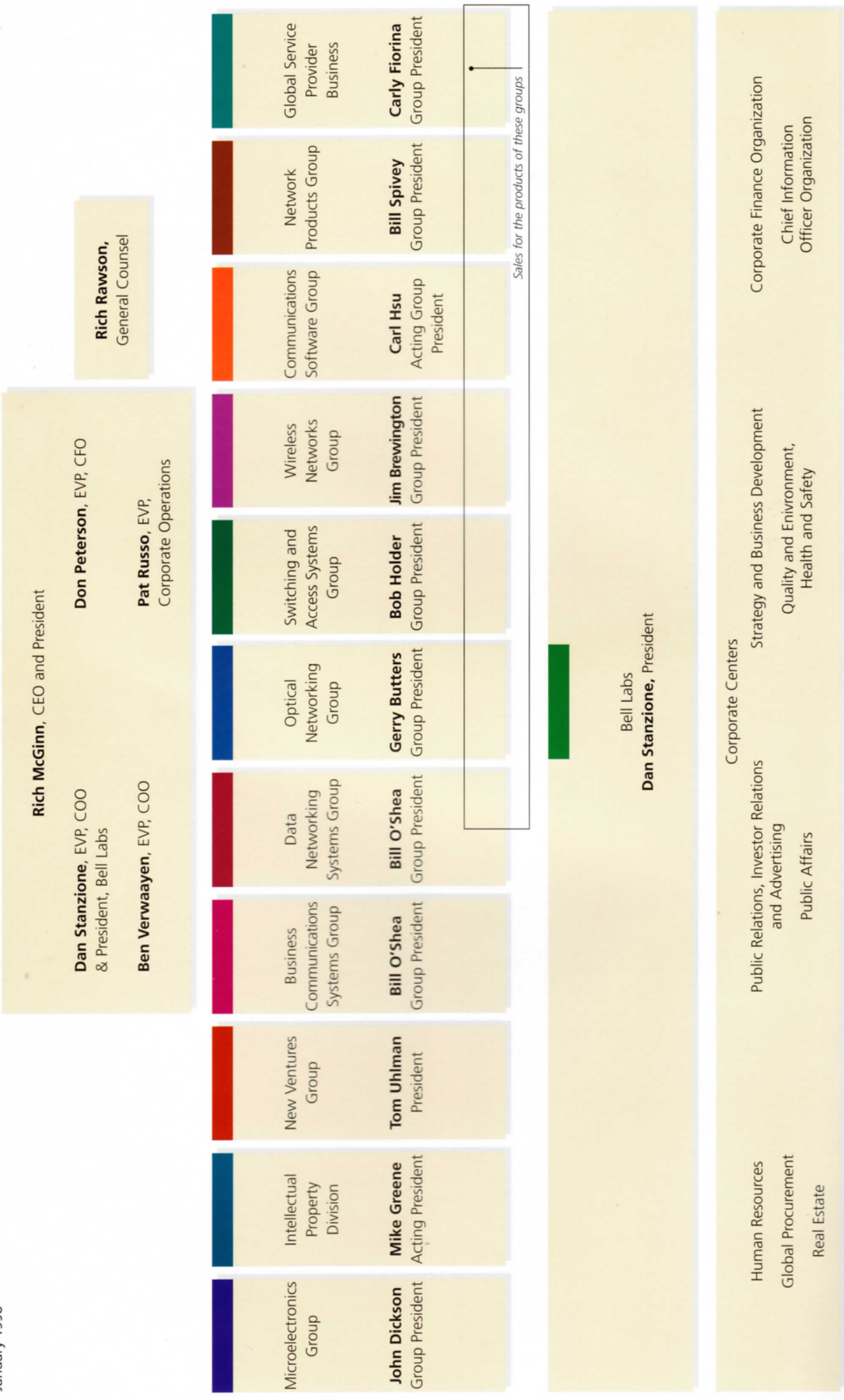POWER SYSTEMS — Astec, Ericsson, Lambda, Lorain, Reltec, Zytec

# Organizing for Growth

**Lucent Technologies**
Bell Labs Innovations

January 1998

**Rich McGinn,** CEO and President

**Dan Stanzione,** EVP, COO
& President, Bell Labs

**Don Peterson,** EVP, CFO

**Ben Verwaayen,** EVP, COO

**Pat Russo,** EVP,
Corporate Operations

**Rich Rawson,**
General Counsel

| Microelectronics Group | Intellectual Property Division | New Ventures Group | Business Communications Systems Group | Data Networking Systems Group | Optical Networking Group | Switching and Access Systems Group | Wireless Networks Group | Communications Software Group | Network Products Group | Global Service Provider Business |
|---|---|---|---|---|---|---|---|---|---|---|
| **John Dickson** Group President | **Mike Greene** Acting President | **Tom Uhlman** President | **Bill O'Shea** Group President | **Bill O'Shea** Group President | **Gerry Butters** Group President | **Bob Holder** Group President | **Jim Brewington** Group President | **Carl Hsu** Acting Group President | **Bill Spivey** Group President | **Carly Fiorina** Group President |

*Sales for the products of these groups*

Bell Labs
**Dan Stanzione,** President

Corporate Centers

Public Relations, Investor Relations
and Advertising

Public Affairs

Strategy and Business Development

Quality and Enivronment,
Health and Safety

Corporate Finance Organization

Chief Information
Officer Organization

Human Resources

Global Procurement

Real Estate

# How I Contribute to
# Global
# Growth


CINDY KARP

**Elizabeth Garcia,**
district manager,
Business Communications
Systems,
Coral Gables, Fla.

"My team helps U.S. multi-nationals set up telecom-munications in Latin America. Our responsibility goes beyond selling equipment. We educate our U.S. customers about the markets they're entering and ensure their first experience in Latin America is a great one."
**Suggestion:** Accept differences and make no assumptions.


SAL DIMARCO

**Narciso Mera,**
strategic marketing manager,
Microelectronics Group,
Allentown, Pa.

"I market DSP solutions to wireless infrastructure equipment providers. Our latest offering, the DSP16210, is a digital signal processor designed to support the major digital wireless standards around the world. Eighty percent of our DSP sales for digital wireless infrastructure are outside the United States, so the market has really forced us to think globally."
**Suggestion:** Face-to-face meetings cultivate relationships.

**Lynn Kim,**
project manager,
Wireless Networks Group,
Seoul, South Korea

"The Korean market for wireless equipment is big and competitive, but CDMA, PCS and AMPS providers are choosing Lucent because we offer better service and a better quality product. We are delivering U.S.-made products, so we have to coordinate closely with people in the United States."
**Suggestion:** Rethink your priorities. The U.S. market is important, but shouldn't always come first.


LISA QUINONES

**June Sulovski,**
division manager,
Intellectual Property
Division,
Liberty Corner, N.J.

"My job is to ensure Lucent captures the value of its intellectual property in global projects. I create intellectual property value by licensing, guarding against unauthorized users, and defending Lucent against claims from others. Leveraging our patent portfolio outside the United States provides an important source of royalties for the company."
**Suggestion:** File patents to protect our inventions on a worldwide basis.


LISA QUINONES

**Ran Yan,**
department head,
Bell Labs,
Swindon, England

"I lead Bell Labs research teams in three countries where we are co-locating researchers and product managers in major markets. For example, our Swindon researchers are developing products for GSM. Being in GSM's home market allows our researchers to receive immediate feedback from product managers and customers, allows customers easy access to our products and is an opportunity for us to showcase Bell Labs to international customers."
**Suggestion:** Be where your customers are.


JUDY GRIESEDIECK

**Ruth Blum,**
practice leader,
Business Communications
Systems,
Burnsville, Minn.

"My group provides business consulting for call centers. We've done several assignments in Asia/Pacific and see a marvelous opportunity there. Companies there are going to leapfrog 20 years of technology in the next five years. We're trying to grow our relationships in the region, starting with consulting instead of simply 'throwing a switch over the wall.'"
**Suggestion:** Make an effort to understand cultural differences, such as religion and the role of women, in the countries where you do business.

**Lucent Technologies**
Bell Labs Innovations