

Wireless advances could mean no more cell towers

February 12 2011, By PETER SVENSSON , AP Technology Writer



In this file photo made Oct. 6, 2009, a mountain-top wireless Internet transmitter tower that serves the Coeur d'Alene Indian reservation and surrounding communities, is shown near Plummer, Idaho. The spread of cell phones has also meant the spread of big cell towers, an unpopular sight in many places. Now, the wireless industry is looking at boosting wireless coverage in a different way: by putting small antennas on lamp-posts, utility poles and buildings. (AP Photo/Ted S. Warren, file)

(AP) -- As cell phones have spread, so have large cell towers - those unsightly stalks of steel topped by transmitters and other electronics that sprouted across the country over the last decade.

Now the wireless industry is planning a future without them, or at least without many more of them. Instead, it's looking at much smaller antennas, some tiny enough to hold in a hand. These could be placed on lampposts, utility poles and buildings - virtually anywhere with electrical

and network connections.

If the technology overcomes some hurdles, it could upend the wireless industry and offer seamless service, with fewer dead spots and faster data speeds.

Some big names in the wireless world are set to demonstrate "small cell" technologies at the Mobile World Congress, the world's largest cell phone trade show, which starts Monday in Barcelona, Spain.

"We see more and more towers that become bigger and bigger, with more and bigger antennas that come to obstruct our view and clutter our landscape and are simply ugly," said Wim Sweldens, president of the wireless division of Alcatel-Lucent, the French-U.S. maker of [telecommunications equipment](#).

"What we have realized is that we, as one of the major mobile equipment vendors, are partially if not mostly to blame for this."

Alcatel-Lucent will be at the show to demonstrate its "lightRadio cube," a cellular [antenna](#) about the size and shape of a Rubik's cube, vastly smaller than the ironing-board-sized antennas that now decorate cell towers. The cube was developed at the famous Bell Labs in New Jersey, birthplace of many other inventions when it was AT&T's research center.

In Alcatel-Lucent's vision, these little cubes could soon begin replacing conventional cell towers. Single cubes or clusters of them could be placed indoors or out and be easily hidden from view. All they need is electrical power and an optical fiber connecting them to the phone company's network.

The cube, Sweldens said, can make the notion of a conventional cell

tower "go away." Alcatel-Lucent will start trials of the cube with carriers in September. The company hopes to make it commercially available next year.

For cell phone companies, the benefits of dividing their networks into smaller "cells," each one served by something like the cube antenna, go far beyond esthetics. Smaller cells mean vastly higher capacity for calls and data traffic.

Instead of having all phones within a mile or two connect to the same cell tower, the traffic could be divided between several smaller cells, so there's less competition for the cell tower's attention.

"If it is what they claim, lightRadio could be a highly disruptive force within the wireless industry," said Dan Hays, who focuses on telecommunications at consulting firm PRTM.

Rasmus Hellberg, director of technical marketing at wireless technology developer Qualcomm Inc., said smaller cells can boost a network's capacity tenfold, far more than can be achieved by other upgrades to wireless technology that are also in the works.

That's sure to draw the interest of phone companies. They've already been deploying older generations of small-cell technology in areas where a lot of people gather, like airports, train stations and sports stadiums, but these are expensive and complicated to install.

In New York City, AT&T Inc. has started creating a network of outdoor Wi-Fi hotspots, starting in Times Square and now spreading through the midtown tourist and shopping districts. Its network has been hammered by an onslaught of data-hungry iPhone users, and this is one way of moving that traffic off the cellular network.

Smaller cells could do the same job, but for all phones, not just Wi-Fi enabled ones like the iPhone. They could also carry calls as well as data.

San Diego-based Qualcomm will be at the Barcelona show with a live demonstration of how "heterogeneous networks" - ones that mix big and small cells, can work. A key issue is minimizing radio interference between the two types of cells. Another hurdle is connecting the smaller cells to the bigger network through optical fiber or other high-capacity connections.

"That's an impediment that we're seeing many operators struggling with right now as data volumes have increased," Hays said.

LM Ericsson AB, the Swedish company that's the largest maker of wireless network equipment in the world, is also introducing a more compact antenna at the show, one it calls "the first stepping stone towards a heterogeneous network."

Small cellular base stations have already penetrated hundreds of thousands of U.S. homes. Phone companies like AT&T, Verizon Wireless and Sprint Nextel Corp. have for several years been selling "femtocells," which are about the size of a Wi-Fi router and connect to the phone company's network through a home broadband connection.

The cells project radio signals that cover a room or two, providing five bars of coverage where there might otherwise be none.

British femtocell maker Ubiquisys Ltd. will be in Barcelona to demonstrate the smallest cell yet. It's the size of a thumb and plugs into a computer's USB drive. According to Ubiquisys, the idea is that overseas travellers will plug it into their Internet-connected laptops to make calls as if they were on their home network, but there are potential problems with interference if used that way.

According to Rupert Baines, marketing head of Picochip Ltd., a more realistic application for a tiny plug-in cell is to make it work with cable boxes or Internet routers, to convert them into femtocells.

A key part of the "small cell" idea is to take femtocells outside the home, into larger buildings and even outdoors.

Picochip, a British company that's the dominant maker of chips for femtocells, will be in Barcelona to talk about its chips for "public-access" femtocells, designed to serve up to 64 phone calls at a time, with a range of more than a mile. They could be used not just to ease wireless congestion in urban areas, but to fill in dead spots on the map, Baines said.

For instance, a single femtocell could provide wireless service to a remote village, as long as there's some way to connect it to the wider network, perhaps via satellite.

Analyst Francis Sideco of research firm iSuppli pointed out a surprising consumer benefit of smaller cells: better battery life in phones.

When a lot of phones talk to the same tower, they all have to "shout" to make themselves heard, using more energy. With a smaller cell, phones can lower their "voices," much like group of people moving from a noisy ballroom to a smaller, quieter room.

"Ultimately, what you end up with is a cleaner signal, with less power," Sideco said.

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Citation: Wireless advances could mean no more cell towers (2011, February 12) retrieved 25

April 2024 from <https://phys.org/news/2011-02-wireless-advances-cell-towers.html>

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