

TECHNOTRENDS[®]

Newsletter

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Celebrating
20 years of
Publication



"It Was 20 Years Ago Today"

By Daniel Burrus

This month we are ending our twentieth year of publishing this newsletter, and I can't help but reflect back on the many technology driven changes we have seen over the past two decades. Technology has indeed changed how we live, work and play. Twenty years ago, there were no laptops, no World Wide Web, no broadband connections to your house, no digital cameras, no iPods, no DVD players, no plasma displays, no X-Box video games, and only scholars and researchers used the Internet. In addition, only a very minimal number of people used e-mail and pagers, and even fewer used the very expensive and bulky cell phone. As a way of thanking our loyal readers (many have been with us the entire 20 years), I would like to look back at a few of the articles I pulled from our first issue. Enjoy!

ONE-MEGABIT CHIPS

AT&T Corp. has begun production of the one-megabit computer chip that can store a 100-page book in the area the size of a fingernail. The chip is four times as powerful as today's 256K model. This will make possible a new generation of portable, battery-operated computers with high sophistication. AT&T's new chip will be in full production by early next year.

FLOPPY DISKS PLAY MUSIC

QRS Music Rolls, Inc., of Buffalo, New York, has been making player piano rolls for over 85 years and is now converting 10,000 songs, including live performances, into digital signals on floppy disks to be played back on personal computers.

DEGREE VIA SATELLITE

National Technological University is a new university for advanced degrees in engineering located in Fort Collins, CO. It has no classrooms and no faculty, and does its teaching by satellite.

OFFICE PRODUCT UPDATE

Eastman Kodak Company recently unveiled new electronic equipment for offices. They introduced two new systems: a \$50,000 network for publishing and a \$500,000 imaging system for displaying microfilm records.

MAGNETS DIAGNOSE DISEASE

General Electric has developed a new technique called depth resolved magnetic resonance spectroscopy. Using a magnetic field 30,000 times as strong as the earth's, computers can track the pattern of atomic nuclei of key chemicals in the body without cutting open the patient or inserting any probes. Therefore, a complete analysis of the human heart could be done without any surgical technique.

Times Have Changed!

I hope you enjoyed this look back as much as we did. In 1985, the rumor of the day was that IBM was going to release a new, high-end PC that would have 256K of memory and a 20, or "possibly" a 30 megabyte hard drive and color graphics. Times have definitely changed!

TECHNOLOGY NEWS HIGHLIGHTS

FLYING MOTORCYCLES!

It's a motorcycle! It's a helicopter! It's PALV (otherwise known as a Personal Air and Land Vehicle)! And, the manufacturer claims it could revolutionize transportation, as we know it. Developed by a Dutch inventor, the three-

wheeled, two-seat vehicle can travel at speeds of up to 200 kilometers per hour (120mph) on the road or in the air. Its retractable rotor gives the PALV a distinct advantage over fixed-wing designs, allowing it to be flown from city to city, landed at a helipad, and then driven to its final destination via normal city streets. With a maximum altitude of 1,500 meters (5,000 feet), it stays well below the airspace used by commercial planes. The list price for this futuristic vehicle is expected to be around \$100,000 US, and it's scheduled to take flight as early as next year.

For information: John Bakker, Spark Design Engineering; Havenstraat 53a, 2984 AC Ridderkerk, Netherlands; phone: +31-180-434 804; fax: +31-180-435 798; Web site: www.sparkdesign.nl

LIQUID POWDER DISPLAY NEEDS NO POWER

Bridgestone recently announced their entry into the electronic display market with a new technology that is capable of displaying still images using no power. Tiny black and white polymer particles – only 10 microns in diameter – are sandwiched between glass or plastic substrates. Images are formed electronically using a mechanism similar to conventional LCD panels. Unlike LCDs, however, the new device retains the image, even when the electrical current is turned off, making it ideal for applications like electronic price tags and smart credit cards. The 4.5-inch screen is capable of displaying a wide variety of text and graphic images including manufacturer's contact information, account balances, and identification photos. Initial versions of the new displays will probably be over 1 mm thick and cost about the same as comparable black and white LCDs. But, with some refining, the technology is capable of producing displays that are paper-thin. Typical LCD panels are 6-7 mm thick. The company also plans to introduce color versions in the future.

For information: Bridgestone Americas, Center for Research and Technology, 1655 S. Main Street, Akron, OH 44301; fax: 330-572-5001; Web site: www.bfresearch.com

WEARABLE DISPLAY

A new display that uses no screen is slated for introduction in 2005. Called Scopo, the new device projects an image in front of the user, in thin air, to create the illusion of a 10-inch display. It can be attached to a cell phone, video player, or other portable device, and is designed for people who need to perform multiple tasks simultaneously. Scopo positions the image slightly below the line of sight so as not to interfere with normal vision. At a cost of about \$400, it's priced well below previously available wearable displays.

For information: Mitsubishi Electric, Mitsubishi Denki Building; 2-2-3 Marunouchi, Chiyoda-ku, Tokyo, Japan, 100-8310; phone: +81-3-3218-2111; Web site: www.global.mitsubishielectric.com

"SMART" KNEE USES ARTIFICIAL INTELLIGENCE

In collaboration with MIT, Icelandic researchers have developed the first prosthetic limb to utilize artificial intelligence. The Rheo Knee™ System incorporates a Dynamic Learning Matrix Algorithm™ (DLMA) to "learn" how the user walks, and automatically adjust the knee's swing and stance to enable a more comfortable gait. Coupled with advanced magnetorheological actuator technology, Rheo Knee dramatically reduces drag and improves response time in comparison to hydraulic knee control systems. This patented technology also eliminates fluid leaks and reduces wear and maintenance. The result is better stability and increased confidence for the wearer, especially when walking on uneven surfaces, ramps, and steps. The next step – "hardwiring" the prosthesis directly to the nervous system – may be as close as five years away.

For information: Hilmar Janusson, Vice President of R&D, Ossur, Grjothals 5, 110 Reykjavik, Iceland; phone: +354-515-1300; fax: +354-515-1366; Web site: www.ossur.com

MEMBRANE FUELS DEVELOPMENT OF HYDROGEN-POWERED CARS

A new hydrocarbon membrane may be the ticket to making fuel-cell vehicles a reality rather than just a pipe dream. The membrane is the part of a fuel cell that converts hydrogen and air into electricity and water. The current standards for perfluorinated membranes are not only expensive to produce, but their performance characteristics have fallen short of what will be needed for fuel-cell technology to gain widespread acceptance. On the other hand, the new hydrocarbon membrane is more durable and easier to produce. It can operate over a wider range of temperatures and humidity levels,

and is 10 to 15 percent more powerful than its perfluorinated counterparts. Several major automakers have already begun testing the new design, which could bring us one step closer to low-cost, high-performance, environmentally friendly vehicles.

For information: PolyFuel, 1245 Terra Bella Avenue, Mountain View, CA 94043; phone: 650-429-4700; fax: 650-930-0219; Web site: www.polyfuel.com

MAKING BLIND MICE SEE

Canadian researchers may have developed a way to combat degenerative eye disease, the most common cause of blindness in people over 55. As a first step, retinal stem cells from human organ donors were placed in petri dishes. To the surprise of the researchers, a single cell produced 7,000 to 10,000 retinal cells in only one week. In addition, the cells differentiated into seven different types of cells that are found in the retina. Then, they tried implanting the cells into the eyes of young mice and chicks. Again, the cells grew and differentiated, but they also became integrated into the animals' retinas and responded appropriately to light signals. The next step will be to implant the human stem cells into eyes of mice that have been bred blind (from retinal degeneration) to see if they are capable of actually restoring sight. The researchers will also be monitoring the stem cell activity to be sure that the new cells do not begin to grow uncontrollably, like a cancerous tumor. It may take as long as a decade before the technique is ready for human trials.

For information: Brenda Coles, University of Toronto, Dept. of Medical Genetics and Microbiology; Room 4285 Medical Sciences Bldg., 1 King's College Circle, Toronto, Ontario M5S 1A8, Canada; phone: 416-978-4539; fax: 416-978-6885; email: brenda.coles@utoronto.ca

BREAKTHROUGH FOR BROKEN BONES

The development of "scaffold" materials to promote tissue and bone regeneration has been under investigation for some time. Several attempts at producing artificial bone have yielded promising results, although the materials themselves are often brittle and don't adhere well to the real bone. Now, a Japanese research team has created a new material that addresses some of these issues. It is composed of collagen and hydroxyapatite (a component of bone); however, when immersed in saline, it becomes so soft you can squash it with your finger. It can be easily cut using a scissors to the size and shape that will fit into the break. New bone cells gradually grow into the spongy material to mend the fracture. The results are faster healing time and a stronger bond. The product has been tested on animals and will likely be ready for human application in 2006.

For information: Junzo Tanaka, National Institute for Materials Science, Biomaterials Center, Tsukuba, Japan; email: biomaterials@nims.go.jp; Web site: www.nims.go.jp/bmc

MOVE OVER ASIMO...

Japanese engineers unveiled a new prototype bi-ped robot that could someday run rings around the now familiar Asimo. The HRP-2 Promet is slightly larger at 5 feet tall and 127 pounds, but that's not what makes this humanoid unique. In a recent demonstration, the robot not only walked, talked and balanced on one foot, but it actually lowered itself to the ground in a face-down position and then stood back up! The HRP-2 is also capable of crossing one leg in front of the other to navigate across a plank, walking on uneven surfaces, lifting up to 20 pounds, and helping a human carry a large object. Three built-in cameras allow the robot to see, but its actions are controlled by a wireless remote. The Humanoid Robotics Program intends to use HRP-2 as a research tool in experiments aimed at further developing robotics technology.

For information: Kawada Industries, Inc., Global Business Department, 1-3-11, Takinogawa, Kita-ku, Tokyo, Japan, 114-8562; phone: +81-3-3915-4617; fax: +81-3-3915-4677; Web site: www.kawada.co.jp

MICRO-FLYING ROBOTS

Improving on their own design, Epson recently announced another advancement in miniaturized flying robots – the FR-II. This tiny flier measures only slightly more than three inches in height and weighs less than half an ounce, yet it's packed with features. Powered by its own battery, the FR-II contains two 32-bit microprocessors, an ultrasonic motor, and the

world's smallest gyrosensor. It can be programmed remotely for independent flight via a Bluetooth wireless connection, and even includes an image sensor to capture and transmit aerial pictures. Two LEDs also act as signaling devices. Microbots like the FR-II that can go places humans can't are finding more and more applications in security and rescue work.

For information: Seiko Epson Corporation, Japan; Web site: www.epson.com

BRINGING THE INTERNET TO THE MASSES

In an effort to bring Internet access to 50 percent of the world's population by 2015 – an initiative that's been dubbed "50x15" – engineers at Advanced Micro Devices are developing the Personal Internet Communicator (PIC). The affordable device is made up of low-cost, high-quality components and includes a core set of software programs to enable basic Internet communication, including email, Web browsing, and download capability.

About the size of a hardcover book, the consumer-friendly PIC sports a 15-inch screen, USB keyboard, and mouse. The highly integrated, non-user-upgradeable platform makes for a very reliable and robust design. And with a list price of \$249, it's aimed at bringing technology to first-time users in emerging markets, such as India, China and Mexico. Currently, it is estimated that only 10 percent of the world's population has access to the Internet. With population figures expected to top 7 billion by 2015, devices like PIC have the potential to revolutionize global communications and educational opportunities.

For information: Advanced Micro Devices, One AMD Place, P. O. Box 3453, Sunnyvale, CA 95070; phone: 408-749-4000; Web site: www.amd.com

ONE FISH...TWO FISH...

A joint investigation between Fisheries and Oceans Canada and the U.S. National Marine Fisheries Service has led to the creation of a new technique for more accurately determining salmon populations in Alaska's rivers. Using existing acoustic sonar equipment, the scientists studied the echoes of four different frequency waves that were fired simultaneously at about 40 chinook and sockeye salmon tethered in place by fishing lines. The results indicated that the shape and orientation of the fish correlated strongly with the pulse width and kurtosis (size of the top half of the pulse as compared to the bottom half). Next, they plan to study how tail strength and swim speed correlate to the echo pulses, and then categorize these variables by species. Their findings may make it easier for conservationists to calculate fishing quotas and prevent over-fishing in all bodies of water.

For information: Tim Mulligan, Fisheries and Oceans Canada, 200 Kent Street, 13th Floor, Station 13228, Ottawa, Ontario, Canada K1A 0E6; phone: 613-993-0999; fax: 613-990-1866; Web site: www.dfo-mpo.gc.ca

CELL PHONE CALLS FROM 30,000 FEET

European airplane manufacturer, Airbus, recently announced that it should be possible to make cell phone calls from their planes by 2006. In a recent test over Toulouse, France, a midair call was completed by routing it through a "picocell" to a satellite, and eventually to a ground-based network. The picocell functions to limit the amount of power emitted by the phone during transmission. This ensures that they won't interfere with the aircraft's navigation and communication systems. The kit will be able to be retrofitted to existing airplanes as well as new ones.

For information: Philippe Chenevier, Airbus, Taxiway, 10 Avenue Guynemer, 31770 Colomiers, France; phone: +33-5-61180601; Web site: www.airbus.com

PEDESTRIAN NAVIGATION SYSTEM

While more and more cars are being equipped with route navigation systems, millions of people who travel on foot (especially in large cities) have not had the benefit of such state-of-the-art technology – until now. A new service for GPS phones that allows pedestrians to access directions en route to their destination was recently unveiled in Tokyo. With a single, short phone call, users can download complete instructions and browse them as they walk. The company reportedly also plans to offer specialized handicap-friendly routes.

For information: Zenrin, 1-1-1 Shimoitozu, Kokurakita-ku, Kitakyushu, Fukuoka 803-8630 Japan; Web site: www.zenrin.com Zenrin USA, Inc., 1814 Ogden Drive, Burlingame, CA 94010; phone: 650-652-1790; fax: 650-652-1791