



Welcome to our new educational technology supplement. The field of new technologies and related issues is one of COL's main areas of focus. While the application of *low-cost, appropriate* technologies has always been the priority in COL's work, the newest of technologies are increasingly and rapidly becoming much more accessible and useful.

These pages will review emerging technologies and issues, as well as resources that are available both in print or on-line through the Internet. Your comments and questions are welcome, as are your suggestions and contributions for specific subject areas.

This issue will focus on bandwidth and access.

Bandwidth and access

"Bandwidth" and its effect on access to the Internet is one of the major issues of concern for users. Bandwidth determines the speed that Internet information flows to your computer's screen. A majority of telecommunications in the world today still relies on copper wire, but copper wire networks do not have the capacity to accommodate masses of computer data that high quality images or video clips of only a few seconds require. Therefore, innovations have taken place in the last number of years to help provide higher speed Internet access to both users in urban and remote areas and also to efficiently use the bandwidth that is already available. The following are innovative solutions on both the telecommunications and computer software fronts.

ASDL

In the Canadian provinces of Saskatchewan, Alberta and British Columbia, high-speed Internet access is either being offered or is in the planning stages using a new technology that provides groundbreaking access speeds over standard telephone lines. The service uses a technology known as asynchronous digital subscriber line (ASDL) that offers connectivity up to 50 times faster than the current standard 28.8 kbps modem service—and allows users to talk on the telephone and access the Internet at the same time without need of a second telephone line. Further information at: <http://www.bctel.com/new/adsl.html> and <http://www.sasktel.com/st45.html>



Image Courtesy of WorldSpace

- Each beam covers 14 million square kilometers
- WorldSpace offices in Accra, Ghana; Nairobi, Kenya; and Johannesburg, South Africa
- ✦ Satellite location

GEO satellites

Communications satellites are quickly becoming an important means of accessing the Internet and several companies are hoping to tap into the global demand for bandwidth. The largest of these is Hughes Communications with its technology called DirectPC, which delivers 200 Kbps to 400 Kbps access speeds. All Hughes satellite systems function in Geostationary Earth Orbit (GEO) where the satellites stay in a window about 22,300 miles above the equator. At that particular altitude, satellites will orbit in sync with the Earth's rotation and remain over the same spot.

GEO's satellites, which deliver a signal to a wide area, are best suited for television broadcast. The WorldSpace initiative plans to launch a satellite in mid-1998 into geostationary orbit. The satellite will accommodate the transmission of digital-quality radio programming with the added benefit of visual information displayed on a small LCD panel on a specially designed digital radio. (<http://www.worldspace.org>)

LEO satellites

Soon the possibilities of Low Earth Orbit (LEO) satellite systems will be implemented. The low orbit makes for quick response time and is better suited for real-time communication. Each satellite beams to a much smaller territory of the Earth, therefore LEO networks must deploy numerous satellites in orbital patterns to ensure global coverage at any given time.

One ambitious project is Teledesic Corporation's, "Internet-in-the-Sky", a proposed network of 288 satellites that will provide two-way broadband, voice, data, videoconferencing and high-speed Internet access.

Teledesic will begin selling its bandwidth to service providers such as phone companies, which will in turn link to their own wired or wireless networks. In theory, Teledesic will deliver enough bandwidth to support millions of simultaneous users. The big question, however, is the cost that the user will be charged for access to this high-speed highway in the sky.

Reference: Byte magazine:
<http://www.byte.com/art/9711/sec5/sec5.htm>

Companies with GEO and LEO initiatives:
Alcatel: http://www.alcatel.com/our_bus/telcom/products/space/whatsnew.htm

Hughes Communications, Inc.:
<http://www.spaceway.com>

Lockheed: <http://www.astrolink.com>

Loral: <http://www.cyberstar.com>

Motorola: <http://www.mot.com>

Teledesic: <http://www.teledesic.com>

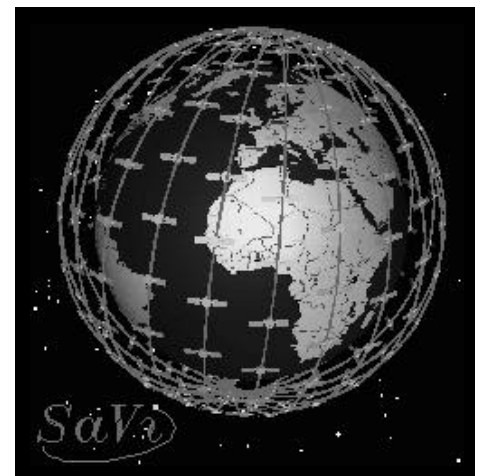


Image courtesy of Teledesic

Using power lines

A Manchester school has become the world's first public user of a technology breakthrough developed by Nortel (Northern Telecom) and Norweb Communications that is capable of delivering Internet and data access for the general public at speeds up to ten times faster than today's fastest home systems.

The technology, which enables electricity companies to deliver Internet and other information services to electricity customers, is attracting significant international commercial interest, with business enquiries from over 150 utility companies, including most of the major power utilities around the world.

The first public installation is at Seymour Park Primary School in Trafford, Greater Manchester, where 12 personal computers have been connected to the Internet by power line. All 12 computers can operate concurrently from just one connection, from which they obtain permanent access to the Internet at speeds of up to 1 megabit per second.

Teachers at the school say that the new technology's high data transfer rate overcomes the practical obstacles to using the Internet as a teaching tool. Headteacher Jenny Dunn, said: "The high-speed connection lets us really take advantage of the educational potential of the Internet. With a normal connection the children could lose interest waiting for pages to download. The new system means information arrives virtually instantaneously, thereby maximising teaching time and keeping children on task. This set up is amazingly flexible in educational terms and gives us the additional medium with which to improve attainment in schools."

Reference: http://www.nortel.com/home/press/1997d/12_11_9797490_UK_School_Norweb.html



Video streaming

The preceding sections dealt with innovations in access and bandwidth on the Internet, but these have direct relevance to cost. Often a user in a developing country, for example, must absorb high communications costs and yet receive little information in return due to the slow speed of connectivity to the Internet provider (such as with a 14.4 Kbps or less modem). Also, the quality of the connection via a lower-grade telephone circuits results in data errors that can cause modem connection speeds to degrade performance even further. Downloading of

video content such as a Quicktime or MPEG clips of 30 seconds in length can not only be torturous for the viewer but in many countries extremely expensive. However, in the last two years "streaming" video across the Internet has become an alternative for those who are ready to sacrifice some image quality for a peace of mind. Educational content that is appropriate for this level of video quality is now being mounted on WWW sites across the Internet.

How does video streaming work? First video data is heavily compressed using a special codec (compression/decompression algorithm) to squeeze as much information as possible into the narrow band. Next, the video files are moved to a server equipped with software using special protocols to "stream" the compressed data (i.e., to send it in a controlled sequential flow of packets) to the client computer that requests the file. Although you must install special software in order to view these files, it is usually available at no charge off the Internet, or included with recent versions of Internet "browsers" such as Netscape or Microsoft's Internet Explorer.

There are several companies that are involved with producing software for video streaming:

RealPlayer (RealVideo and RealAudio) from Progressive Networks: <http://www.real.com>

Vxtreme's Web Theater: <http://www.vxtreme.com>

VDOnet's VDOLive: <http://www.vdolive.com>

Vivo Software's VivoActive Producer: <http://www.vivo.com>

Microsoft NetShow: <http://www.microsoft.com>

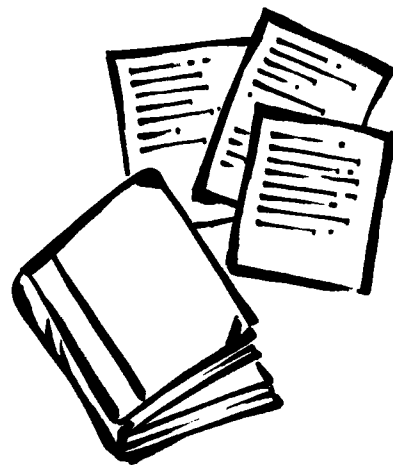
Technology Resources

Books

Cairncross, Frances. **The Death of distance: How the communications revolution will change our lives.** Boston, MA: Harvard Business School Press, 1997. ISBN: 0-87584-806-0 (Hardcover, list: US\$ 24.95) From the Publisher: *This book predicts the ways in which the communications revolution will tilt the balance between large and small, rich and poor, as it transforms many business and government decisions. It is a trendspotter's guide to the twenty-first century.*

Dyson, Esther. **Release 2.0: A Design for living in the digital age.** Broadway Books, 1997. ISBN: 0-76790-011-1 (Hardcover, list: US\$ 25.00) From the Publisher: *Esther Dyson, who has been a leader in the high-tech industry for more than twenty years, explores the impact and implications of cyberspace—its effect on our daily lives, the responsibilities that come with our new powers, and the global issues the Internet creates.*

Howkins, John and Robert Valantin (eds.). **Development and the information age: Four global scenarios for the future of information and communication technology.** Ottawa, ON: IDRC, 1997. ISBN 0-88936-835-X (Pbk., list: Cdn.\$ 15.00) Web: <http://www.idrc.ca/books/835/index.html> From the publisher: *This book offers a glimpse*



into the future of the Information Age. Its brevity and clarity will appeal to all readers interested in development issues and the new information technologies, and will particularly inform policymakers, academics, students, and practitioners in development and information technology worldwide.

Johnson, Steven. **Interface culture: How new technology transforms the way we create and communicate.** San Francisco, CA: Harper, 1997. ISBN: 0-06251-482-2 (Hardcover, list: US\$ 24.00)

Minoli, Daniel. **Distance learning: Technology and applications.** Norwood, MA: Artech House, Inc., 1996. ISBN: 0-89006-739-2 (Hardcover, list: US\$ 69.00) From the publisher: *...Provides a comprehensive analysis of the engineering, business, and regulatory issues affecting this field.*

Porter, Lynnette. **Creating the virtual classroom: Distance learning with the Internet.** New York: John Wiley & Sons, 1997. ISBN: 0-47117-830-6 (Pbk., list: Cdn.\$49.50) From the publisher: *...gets right down to the real issues of the design and management of distance learning programs—giving practical advice on putting together effective courses and programs.*

EdTech News

EdTech News published by the Commonwealth of Learning as a supplement to the *Connections* newsletter.

The Commonwealth of Learning
1285 West Broadway, Suite 600
Vancouver, BC V6H 3X8
Canada

Tel: 604.775.8200
Fax: 604.775.8210
Telex: 04507508 COMLEARN
E-mail: info@col.org
World Wide Web: <http://www.col.org>

EdTech News is compiled by Mr. David Walker (Education Specialist, Educational Technology) and Ms. Sue Parker (Library Technician, Information Resource Centre).

Connections and *EdTech News* are edited by Mr. David Wilson.