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Electric lines could deliver Internet service

Thursday, January 06, 2005

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Of The Patriot-News

Delivering broadband Internet service over the electric lines that connect homes and businesses nationwide is both feasible and attractive, two Penn State University engineers say.

Pouyan Amirshahi, a doctoral candidate in electrical engineering, and Dr. Mohsen Kavehrad, a professor of electrical engineering and director of the Center for Information and Communications Technology Research, outlined their research in a paper presented yesterday by Amirshahi at the IEEE Consumer Communications and Networking Conference in Las Vegas.

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It wouldn't just work, the engineers say. The Internet service also would be fast.

"We've run a computer simulation with our new power-line model and found that, under ideal conditions, the maximum achievable bit rate was close to a gigabit per second per kilometer on an overhead, medium-voltage, unshielded U.S. electric power line that has been properly conditioned through impedance matching," Kavehrad said.

Translated, that means Internet connections perhaps 500 times as fast as the usual DSL or cable-modem speeds of 2 to 3 megabits per second could be achieved over power lines, provided that inherent technical problems can be overcome. And they believe that is possible.

One of the biggest problems is caused by junctions and branches in the electrical grid that cause broadband signals to reflect, degrading the transmission. The two engineers believe this problem could be corrected with "impedance matching" to eliminate reflection of energy. They compare it to the military using anti-reflective materials on airplanes so they can't be detected by radar.

Kavehrad said electric companies have known for a century that power lines also can carry information, but until relatively recently there was no such thing as broadband Internet and no reason to address the inherent technological problems.

Today, electric companies see delivery of broadband Internet service over their transmission and distribution grids as a promising source of new revenue.

Kavehrad said broadband over power lines is especially attractive in rural areas that are too sparsely populated to attract providers of cable-modem or DSL service.

The study was supported by a grant from AT&T Corp., according to Penn State.

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