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NEW INTERNET IS THE STUFF OF DREAMS

Chicago stands at the hub of a fast network that will offer wonders of 3-D virtual reality

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The day is coming when you'll talk to a friend, even shake his hand and offer him a seat--from a city hundreds of miles away.

A new and improved Internet, now under development in labs around the globe, will offer holographic images and go beyond the flat screen in other ways, offering consumers an array of products that can only be imagined right now. You could find yourself in the middle of a virtual reality NASCAR race, for example. Or perhaps you'll become a detective trying to solve a three-dimensional mystery.

In other words, it isn't your father's Internet.

And the gateway through which the network will connect is right here in Chicago.

In a symbolic move that solidifies the city's important role in the Internet's next generation, a group of Japanese computer gurus came to the University of Illinois at Chicago campus Wednesday to sign a ceremonial agreement linking researchers there to the rest of the world through the Chicago hub.

"Our scientists are very pleased to exchange massive amounts of data with American colleagues," said Kunihiro Kato, vice president of Japan's National Institute of Information and Communications Technologies.

Chicago's advanced computer network, dubbed Starlight, is operated by Northwestern University and UIC and has connections to Europe as well as Asia. It runs at speeds more than 10,000 times faster than broadband connections common to home computers and is used by scientists doing advanced research.

And researchers say that consumers will start taking advantage of the greatly higher speeds in various stages within the next seven years or so. Already New York-based phone giant Verizon Communications Inc. is offering new fiber-optic cable to customers' homes, making it easier to download huge amounts of data.

That's only expected to grow, as supercomputing, like Chicago's Starlite network, continues to evolve.

This isn't the first time Illinois researchers have had a hand in developing crucial elements of the Internet. Computer scientists from University of Illinois' Urbana campus developed the first Web browser that enabled ordinary people to make their way through the maze of Web sites.

But today's commercial Internet began more than three decades ago and is based on fairly stale technology, said Joel Mambretti, director of Northwestern's center for advanced Internet research.

"The Internet needs to be refreshed," Mambretti said. "The text- and picture-based Internet people see today isn't the

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Internet we'll soon have. It's undergoing a revolution."

Digital video with resolution four times finer than today's high-definition television is already being used by scientists on advanced networks, Mambretti said. Sending three-dimensional holograms that incorporate haptic technology providing a realistic sense of touch is part of the research scene, he said.

Academic researchers aren't devising games that operate in virtual reality, but their needs are pushing the technology ahead so that such applications will become possible.

A neurologist in the U.S. might need the power of a unique microscope in Japan, said Maxine Brown, associate director of the UIC's electronic visualization lab.

"He can send the specimen to Japan, but today would get the images back a few days later," Brown said. "With these advanced connections, he can see the images as they're being made and can ask for modifications in real time to get the information he needs."

Many universities have access to Internet 2, a high-speed network that runs at speeds up to 10 billion bits per second, said Thomas DeFanti, director of UIC's electronic visualization lab. The newest network, called the national lambda rail, runs at multiples of 10 billion bits per second and is being expanded to universities around the world.

While the high-speed research networks aren't connected to the commercial Internet, their impact will reach consumers in many ways.

"We work directly with industrial partners who commercialize new technology," DeFanti said. "We write papers, present our work at conferences, and our students who participate in this research go to work in the commercial sector and take their ideas along."

The drive to carry bits at greater speeds stems from image transmissions, especially moving images, DeFanti said.

Just where industry may take technology developed by academic researchers is difficult to say, but an early adopter will likely be the movie industry.

"If you could ship the digital bits of a daily movie shoot back to the studio for processing from a remote location, that'd be a lot cheaper than transporting all the technicians and equipment," he said.

Japan, China, Korea and other countries with booming technology sectors are also pushing to upgrade current Internet technologies for their own economic reasons.

When Internet protocols were formulated 30 years ago, the scheme agreed upon held the possibility of 4.5 billion different addresses, which seemed like a lot at the time. But now that every cell phone, BlackBerry, iPod and who knows what else wants an IP address, the supply has been drained.

"China and other Asian countries that manufacture all these devices want the next-generation IP system so they'll have enough addresses," said Northwestern's Mambretti. "They also want protocols that enable them to have addresses in their own languages. There is a big push to globalize protocols that were more Americanized when the Internet was developed."

Mambretti said that American consumers and corporations should adapt to Internet upgrades without much difficulty or economic dislocation.

Nearly two decades ago DeFanti's lab developed the Cave, a virtual reality room providing three-dimensional images. The researchers soon wanted to link Cave environments in different locations together so that people separated by hundreds of miles would share the same virtual experience.

This research along with other initiatives put the University of Illinois campuses in Chicago and Urbana/Champaign and its partners at Northwestern, Argonne National Laboratory and the University of Chicago at the forefront of

networked computer research.

Japanese computer scientists have \$140 million in funding to do research on upgrading the Internet. When they sought to connect to advanced networks in the United States, they picked Chicago rather than a West Coast location because of their existing collaborations with Illinois researchers, said UIC's Brown.

"It would've been less expensive for them to connect to a California hub," she said. "But the scientists insisted on connecting to Chicago's hub where they have collaborators."

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