

PROFILE OF NEW TECHNOLOGY

BELL LABS

Stories by Ron Lietzke
Dispatch Business Reporter

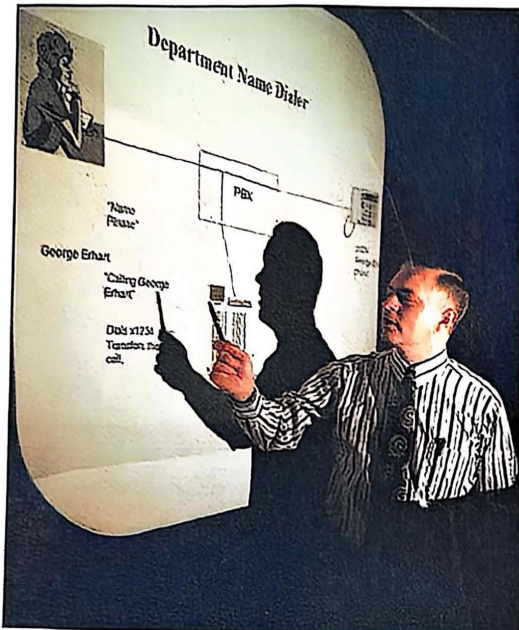
MURRAY HILL, N.J. — Within 20 years, technology will allow you to order a rug, custom made at a shop in the Middle East, on a video telecommunications system that translates languages as you speak.

Also in this future world, you can be contacted anywhere at any time, or have your personal communicator set so your "assistant" — a personified electronic helper in your computer — handle routine business matters while you fish on a lake in Mongolia.

That same computerized assistant will order dinner while you drive home and guide your children through their studies.

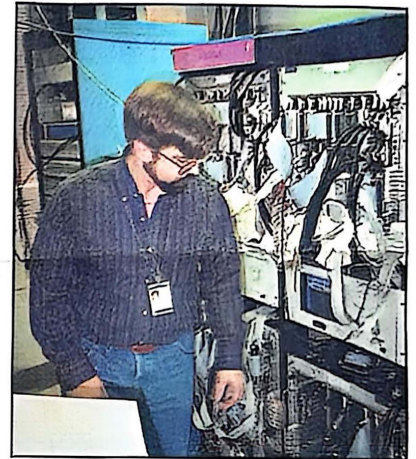
This is how the world might be, according to technology being developed at this AT&T Bell Laboratories site, nestled in the Watchung Mountains near Newark, N.J.

Staffed with 25,000 research-and-development employees, approximately 15,000 of them in New Jersey, American



Mary Circelli/Dispatch

Robert J. Perdue, technical manager of voice processing at AT&T Bell Laboratories in Columbus, shows how people can call one another in an office by simply saying the name.



Ron Lietzke/Dispatch

James S. Lauranchuk, a member of the technical staff at AT&T Bell Laboratories in Murray Hill, N.J., tests components for high-definition television.



AT&T's Worldwide Intelligent Network Control Center in Bedminster, N.J., handles more than 125 million calls on a typical business day.

American Telephone & Telegraph Co.

Telephone & Telegraph Co. will spend \$3.3 billion this year at the laboratories, most of it focused on developing new products and manufacturing techniques, said Robert M. Ford, media relations manager for the laboratories.

Current research — and applications — includes voice processing, developing a fiber-optic cable that is resistant to corrosion, packing more information on computer chips, compressing information so more can be sent through cables and over the airwaves, and developing high-definition television. The list is almost endless.

Ninety percent of the research-and-development effort goes into applying the technology to make AT&T more competitive in a world economy, with the rest devoted to pure research, Ford said.

"This is the wellspring of AT&T's technology," he said, adding that its research-and-development complex is among the largest in the world. "In effect, we are a good part of AT&T's future, and that is why AT&T continues to fund us."

The laboratories have a rich history. They were the birthplace of the transistor, laser, solar cell, digital switching, communications satellites, cellular radio, the artificial larynx, sound motion pictures and stereo recording. AT&T Bell Laboratories has received more than 25,000 patents — averaging one per day — since its founding in 1925.

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In recent years, AT&T has emphasized moving technology more quickly into the marketplace by closely linking research and development with company operations and AT&T's customers.

"There certainly is a more concerted effort to see the fruits of research appear in the marketplace," Ford said. "Everybody that you speak to here seriously wants to have their work used."

Formerly the laboratories' staff was more removed from AT&T operations where technology is applied. But Ford said increasingly they are working much closer with AT&T's business units and customers.

The laboratories' goal is to be "first with new technology," said David Boyce, director of public relations. The entire AT&T Bell Laboratories community operates in eight states and nine foreign countries, primarily developing products to move and manage information, he said.

"We are more aggressively and more quickly coming out with products," he said. Using advanced telecommunications equipment "will change to become much more natural and there will be more voice and handwriting applications."

For example, today's voice-recognition systems can handle about 20 words, but within two years will have vocabularies of 1,000 words, he said. Since people on average use a 5,000-word daily vocabulary, voice automation within a few years will replace human receptionists at rental car firms or theater box offices.

"TicketMaster employs hundreds of people to take ticket orders," he said. "Such a voice-automation system could handle 700 transactions simultaneously."

Boyce emphasizes that the integration of television, computers, telephones, facsimile and other devices will continue at a rapid pace.

Last month AT&T announced a system that combines video telecommunications in desktop personal computers. Work on documents can be done from multiple locations, and video of people at other sites also can appear on the screen, so there is "face-to-face" conversation. Starting

at about \$28,000 for four units, the Personal Video System will be available this fall.

Researchers at Bell Labs back their 20-year prediction with projected increases in the processing power of computer chips and the expanding capacity on fiber-optic transmission systems.

"Capacity on a chip is doubling every 18 months now," Boyce said. "Now we can put 125 million to 130 million components on a silicon chip. We will have 1 to 3 billion by 2000 on a thumbnail-sized chip, and 10 billion by 2005."

The ability to transmit data over fiber-optic cables doubles every year, and compression technology could increase it a thousandfold through a process called multiplexing, he said. The technique uses colors of light to transmit different information simultaneously on the same glass fiber.

The result is a dramatic increase in the transmission capacity of the existing fiber-optic network — without laying another cable.

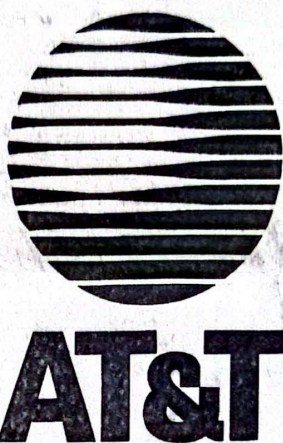
This huge growth in processing and transmission capacity is making electronic devices smaller and less expensive, Boyce said, and opens the door to more powerful voice-based and video applications.

In the lab, researchers at Murray Hill have achieved computer storage densities of 45 billion bits of information per square inch and see a maximum capacity of 200 billion to 500 billion bits before reaching physical limitations.

At 45 billion bits, Eric Betzig, a Murray Hill physicist, said two copies of *War and Peace* could be stored in a space the size of a pinhead. A compact disc the size of a quarter would carry enough music to play for eight days.

Betzig, who led the research, said it likely will take five years to make the technology practical.

Physical limitations ultimately prevent further increases in micro-electronic storage, so scientists at Murray Hill are working in photonics, where light-based processing theoretically can push processing to vast limits, possibly 1 trillion bits of information on a chip, Boyce said.



Network

By Ron Lietzke

Dispatch Business Reporter

BEDMINSTER, N.J. — A major earthquake that struck the area on Oct. 17, 1980, was of a magnitude of 6.5, but also the

"Every call that was generated 10 more times," Lori Glover, a district manager for Telephone & Telegraph Network. "The day after and 48 hours later, the quake area."

The glut of information overwhelmed the system. The center here immediately cut the number of outgoing calls to the network and give them a better chance to connect. "The anxious friends and family area were blocked."

Today the center

NCC to acquire Ohio Bancorp

CLEVELAND — National City Corp. plans to acquire Youngstown-based Ohio Bancorp, which lost \$20 million

Ohio Bancorp would receive a combination of cash and stock equal to \$20 million per share, for a total of \$200 million. The deal, subject to regulatory approval, is expected to be completed in the fourth quarter of this year.

Ohio Bancorp has \$1.5 billion in assets and 50 offices in Ohio. National City has \$2 billion in assets with branches in Ohio, Kentucky and

Ohio Bancorp, part of PNC Savings & Trust Co., is being acquired by PNC Bank of Ohio. The deal is being completed in February.

The new deal, announced today, will retire the 10-year-old Bank name. Ohio Bancorp will become a part of National City, an affiliate bank, Akron-based City Bank, Northeast.

Ohio Bancorp last year reported loan losses from alleged fraud by a neighbor and customer. The bank's drugstore chain Phar-Mor

National City is the successor company of the former First National Bank in Columbus